

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.

ILLUSTRATED WITH NUMEROUS ENGRAVINGS,

BY THE MOST DISTINGUISHED ARTISTS.

IN THIRTY-NINE VOLUMES.

VOL. XXXVI.

LONDON:

PRINTED FOR LONGMAN, HURST, REES, ORME, & BROWN, PATERNOSTER-ROW,
F. C. AND J. RIVINGTON, A. STRAHAN, PAYNE AND FOSS, SCATCHERD AND LETTERMAN, J. CUTHELL,
CLARKE AND SONS, LACKINGTON HUGHES HARDING MAJOR AND JONES, J. AND A. ARCH,
CADELL AND DAVIES, S. BAGSTER, J. MAWMAN, JAMES BLACK AND SON, BLACK KINGSBURY
FARRURY AND ALLEN, R. SCHOLEY, J. BOOTH, J. BOOKER, SUTTABY EVANCE AND FOX, BALDWIN
CRADOCK AND JOY, SHERWOOD NEELY AND JONES, R. SAUNDERS, HURST ROBINSON AND CO.,
J. DICKINSON, J. PATERSON, E. WHITESIDE, WILSON AND SONS, AND BRODIE AND DOWDING.

1819.

*A.E.E.
R25
1819
v.36

CYCLOPÆDIA:

OR, A NEW

UNIVERSAL DICTIONARY

OF

ARTS and SCIENCES.

T O L

TOLERIUM, in *Ancient Geography*, a town of Italy, in ancient Latium, and one of those which were taken by Coriolanus, according to Plutarch and Steph. Byz.

TOLESCAPATAM, in *Geography*, a town of Hindoostan, in the Carnatic; 28 miles S.E. of Tanjore.

TOLETUM, **TOLEDO**, in *Ancient Geography*, a town of Hispania Citerior, belonging to the Carpetani, to the S.W. upon the Tagus. According to Silva and other Spanish historians, this city was founded by a considerable body of Jews, who, on their emancipation from captivity, 540 years before the vulgar era, established themselves here, and called the place Toledoth, or Toledath, that is, mother of the people. However this be, Toletum became in process of time a Roman colony. Cæsar made it a place of arms, and Augustus rendered it the principal seat of justice for the provinces of Spain in his department. Many ancient remains, such as an aqueduct, a road, &c. have been discovered at *Toledo*; which see.

TOLETUS, (**DE TOLEDO**.) **FRANCIS**, cardinal, in *Bio-geography*, was born at Corduba in 1532, and studied at Salamanca, where he took the degree of doctor in theology, and was made professor of philosophy. At the age of twenty-seven years, he entered the society of Jesuits, and in the following year he went to Rome, and read lectures on Aristotle and theology. He acquired great popularity as a preacher, inasmuch that, when he was compared with other preachers, it was said "Toledo teaches, Panigarola pleases, and Lupo moves." He was employed by several popes in various legations, and in 1593 Clement VIII. invested him with the purple, being the first Jesuit who obtained that dignity. He died at Rome in 1596, at the age of sixty-four. Toledo was one of those theologians who were employed by Sixtus V. in revising his bible. Of his various works, we shall only mention his "Sum of Cases of Con-

VOL. XXXVI.

T O L

science, or Instructions to Priests, in eight Books," justly chargeable with the pernicious maxims of the fee of Rome concerning the forfeiture of the allegiance of their subjects by excommunicated princes, and with the dangerous doctrines of equivocations and mental reservations. Dupin. Nouv. Dict. Hist.

TOLFA, in *Geography*, a town of the Popedom, in the Patrimonio, in the environs of which are mines of alum and iron, with warm baths, and quarries of alabaster and lapis lazuli, about four miles from the sea-coast; 25 miles N.W. of Rome.

TOLHAR, a town of Hindoostan, in Lahore; 18 miles S. of Rotas.

TOLHUYS, a town of Guelderland, on the Rhine; where the French passed that river in the year 1672, and the Hanoverians in 1758; 6 miles W.S.W. of Emmerick.

TOLI, a town of European Turkey, in Macedonia; 85 miles N.W. of Saloniki.

TOLITZIN, a town of Russia, in the government of Mogilev; 70 miles N. of Mogilev.

TOLKEMIT, a town of Prussia, in the province of Ermeland, on the Frisch Haff; 12 miles N.E. of Elbing. N. lat. 54° 18'. E. long. 19° 33'.

TOLL, **TELONIUM**, a Saxon word, though derived originally from the Latin *tollere*, to take away, or rather the Greek τολος, *tribute, tax*. It has two acceptations, denoting, first, a liberty to buy and sell within the bounds of a manor: and, secondly,

TOLL is also used for a tax or custom paid for passage, or for vending goods in a market, fair, or the like.

This tax originated in the expence attending the construction and preservation of highways, bridges, and canals: and it is evidently just that a traveller, and especially a merchant, who derives advantage from a bridge, a canal, or a

B

causeway,

444077

caufeway, in his own paffage, and in more commodioufly conveying his merchandife, fhould contribute to the expence of thefe ufeful eftablifhments, by a moderate contribution; and if the ftate thinks proper to exempt the citizens from paying it, it is under no obligation to gratify ftangers in this particular. But a law fo juft in its origin, frequently degenerates into a great abufe. There are countries where no care is taken of the highways, and where they nevertheless require confiderable tolls.

Some records make mention of *toll thoro*, or *thorough toll*, which is money paid for paffage in or through fome highways, or over ferries, bridges, &c. *Toll travers*, for paffing or driving cattle over a private man's ground. And *toll-turn*, or *turn-toll*, which is paid at the return of beafts from fairs and markets, though they are not fold.

By the ancient laws, the buyers of corn and cattle in fairs or markets were made to pay toll to the lord of the market, in testimony of the contract there lawfully made in open market, becaufe privy contracts were held unlawful.

Some interpret toll a liberty, as well to take as to be free from toll; for that they who are infeoffed with toll are custom-free.

Of this freedom from toll the city of Coventry boasts an ancient charter, granted them by Leofrick, or Luriche, earl of the Mercians, in Edward the Confessor's time, who, at the importunity of Godeva, his lady, granted this freedom to the city.

TOLL-Bar, or *Stop*, on a canal, is a beam for ftopping boats at the toll-houfes.

TOLL-Houfes, habitations conftituted on the banks of a canal or navigation for the toll-clerks.

TOLLAND, in *Geography*, a county of America, in

the ftate of Connecticut, divided into ten townfhips, and containing 13,779 inhabitants.—Alfo, a town of the fame ftate and county; 65 miles W.S.W. of Boston, containing 1610 inhabitants. N. lat. 41° 58'. W. long. 72° 26'.

TOLLEIT, a town of Auftria; 6 miles S.W. of Efferding.

TOLLEN, a lake of Anterior Pomerania, near Trepto.

TOLLENON, among the *Romans*, a warlike machine, formed in this manner: one beam was fixed very deep in the earth, and on the top of it another more than half as long, and moveable upon a centre. On one end of this crofs-beam was placed a covering of hurdles or planks, within which a few foldiers were put, and, by pulling down the other end with ropes, thefe were raifed above the walls of a befieged town.

TOLLENON was alfo an engine for raifing water out of a draw-well.

TOLLERSHAM, in *Geography*, a town of Auftria; 4 miles N.E. of Zwettl.

TOLLES, or *TOLÆ*, names given by fome to the tonfils, and by others to the glandular abfcefles fometimes affecting the limbs.

TOLLESIO, in *Geography*, a town of Sweden, in Weft Gothland; 23 miles E.N.E. of Gotheburg.

TOLLET, THOMAS, in *Biography*, a compofer for, and a performer on, the common flute, when it was in its higheft favour in England. He publifhed likewise directions for playing on the French flageolet. And, in conjunction with John Linton, whofe intrument was the flute, one of king William and queen Mary's band, publifhed a work entitled "A Confort of Mufick in Three Parts."

A ground compofed by Tollet, was much in favour during our own time.



TOLLING a Bell. See RING.

TOLLIIUS, CORNELIUS, in *Biography*, a man of learning in the 17th century, was born at Utrecht, and became fecretary to Ifaac Voffius, by whom he was difmiffed under a charge of unfaithfulnefs. He was afterwards profefor of eloquence and Greek at Harderwyk, and fecretary to the curators of that univerfity. His works were numerous: and the time of his death is unknown.

TOLLIIUS, JAMES, M. D., brother of the preceding, profefor of eloquence and Greek in the univerfity of Duisburg, was the author of many learned works, and made feveral journies for literary purpofes, an account of which was given in a pofthumous work, entitled "Epiftolæ Itinerariæ," publifhed with notes, by Henninius at Amfterdam. A work of fomewhat fimilar title, viz. "Infignia Itinerarii Italici," was publifhed by himfelf at Utrecht in 1696, and contained the writings of fome ancient ecclefiaftical authors in Greek and Latin, with the editor's notes. He had alfo previously publifhed an edition of "Aufonius, cum Notis Variorum," 1671; of "Ciceronis Oratio pro Licinio," with notes and a commentary, 1677; and of "Longinus," Gr. and Lat. with Boileau's French tranflation, and notes by himfelf and others. He had alfo directed his attention to alchemy, as appears by his "Manuductio ad Colum che-

micum;" "Sapientia infaniens, five Promiffa chemica;" and "Fortuita Sacra, in quibus, præter critica nonnulla, tota fabularis Hiftoria Græca, Phœnicia, Ægyptiaca, ad Chemiam pertinere aperitur." From this work were felected comparifons between the Greek and Latin poets, printed at Leyden under the title of "Differtationes felectæ criticæ de Poetis Græcis et Latinis." Tollius died in 1696.

Another brother of this family, named ALEXANDER, prefented to the public an edition of "Appiani Alexandr. Romanæ Hiftoriæ," Gr. and Lat. Moreri.

TOLLUNDY, in *Geography*, a town of Hindooftan, in Oude; 18 miles N. of Bareilly.

TOLMEZO, a town of Italy, in Friuli, with a caftle, on the Tajamento. Near the town is an extenfive and celebrated linen manufacture, which, in the year 1782, produced 40,000 pieces of printed linen for exportation; 12 miles N.W. of Gemona. N. lat. 46° 23'. E. long. 12° 52'.

TOLMIDESSA, in *Ancient Geography*, a town of Syria, in the fmall country called Chaleidica. Ptol.

TOLMINO, in *Geography*, a town of Germany, and capital of a diftrict, in the duchy of Carniola; 9 miles S.S.W. of Felde. N. lat. 46° 12'. E. long. 13° 47'.

TOLNA,

TOLNA, a town of Hungary, on the Danube; 50 miles S. of Buda. N. lat. 46° 20'. E. long. 18° 41'.

TOLNANI, a town of Hindoostan, in the country of Baglana; 70 miles W. of Burhanpour. N. lat. 21° 15'. E. long. 75° 3'.

TOLO, a town of Spain, in Catalonia; 22 miles N. of Balaguer.—Also, a town on the E. coast of the island of Morfy. N. lat. 2° 12'. E. long. 128° 18'.

TOLO Bay, a large bay on the E. coast of the island of Celebes, very broad at its entrance, but becoming narrower towards the bottom. S. lat. 1° 30' to 3° 5'. E. long. 121° 18' to 123°.

TOLOMETO, a seaport of Africa, in the country of Tripoli, anciently called *Ptolemæis*; 350 miles E. of Tripoli. N. lat. 32° 30'. E. long. 20° 40'.

TOLOMMEI, CLAUDIO, in *Biography*, a patron of literature and the arts, was born at Siena, of an ancient and noble family, in 1492. Having spent many of his earlier years at the court of Rome in the service of cardinal Ippolito de' Medici, he attached himself to the duke of Parma and Placentia. Upon his death he removed to Padua, and in 1549 was nominated to the bishopric of Corsola, an island in the Adriatic. In 1552 he became one of the sixteen conservators of the public liberty at Siena, and joined three other citizens in an embassy to France. Having spent about two years in that country, he returned to Rome, and died there in 1555. Tolommei took pains in cultivating the Italian language, and contended that it ought to be denominated the Tuscan. With a view of reducing Italian verse to the measure and harmony of the Latin, he published, in 1539, his "Versi e Regole della Poesia Nuova;" but his scheme did not succeed. To him was ascribed the foundation of the academy "Della Virtu" at Rome, for the purpose of explaining the architectural work of Vitruvius; and for which he was eminently qualified by his classical and antiquarian learning.

TOLON, in *Geography*, an island in the Grecian Archipelago. N. lat. 37° 35'. E. long. 23°.

TOLONES, one of the smaller Philippine islands, near the N. coast of Samar. N. lat. 12° 50'. E. long. 124° 57'.

TOLOSA, or TOLOSETTA, a town of Spain, and capital of the province of Guipuscoa, celebrated for its steel manufacture, particularly of sword-blades; 7 miles S. of St. Sebastian. N. lat. 43° 12'. W. long. 2° 7'.

TOLOSA, in *Ancient Geography*, a town of Gaul, in the Narbonne province, and diocese of Touloufe.

TOLOTÆ, a people of Africa, in Mauritania Cæsariana.

TOLOUR, in *Geography*, an island in the East Indian sea, of a triangular form, and about 45 miles in circumference, considered as one of the Salibabo islands. N. lat. 4° 12'. E. long. 126° 28'.

TOLOUS, in *Ancient Geography*, a place of Spain, between Ilerda and Pertusa. Anton. Itin.

TOLPAS, in *Geography*, a river of Russia, in the province of Ustiug, which runs into the Schugor, N. lat. 63° 40'. E. long. 58° 22'.

TOLPIS, in *Botany*, a word of which we can trace neither the derivation nor meaning, and which seems to have been actually invented by Adanson; nor is it the only instance of such a kind of forgery to be found in his book. We have sometimes been tempted to suppose these seemingly original names of Adanson might be reduced from some recondite sources of nomenclature or literature; but the search has always proved vain. He was no scholar, nor is his new French orthography founded in any extensive knowledge, much less any refined taste, in language, but in mere affect-

ation. Gærtner cannot be excused for adopting the above name, when he had the choice of an excellent one, (see DREPANA,) given by Jussieu to this same genus. Nevertheless, *Tolpis* is now established, and cannot without inconvenience be set aside.—Adans. Fam. des Pl. v. 2. 112. Gærtner. v. 2. 371. t. 160. Willd. Sp. Pl. v. 3. 1608. Ait. Hort. Kew. v. 4. 461. Sm. Prodr. Fl. Græc. Sibth. v. 2. 140. Lamarek Illustr. t. 651. Bivona Monogr. delle Tolpidi. (Drepania; Juss. 169. Desfont. Atlant. v. 2. 232.)—Class and order, *Syngenesia Polygamia-æqualis*. Nat. Ord. *Compositæ semiflosculosæ*, Linn. *Cichoraceæ*, Juss.

Gen. Ch. *Common Calyx* ovate, of many linear, nearly equal, parallel, close scales, with a distinct series of somewhat scattered and lax, awl-shaped, incurved scales at the base. *Cor.* compound, imbricated, uniform; the florets numerous, equal, all perfect, each of one petal, ligulate, abrupt, five-toothed. *Stam.* Filaments five, capillary, short; anthers united into a cylindrical tube. *Pist.* Germen ovate-oblong; style thread-shaped, the length of the stamens; stigmas two, recurved. *Peric.* none, except the closed permanent calyx, tumid at the base. *Seeds* solitary, small, obovate, striated; down sessile; that of the radius of numerous, little, membranous, equal, acute, marginal teeth, or scales; that of the disk of similar scales, accompanied by two, four, or ten straight, rough bristles, longer than the feed. *Recept.* cellular, with crenate edges to the cells.

Eff. Ch. Receptacle cellular. Calyx equal, with many awl-shaped scales at the base. Seed-down of the circumference toothed: that of the disk toothed, accompanied by several bristles.

The present genus agrees most with CREPIS in habit. (See that article.) The seed-down affords a clear distinctive character, and the outer scales of the calyx do not assume that enlarged, dilated, tumid appearance so remarkable in *Crepis*.

1. *T. barbata*. Purple-eyed Succory-hawkweed. Willd. n. 1. Ait. n. 1. Prodr. Fl. Græc. n. 1942. Bivona Tolp. 13. t. 3. Savi Etrusc. v. 1. 183. (*Crepis barbata*; Linn. Sp. Pl. 1131. Curt. Mag. t. 35. Hieracium medio nigro bæticum majus; Herm. Parad. 185. t. 185. H. calyce barbato; Column. Eeplr. v. 2. 28. t. 27. f. 1. H. medio nigrum, flore majore; Ger. Em. 1625.)—Leaves elliptic-lanceolate, toothed. Outer scales of the calyx falcate, distant, longer than the inner. Bristles of the feeds two or four.—Native of sandy fields, or waste ground, especially near the sea, in the south of France, Italy, and the Levant, flowering in May and June. This elegant hardy annual, very easy of cultivation, has, for two hundred years past, been common in gardens, where it produces, from Midsummer till the autumnal frosts, abundance of flowers. The stems are branched, erect, spreading or decumbent, rather downy, leafy, repeatedly subdivided at the top, in a corymbose, or somewhat forked manner, the flowers, which are at first terminal and solitary, being copiously overtopped by their successors. The scales of their outer calyx are partly scattered down the stalk. *Corolla* expanded in the early part of the day only, and in sunshine, an inch, more or less, in diameter, of a delicate pale lemon-colour; a number of the central florets of a dark purplish chocolate hue, forming an almost black velvet-like spot, or eye, in the middle, which constitutes the chief beauty of the flower. The leaves are rather regularly toothed, alternate, sessile, green, slightly roughish; the upper ones mostly entire.

2. *T. quadriaristata*. Pale Succory-hawkweed. Bivona Tolp. 9. t. 1. Prodr. Fl. Græc. n. 1943. Fl. Græc. t. 810, unpubl. (*Hieracium cichorii sativi folio integro, denticulato, curvo, glaucescens*; Cupan. Phyt. ed. 2. t. 118.

“*H. cichorii fativi folio, denticulato, curvo, diuturnè florens, incanum*; Cupan. Hort. Cath. 96.”—Leaves lanceolate, strongly toothed, somewhat hairy. Outer scales of the calyx lax, the length of the inner. Bristles of the seeds four or more.—Common in Sicily, by way-sides, on calcareous hills near Messina, and various parts of mount Etna, flowering in June and July. *Bivona*. Dr. Sibthorp found it in Cyprus. The root is perennial, tapering, milky. Stems one or more, erect, wand-like, somewhat angular, one and a half or two feet high, leafy, much branched and corymbose at the upper part. Leaves more tapering at the base, with stronger teeth, and rather more hairy than in the first species. Flowers numerous, about half as large as the former, of a pale sulphur-colour, reddish underneath, sometimes purplish-brown in the middle. Outer scales of the calyx falcate, lax, partly dispersed down the stalk, but none of them longer than the inner scales. Bristles on the seeds of the disk eight, ten, or more, even in a specimen sent by baron Bivona himself. Can the purple-eyed variety of this species be the *Hieracium medio nigrum, flore minore*, mentioned in Ger. Em. 1625, along with the preceding?

3. *T. saxaristata*. Close-cupped Succory-hawkweed.—*Bivona* Tolp. 11. t. 2. (*T. virgata*; Savi Etrusc. v. 1. 184. *Crepis ambigua*; Balbis Crep. 4. t. 1. “Decand. Franc. 40. t. 4.”)—Lower leaves lanceolate, deeply and unequally toothed; upper linear-lanceolate, entire. Outer scales of the calyx close, half as long as the inner. Bristles of the seeds six or more.—Native of hills in Italy, Sicily, and the south of France, flowering in June and July. Root perennial, tap-shaped. Stem three or four feet high. Pubescence of the whole plant very variable. Radical leaves numerous, spreading circularly on the ground, four inches long, tapering at the base; those of the stem, except a few at the bottom, slender and awl-shaped. Flowering branches rather more distant and slender than the last. Calyx mealy. Corolla lemon-coloured. “Bristles of the seeds usually six, sometimes only five, or four;” *Bivona*: “sometimes seven;” *Savi*.

4. *T. virgata*. Short-cupped Succory-hawkweed. *Bivona* Tolp. 15. t. 4. (*Crepis virgata*; Desfont. Actes de la Soc. d’Hist. Nat. de Paris, v. 1. 37. t. 8. Atlant. v. 2. 230. Willd. Sp. Pl. v. 3. 1600.)—Lower leaves elliptic-lanceolate, acute, unequally toothed; upper nearly entire. Flower-stalks divaricated. Outer scales of the calyx very short, capillary, rather lax. Bristles of the seed ten or more.—Native of sandy borders of fields about Tunis and Algiers, flowering in April and May. Root annual. Stem a foot or two in height, striated, leafy, smooth. Leaves smooth, two or three inches long; tapering at the base. Flower-stalks slender, spreading, gradually rising above each other, slightly scaly at the top. Flowers yellow; their under side reddish. *Desfontaines*.

5. *T. coronopifolia*. Fleishy-leaved Succory-hawkweed. *Bivona* Tolp. 17. t. 5. (*Crepis coronopifolia*; Desfont. Actes de la Soc. d’Hist. Nat. de Paris, v. 1. 38. t. 9, excluding the syn. of Boccone, 13. t. 7. Willd. Sp. Pl. v. 3. 1606.)—Lower leaves pinnatifid, with linear segments. Flower-stalks divaricated. Outer scales of the calyx close, very short. Bristles of the seed ten or more.—Native of the Canary islands, from whence it was brought to Kew by Mr. Masson, in 1777. A hardy annual plant, flowering in August and September. The stem is a yard high, round, striated, leafy, smooth, much branched. Leaves smooth, rather succulent, various in size; their segments decurrent, often subdivided. Flowers numerous, small, yellow, on slightly scaly hollow stalks. Calyx white and cottony; its outer scales awl-shaped, unequal, scarcely spreading, except

when dried. The teeth, which make a part of the seed-down, though here and there present, are so small as to be easily overlooked: the bristles are numerous, sessile.

TOLRE, in *Geography*, a town of Hindoostan, in the Carnatic; 15 miles E. of Volconda.

TOLSEY, in our *Old Writers*, denotes the places where merchants meet in a city or town of trade.

The word is compounded of the Saxon *tol*, *tributum*, and *see*, *sedes*.

TOLSTA, in *Geography*, a town of Sweden, in West Gothland; 30 miles W.S.W. of Linköping.

TOLSTA Head, a cape on the E. coast of the island of Lewis. N. lat. 58° 22'. W. long. 6° 6'.

TOLSTONOSKOI, an ostrog of Russia, in the government of Tobolsk, on the Enifei; 280 miles N.N.W. of Turuchansk. N. lat. 70° 16'. E. long. 85° 14'.

TOLT, in *Law*, a writ whereby a cause depending in a court-baron is removed into the county-court. Old Nat. Br. 4. See PONE.

TOLTEN, in *Geography*, a river of Chili, which runs into the Pacific ocean, S. lat. 38° 50'.

TOLTERCAIZTLI, in *Natural History*, the American name of a stone, much resembling the novacularum lapis, but variegated with red and black spots. They use the powder of this stone and crystal, calcined together, for diseases of the eyes.

TOLU, in *Geography*, a sea-port town of South America, in the province of Carthagena, with a harbour open to the Spanish Main; in the environs of which is found the celebrated balsam to which it gives name; 50 miles S.E. of Carthagena. N. lat. 9° 45'. W. long. 75° 25'.

TOLU Balsam. See BALSAM.

TOLU-Tree, Balsam of, in Botany. See TOLUIFERA.

TOLVA, in *Geography*, a town of Naples, in Basilicata; 9 miles S.S.E. of Acerenza.

TOLUCO, a town of Mexico, in the province of Mechoacan; 100 miles W.N.W. of Mechoacan.—Also, a town of Mexico; 28 miles S.W. of Mexico.

TOLUIFERA, in *Botany*, so called from its producing the balsam of Tolu. Linnæus attributes the name to Van Royen.—Linn. Gen. 210. Schreb. 282. Willd. Sp. Pl. v. 2. 545. Mart. Mill. Dict. v. 4. Juss. 372.—Class and order, *Decandria Monogynia*. Nat. Ord. *Lomentaceæ*, Linn. *Leguminosæ*, *sect.* 10. Juss.

Gen. Ch. Cal. Perianth inferior, of one leaf, bell-shaped, five-toothed, nearly equal; one angle (or tooth?) more distant than the rest. Cor. Petals five, inserted into the receptacle; four of them equal, linear, somewhat longer than the calyx; the fifth twice as large, inversely heart-shaped, its claw the length of the calyx. Stam. Filaments ten, very short; anthers longer than the calyx. Pist. Germen oblong; style scarcely any; stigma acute. Peric. and Seeds not described.

Ess. Ch. Calyx five-toothed, bell-shaped. Petals five; the lower one very large, inversely heart-shaped. Style none.

1. *T. Balsamum*. Balsam of Tolu. Linn. Sp. Pl. 549. Willd. n. 1. Woodv. Med. Bot. t. 193. (B. toltutanum; Dale Pharmac. 304. B. toltutanum, foliis ceratiæ similibus, quod candidum est; Baulh. Pin. 401.)—Native of the province of Tolu, in South America. We have never seen any original specimen of this plant, nor any figure, except Dr. Woodville’s, drawn from a dried specimen in Sir Joseph Banks’s collection, the authority for which is not mentioned. Miller appears to have raised plants from seeds sent by Houstoun, but they probably did not prosper long. Perhaps the specimen just mentioned was obtained from the same

fame source. Authors describe the *tree* as lofty, with large branches, and a thick greyish bark; the *leaves* like those of the Carob. If so, they are pinnate, as the natural order of the genus should indicate; but of which Dr. Woodville seems not to have been aware. The *flowers* in his figure are racemose. All we can make out respecting the characters of this tree confirm the account of Mutis, of its close affinity to *MYROXYLON*, see that article, sp. 1; the long-stalked germin of the latter appearing to be the only difference which is even obliquely hinted. The generic name of *Toluifera* therefore, though the most ancient, should give way to *Myroxylon*, as the most comprehensive.

T. cochinchinensis, Loureir. Cochinch. 262, having simple leaves, and a berry with one or two seeds, should seem, as Poiret observes, in Lamarck's Dict. v. 7. 696, to be very different from the original *Toluifera*, and more probably a *Bursera*.

TOLUIFERA, in *Gardening*, comprises a plant of the exotic tree kind for the stove, of which the species cultivated is the balsam of Tolu tree (*T. balsamum*).

Method of Culture.—This tree is raised from seeds, which should be obtained from its native situation, and be sown as soon as possible afterwards in pots of light earth, plunging them in the bark-bed of the stove. When the plants have three or four inches growth, they should be potted off separately, giving them water, and replunging them in the bed. They afterwards only require to be managed as other woody stove plants.

They afford variety in stove and hot-house collections among other potted plants. A balsam of great use in medicinal compositions is extracted and prepared from this tree.

TOLZ, in *Geography*, a town of Bavaria; 24 miles S. of Munich.

TOM, a river of Russia, which rises 80 miles S.E. of Kufnetz, in the government of Kolivan, and runs into the Oby, 32 miles W.N.W. of Tomsk. N. lat. $56^{\circ} 40'$. E. long. $84^{\circ} 14'$.—Also, a river of China, which runs into the Heng, 5 miles S. of Heng-chan.

TOM Zil, a town of the Arabian Irac, on the Tigris; 118 miles S.E. of Bagdat.

TOMADÆORUM INSULÆ, in *Ancient Geography*, islands situated in the Arabian gulf. Ptol.

TOMÆUS, a mountain of the Peloponnesus, in Messenia, near the promontory Coryphasium. Thucydides.

TOMAHABI, in *Geography*, a town of Peru; 60 miles S. of Potosi.

TOMAN, or *TOUMAN*, a kind of imaginary money used among the Persians in the keeping of their books, and to facilitate the reduction of money in the payment of considerable sums.

The toman contains 50 abassis, 100 mamoodis, 200 shatrees, 1000 dinars bifti, or 10,000 dinars simple. The toman and dinar are imaginary monies. An abassi is worth 2 mamoodis, 4 shatrees, 40 kabefquis, 20 dinars bifti, or 200 dinars.

D'Herbelot derives the word from the language of the Moguls, where it signifies the number of ten thousand. Eben Arabschah says, that the word *touman*, when used to express a weight, or money, contains ten thousand silver Arab drachmas, called *mehkal*; which are a third lighter than the Attic.

The Moguls, &c. frequently use toman for ten thousand men; and say, *e. gr.* that the city Samarcand contains seven tomans of people fit to bear arms; and that of Andechan nine tomans.

TOMANI, in *Geography*, a kingdom of Africa, situated on the side of the river Gambia, W. of Kantor.

TOMANANISA, a town of Japan, in the island of Nippon; 75 miles W. of Meaco.

TOMAR, a circar of Bengal, bounded on the N. by Sillee, on the E. by Pachete, on the S.E. by Singboom, and on the W. by Nagpour; about 20 miles long from N. to S., and from 10 to 20 broad.—Also, a town of Bengal, and chief place of a circar of the same name; 145 miles W. of Calcutta. N. lat. $23^{\circ} 10'$. E. long. $85^{\circ} 53'$.

TOMAR. See *THOMAR*.

TOMARA, in *Ancient Geography*, a town of India, on this side of the Gauges. Ptol.

TOMARE, a mountain on the confines between Thesprotia and Chaonia, two countries of Epirus.

TOMATO, in *Botany*, a word whose origin we have not ascertained, is the name of the Love-apple, or *Solanum Lycopersicum*. See *SOLANUM*.

TOMB, in *Geography*. See *TUMB*.

TOMB, includes both the grave or sepulchre, wherein a defunct is interred, and a monument erected to preserve his memory.

The word is formed from the Greek, *τυμῶς*, *tumulus*, sepulchre; or, according to Menage, from the Latin, *tumba*, which signifies the same.

Among the Romans, none but the emperors, vestals, and persons signalized by great actions, were allowed to have tombs in the cities, the rest were all in the country, near the high roads; whence those common words, *Siste, & abi, viator*, which are still retained in the inscriptions of our monuments, though set up in churches, &c.

At Anchiale was anciently seen the tomb of Sardanapalus, with this inscription in verse: "Sardanapalus built Anchiale and Tarsus in one day: go passenger, eat, drink, and be merry; the rest is nothing." Strab. Geol. lib. 14.

The Romans had a kind of empty tomb, called *cenotaphium*, an *honorary* tomb, in which the body of the deceased was not laid. See *CENOTAPH*.

The occasion of this was a superstitious notion, that the souls of those who had not funeral honours, wandered a hundred years by the banks of the rivers of hell, before they were admitted to pass over. The *κενοτάφιον* being made, the same ceremonies were practised as at real funerals.

The cenotaphia were inscribed with the words *ob honorem*, or *memoria sacrum*, whereas other tombs in which the ashes were really deposited, were inscribed *D. M. S. q. d. sacred to the manes*. When the words *tacito omine* were added, it declared the ashes enclosed therein belonged to a person infamous for some crime.

TOMB-Stones, Characters on. See *CHARACTER*.

TOMB-Stones, Epitaphs on. See *EPITAPH*.

TOMBA, in *Geography*, a river of Peru, which runs into the Pacific ocean, S. lat. $17^{\circ} 50'$.

TOMBAC, a name given by the French to a yellow metal, very nearly approaching to what we call Prince's metal, and made by mixing and fusing together a large quantity of zinc with a smaller of copper. See *GOLD-coloured Metal*.

TOMBACONDA, in *Geography*, a town of the kingdom of Burfalli. N. lat. $13^{\circ} 56'$. W. long. $14^{\circ} 57'$.

TOMBALY POINT, a cape on the west coast of Africa. N. lat. $10^{\circ} 48'$. W. long. $4^{\circ} 36'$.

TOMBAY, a town of Pegu; 6 miles S. of Pegu.

TOMBEBŒUF, a town of France, in the department of the Lot and Garonne; 12 miles N.W. of Villeneuve d'Agen.

TOMBI, a town of Africa, in Quoja. N. lat. $6^{\circ} 50'$.

TOMBIGHE, a river which rises in the north part of Georgia, enters West Florida, and joins the Alabama to form the Mobile, N. lat. $31^{\circ} 32'$. W. long. $87^{\circ} 50'$.—Also, a town of West Florida, on a river of the same name. N. lat. $32^{\circ} 30'$. W. long. $87^{\circ} 50'$.

TOMBUCTOO, or TIMBUCTOO, a city of Africa, the capital of a rich and populous kingdom, said to have been built in the 13th century by Soliman, pretended to be of the royal race of Morocco. The extent of its territory is very imperfectly ascertained; but it is said to extend northward to the confines of Sahara or the Desert, comprehending a tract of country about 90 miles in breadth; its western boundary being 130 miles W. of the city, and the eastern extending to the Bahar Soudan, or sea of Soudan, which is a lake formed by the Nil-El Abeede or Niger, whose opposite shore is not discernible. The city is situated on a plain, surrounded by sandy eminences about twelve miles N. of the Niger, and three days' journey from the confines of Sahara. It is said to be twelve miles in circumference, but without walls. The town of Kalra, situated on the banks of the river, is its commercial depôt, or port. By means of a water-carriage E. and W. of Kabra, the trade of Tombuctoo acquires great facility; and hence the various articles of European as well as Barbary manufactures brought by the akkabaahs, or caravans, from the N. of Africa, are distributed to the different empires and states of the Soudan and the South. This great mart is resorted to by all nations, whither they bring the various products of their respective countries, to barter for the European and Barbary manufactures. The houses at Tombuctoo have, in general, no upper apartments: they are spacious, and of a square form, with an opening in the centre, towards which the doors open. Contiguous to the door of entrance is a building, consisting of two rooms, called a *duaria*, in which visitors are received and entertained, so that they do not see the women, who are very handsome. The men are so excessively jealous of their wives, that when the latter visit a relative, they are much muffled up, in order to disguise their persons; their face is also covered with their garment, through which they peep in order to explore their way. The king, whose authority has been acknowledged at Tombuctoo ever since the death of Muley Ishmael, emperor of Morocco, is the sovereign of Bambarra: his name in 1800 was Woolo; he is a black, and a native of the country which he governs: his usual place of residence is Jinnie, though he has three palaces at Tombuctoo, which are said to contain an immense quantity of gold. Many of the civil appointments at Tombuctoo, since the decease of Muley Ishmael, and the consequent decline of the authority of the emperor of Morocco, have been occupied by Moors of Maroquin origin; but the military appointments, since the forementioned period, have been distributed among Negroes of Bambarra, assigned to them by the king Woolo. The inhabitants are chiefly Negroes, who resemble the Arabs in hospitality, and value themselves on their attention to strangers. The various costumes exhibited in the market-places and streets indicate the variety and extent of the commercial intercourse with the different nations of Central Africa; the individuals being each habited in the dress of his respective country. The toleration prevalent at Tombuctoo is worthy of notice. The divan, or P'alemma, never interfere with the religious tenets professed by the different people who resort hither for commercial or other purposes. The police of this place is extolled: robberies and house-breaking are scarcely known: the inhabitants of the town are peaceable and orderly. The government of the city is

intrusted to a divan of twelve alemma, or men learned in the Koran, and an umpire, who retain their appointments, received from the king of Bambarra, for three years. Their power is great. The civil jurisprudence is directed by a *cadi*, who decides all judicial proceedings according to the spirit of the Koran: he has twelve attorneys, called *talbs*, who attend him, and to each of these belongs a separate department of justice. It is asserted that till of late no Jews were permitted to enter the town; and it is said, moreover, that those Jews who now resort thither, are obliged to become Mahometans. The probable reason of the exclusion of the Jews is deduced from the extreme jealousy of the individuals of the Moorish factory, whose avarice induces them to prevent any person from sharing their emoluments, whenever a plausible pretext can be found.

The climate of Tombuctoo is much extolled as salubrious and invigorating; inasmuch that there is no man of the age of eighteen, who has not his wives or concubines; and it is a disgrace for a man to attain the age of puberty without being married. The natives possess an elegance and suavity of manners, a great flow of animal spirits, and an invincible attachment to their country. The accommodation for travellers is very simple; camels, horses, drivers and merchants, rendezvous at a large house, with an open space in the middle, round which are rooms sufficient for containing a bed and a table. The merchants are accommodated with houses during the period of their stay, for bartering and exchanging their commodities, which they invest in the produce of Soudan as speedily as possible, so that they may be ready about September for the akkabaah, and proceed to Morocco, Cairo, Jidda, or some other place. The manufactures of different kinds of apparel are prepared chiefly by the women in their own houses, whenever they cannot procure European cloths and linens, or when there is a great scarcity of Fez and Tafilet manufactures of silk, cotton, and woollen. The soil about Tombuctoo is generally fertile, and near the river produces rice, millet, Indian corn, and other grain; wheat and barley grow in the plains, and are cultivated principally by the Arabs of the tribe of Brabeeha, who receive a tribute from the town for forbearing to plunder the caravans from the north which pass through their territory. Coffee grows wild here, as does also indigo, which latter is occasionally cultivated, and produces a very fine blue dye used in their various cotton manufactures. The husbandmen are very expert in the management of bees: honey and wax are abundant, the former being used at Tombuctoo as an article of food, and the latter for candles. The river about Kabra affords a supply of fish. The mines of gold which lie S. of the bed of the river belong to the sultan Woolo, who resides at Jinnie; but his gold is deposited in his palaces at Tombuctoo. The exact bearing and distances of places from Tombuctoo are not satisfactorily ascertained. The city appears, says Mr. Jackson, to be situated 1500 miles S.S.E. of Fez, 1150 miles about S.S.E. of Akka, Tatta, and Wedinoon; 1300 miles in nearly the same direction from Morocco; 1320 miles from Tafilet; about 230 miles E. of Jinnie; and 1000 miles E. of Houffa. Major Rennell, in his Geographical Elucidations annexed to the Proceedings of the Association for discovering the Interior of Africa, says that Tombuctoo is fifty days' caravan travelling from Tatta, a place situated on the frontiers of Morocco, Drah, and Zenhaga, and on the route from Morocco and Suz to Tombuctoo. Tatta is found to be nine and a half days' journey from Morocco: and one day short of a station on the Wad-drah or Drah river, which station is four days, or sixty-six miles lower down than Tinguleen, a place in D'Anville's and De Lisle's map of Africa,

TOMBUCTOO.

Africa. It was also twelve days' journey from the city of Nun, or Non, which city, by Ben All's account, is two days from the sea-coast, and well known to be opposite to a cape of the same name. These authorities, says the major, enable us to place Tatta 170 miles S.S.E. from Morocco. Thus, 50 days from Tatta to Tombuctoo, at 13 miles each day, produce 650 miles. By Ben All's report, Tombuctoo is 48 days from the capital of Sultán Fullan, lying within the district of Gallan, on the river Senegal: 48 days, at 13 each day, produce 620 miles; and this line of distance meets that from Tatta in lat. $19^{\circ} 40'$, and nearly midway between Gallan and Cassina. In this position it falls only 28 miles to the N.W. of D'Anville's Tombuctoo.

The country north of Tombuctoo is inhabited by a powerful tribe of Arabs, called Brabeesha, whose original stock emigrated in the eighth century, and took possession of a tract of country bordering on Egypt westward: they are a turbulent, restless, and warlike tribe, but much afraid of fire-arms, as they have no such, being armed only with the lance, and occasionally with knives or daggers. There is another nation, situated many journeys south-east of Tombuctoo, who worship the sun, and abstain from animal food, subsisting on milk and vegetables. In a part of the country between Tombuctoo and Cassina is discovered a race of people, compared by the Arabs to the English, who speak a language different from all the others known in Africa, and resembling the whistling of birds, to which they compare the English language. They ride on saddles like those used in England, and wear rowelled spurs, which are peculiar to themselves. Their faces are covered by turbans, and their weapons are swords, bows, arrows, and lances. They are said to be a grossly superstitious people; their bodies, as well as their houses, being covered with charms or amulets. It is said that there is a water communication between Tombuctoo and Cairo; but the expence of land-carriage by camels being more moderate, the other is not used.

Tombuctoo has, from time immemorial, been the great emporium of Central Africa; an extensive and profitable trade having been carried on with the various maritime states of North Africa, viz. Morocco, Tunis, Algiers, Tripoli, Egypt, &c. by means of akkabaahs, or accumulated caravans, which cross the Sahara, or Great Desert, generally between the months of September and April: these akkabaahs consist of several hundred loaded camels, accompanied by the Arabs who let them to the merchants. The articles transported from Fez to Tombuctoo are principally the following; viz. various kinds of German linens, Irish linens, muslins, cambrics, fine cloths, coral beads, amber beads, pearls, Bengal raw silk, brass nails, coffee, fine hyson teas, refined sugar, and various manufactures of Fez and Tafilet, such as shawls and fashes of silk and gold, hayks or pieces of silk, of cotton and silk mixed, of cotton and wool: to which may be added red woollen caps, turbans, Italian silks, nutmegs, cloves, ginger, and pepper, Venetian beads, cowries, tobacco and salt. The produce of Soudan in return for these articles, consists principally in gold-dust, twisted gold rings of Wangara, gold rings made at Jinnie, bars of gold, elephants' teeth, gum of Soudan, grains of Sahara, or grains of paradise, odoriferous gums, and a great number of slaves purchased at Tombuctoo of the states or slave merchants, and brought from those regions which border on the mountains of the Moon. To these we may add ostrich-feathers and ambergris, collected on the confines of the Desert. The circulating medium at Tombuctoo is (tshber) gold-dust, which is exchanged for mer-

chandize; a plattilia being worth 20 mizans of gold, and the value of a mizan being about 11s. sterling. Jackfon's Morocco.

To the account above given of Tombuctoo, we shall subjoin a few extracts from the narrative of Robert Adams, a sailor, who was wrecked on the western coast of Africa, in the year 1810, and detained three years in slavery by the Arabs of the Great Desert, and resided several months in the city of Tombuctoo, 4to. London, 1816.

Tombuctoo, according to this narrative, stands on a level plain, having a river about two hundred yards from the town on the S.E., named La Mar Zarah, three quarters of a mile in width, appearing to have but little current, and that little flowing to the S.W. The city seemed to Adams to cover as much ground as Lisbon: but the houses were not continuous, had a ground-floor only, were built of sticks, clay, and grass, and were furnished merely with the rudest domestic implements: the town had no exterior walls, or fortifications; and the population, of which our informant could not make a regular estimate, bore no corresponding proportion to the area of the place, if compared with European towns, as indeed we may infer from the nature of the houses. The river-water, although somewhat brackish, is constantly used for drink; and Adams does not believe that there were any wells at Tombuctoo. The natives have no larger boats or vessels than canoes, of about ten feet in length, made very inartificially. Of the natural productions, vegetable and animal, we will specify a few. The principal fruits are cocoa-nuts, dates, figs, pine-apples, and sweet fruit of the peach kind: the vegetables are, carrots, turnips, sweet potatoes, negro-beans, and small cabbages: the grain consists chiefly of rice and guinea-corn; and the cultivation of the land is performed solely with a kind of hoe, the only implement of husbandry that Adams observed. The animals are elephants, cows, goats, asses, camels, dromedaries, dogs, antelopes, rabbits, and a creature called *heirie*, resembling a very small camel, and used only for riding. Besides these, there is, in the vicinity of Tombuctoo, a most extraordinary animal named *courcoo*, somewhat resembling a very large dog, but having an opening or hollow on its back like a pocket, in which it carries its prey. It has short-pointed ears and a short tail. Its skin is of a uniform reddish-brown on its back, like a fox, but its belly is of a light-grey colour. It will ascend trees with great agility, and gather cocoa-nuts, which Adams supposes to be a part of its food. But it also devours goats and even young children, and the negroes were greatly afraid of it. Its cry is like that of an owl. The natives of Tombuctoo are a stout healthy race, and are seldom sick, although they expose themselves by lying out in the sun at mid-day, when the heat is almost insupportable to a white man. It is the universal practice of both sexes to grease themselves all over with butter produced from goats' milk, which makes the skin smooth, and gives it a shining appearance. This is usually renewed every day; when neglected, the skin becomes rough, greyish, and extremely ugly. They usually sleep under cover at night; but sometimes, in the hottest weather, they will lie exposed to the night-air with little or no covering, notwithstanding that the fog which rises from the river descends like dew, and, in fact, at that season, supplies the want of rain.

All the males of Tombuctoo have an incision on their faces, from the top of the forehead down to the nose, from which proceed other lateral incisions over the eye-brows, into all of which is inserted a blue dye, produced from a kind of ore which is found in the neighbouring mountains. The women have also incisions on their faces, but in a different

ferent fashion; the lines being from two to five in number, cut on each cheek-bone, from the temple straight downwards: they are also stained with blue. These incisions being made on the faces of both sexes when they are about twelve months old, the dyeing material which is inserted in them becomes scarcely visible as they grow up. The ornaments of the natives are similar to those which are generally found among savage tribes. It does not appear that they hold any public exercise of religion, or have any house of worship, or ever meet to pray, though some ceremony, seemingly religious, was observed at the burial of the dead: but Adams was probably not a very accurate inquirer into these matters. Park describes the natives of Soudan as saying a prayer on the appearance of the new moon; and if the religious observances of these people were so rare of occurrence, it is not surprising that they escaped the seaman's notice.

Adams says that he saw no shops at Tombuctoo. The articles bought for sale, which consisted chiefly of tobacco, tar, gunpowder, blue nankeens, blankets, earthen jars, and some silks, are obtained from the Moors, and remain in the king's house until disposed of. The only other objects of trade seemed to be slaves. Gunpowder appeared to be more valuable than gold, since a greater weight of the former was given in a barter of the two articles. The exports of this people were chiefly gold-dust, ivory, gum, cowries, ostrich-feathers, and goat-skins, the latter stained red and yellow. Slaves were procured by purchase, and also by predatory incursions into neighbouring states. The king of Tombuctoo seemed to be despotic, but the government was mildly exercised; he and his wife were old and grey-headed: blue nankeen, adorned with gold lace, formed the usual dress of both; and the queen was accustomed to sit and look at Adams and Stevens for hours together. The palace consisted simply of eight or ten small rooms on a ground-floor, not even white-washed, and built of clay and grass. To the surprise of the African committee, Adams did not recollect to have heard there of the Joliba river, a subject of such interesting research: but we should consider that the same river would probably pass under different appellations in the territories of different states. The name of La Mar Zarah closely corresponds with that of the Zayr, or Congo river, presumed by Park to be the termination of the Niger in the Atlantic ocean: but the distance from Tombuctoo to that mouth renders it highly improbable that the river should preserve its name throughout. It should be added, also, that the Tombuctoo river is supposed to fall into the Niger at twelve miles distance from that town; yet the breadth ascribed to it by Adams will not allow us to consider it as a merely subsidiary stream. The editor draws two simple conclusions from this information relative to Tombuctoo; the one, he says, propitious, and the other adverse to the progress of discovery and civilization: viz. "the mild and tractable manners of the Pagan Negroes of Soudan, and their friendly deportment towards strangers," on the one hand;—and on the other, "the extended and baneful range of that original feature of African society—Slavery."

TOME, a small island near the west coast of France. N. lat. 48° 50'. W. long. 3° 24'.

TOME, *τομος*, a bound book or writing that makes a volume.

TOMEION, formed from *τομη*, *section*, a general name used to express any sharp or cutting instrument, used either in surgery or in the mechanic arts.

TOMELLOSO, in *Geography*, a town of Spain, in New Castile; 58 miles S.E. of Toledo.

TOMENLOSE LEAF, among *Botanists*. See LEAF.

TOMENTUM, properly signifies flocks or locks of wool, but by botanists is used for that soft downy matter which grows on the leaves of some plants, hence denominated *tomentose*; as *verbascum tomentosum*, *carduus tomentosus*, &c.

TOMENTUM Cerebri, in *Anatomy*, the flocculent internal surface of the pia mater, with its waving productions belonging to the intervals of the convolutions. The vessels, which enter the cerebral substance, give to the whole a completely villous appearance: it is best seen when the vessels have been injected, and the membrane floats in water.

TOMEPENDA, in *Geography*, a town of South America, in the audience of Quito; 5 miles S.E. of Jaen de Bracamoros.

TOMERIT, a mountain of European Turkey, in Albania; 12 miles E. of Dulcigno.

TOMEROS, in *Ancient Geography*, a river of Asia, in Carmania. Arrian.

TOMERUS, a river of India, W. of the Indus and Arabus, so named by Nearchus. It had its source towards 27° 20' of lat. traversed the country of the Oritæ, and discharged itself into the sea about 25° lat.

TOMESOBI, in *Geography*, a lake of Lower Canada, whence issues the branch of the river St. Francis, on the borders of Vermont.

TOMEX, in *Botany*, from *tomentum*, woolly down, alluding to the pubescence of the plant. The original *Tomex* of Linnæus proving a *CALLICARPA*, see that article, sp. 3, Thunberg transferred the name to a new Japanese genus, with which it now remains. Such adaptations of discarded names are not entirely to be commended, and yet we cannot but think them more allowable than the too frequent practice of Linnæus, of applying ancient Greek or Latin ones to new genera, avowedly different from the original plants, though the latter could not be ascertained.—Thunb. Jap. 10. Nov. Gen. 65. Schreb. 315. Willd. Sp. Pl. v. 2. 839. Mart. Mill. Dict. v. 4. Juff. 440. Poiret in Lamark Dict. v. 7. 696.—This genus is the same with *TETRANTHERA*; see that article.

TOMI, in *Ancient Geography*, a town of Lower Mæsia, towards the mouth of the Danube, near the Euxine sea. This town was considerable, and was the place of Ovid's exile. It was the metropolis of Pontic Scythia. According to this poet, in his third book of *Tristes*, this city was founded by a colony sent thither from Miletus. Tomi was declared the metropolis of Scythia under the emperor Theodosius, and it was the see of the bishop of that country.

TOMIAS, *τομιας*, in *Antiquity*, an appellation given to the sacrifice offered at the ratification of solemn leagues. It was so called because they cut out the testicles of the victim, and took the oath standing upon them.

TOMIDA, in *Geography*, a town of Japan, in the island of Nippon; 5 miles S.S.W. of Quano.

TOMIN, in our *Old Writers*, a weight of twelve grains, used by goldsmiths and jewellers.

TOMINA, in *Geography*, a government of Peru, in the viceroyalty of Buenos Ayres, and archbishopric of La Plata, which begins about sixteen leagues south-east from the city of La Plata. The climate here is hot, and consequently its productions are such as are common to hot countries. Some parts have vineyards, and in others are made considerable quantities of sugar. It also abounds in cattle and sheep. Its extent in some parts is near forty leagues. The vicinity of some free Indians is a continual uneasiness to the towns in this jurisdiction, and even to the city

city of Plata itself, as they have often attempted to surprize it. Tomina, the chief town, is situated 60 miles E.N.E. of La Plata. S. lat. 19° 10'. W. long. 65° 46'.

TOMINE, in *Commerce*, a weight for gold and silver in Spain. Gold is weighed by the Castilian mark of 50 castellanos, 400 tomines, or 4800 grains. Silver is weighed by the same mark, but it is divided into 8 ounces, 64 ochavos, 128 adarmes, 384 tomines, or 4608 grains. The Castilian mark weighs 3557 English troy grains; hence 144 such marks correspond nearly to 89lbs. English troy weight; and, therefore, 96 Castilian ounces = 89 troy ounces.

TOMINEIO, in *Ornithology*, a name by which some authors have called the *guainumbi*, or humming-bird, the smallest of all birds.

The name seems derived from the Spanish *tomine*, a grain weight, as if they would call it a bird of a grain weight.

TOMINY, in *Geography*, a town on the east coast of the island of Celebes, in a bay to which it gives name. S. lat. 0° 45'.

TOMINY Bay. See GUNONG-TELLU.

TOMISA, in *Ancient Geography*, a small country of Asia Minor, which separated Cappadocia from mount Taurus.—Also, a town of Asia, upon the eastern bank of the Euphrates.

TOMISUM, or TOMISUS, a town of Asia, in Greater Armenia, in the country named Sophené. Strabo.

TOMKIN and TOMPION. See TAMPION.

TOMKINS, THOMAS, in *Biography*, a disciple of Bird, M. B. and gentleman of his majesty's chapel (James I.) was an excellent musician. He published songs of three, four, five, and six parts, without a date. But it appears by a copy of these songs in the library of Christ-church college, Oxon. that they were published in 1622.

There are two very curious compositions by Tomkins in the 3d vol. of Dr. Tudway's "Collection of Cathedral Music," in the British Museum: the one is a full anthem, in twelve parts; and the other an anthem in canon throughout, of four parts in one, both well worthy the disciple of the admirable Bird. Indeed, by the compositions we have scored, or examined in score, of Tomkins, he seems to us to have had more force and facility than Morley. In his songs there are melody and accent, as well as pure harmony and ingenious contrivance.

Thomas Tomkins, the father of Bird's disciple, was chanter of the choir at Gloucester, whose family produced more able musicians, during the 16th and 17th centuries, than any other which England can boast. Thomas, the younger, had several brothers, musicians, &c. who distinguished themselves both in composition and performance; among whom was Giles Tomkins, according to Anthony Wood, a most excellent organist of the cathedral at Salisbury; John Tomkins, organist of St. Paul's cathedral, and afterwards gentleman of the chapel-royal; and Nicholas Tomkins, one of the gentlemen of the privy-chamber to Charles I. Thomas, the subject of the present article, the disciple of Bird, and bachelor of music, was afterwards organist of the cathedral of Worcester, gentleman of his majesty's chapel, and, at length, organist. Though he contributed to the "Triumphs of Oriana" in the reign of queen Elizabeth, he was living after the breaking out of the grand rebellion, about which time he published a work in ten books, or separate parts, entitled "Musica Deo sacra et Ecclesiæ Anglicanæ," consisting of anthems, hymns, and other compositions suited to the church-service. The copy of these compositions, in Christ-

church college, Oxford, is dated 1664. If this was not a second edition, it is probable that his son was either the author, or at least the editor of the work. By a copy of his songs, in the same collection, that have been said above to be of uncertain date, they appear to have been printed in 1622.

Butler, in his "Principles of Music," published 1636, speaking of the *Lydian mood* of the ancients, which he seems to have persuaded himself he understood, says, "of this mood is that passionate lamentation of the musical king, for the death of his son Absalom, composed in five parts by Mr. Thomas Tomkins, now organist of his majesty's chapel; the melodious harmony of which, when I heard it in the music-school (Oxon.), whether I should more admire the sweet well-governed voices, with consonant instruments, of the fingers, or the exquisite invention, wit, and art of the composer, it was hard to determine." And he calls Mr. Thomas and Mr. J. Tomkins *aureum par Musicorum*.

A set of his vocal church music, in four and five parts, MS. is lodged in Magdalen college, and a printed copy in Christ-church, Oxford. The manuscript copy was presented to Magdalen college by James Clifford, who, in 1663, published a collection of the words, with the names of the composers of such services and anthems as continued to be sung in our cathedrals. To this book Ant. Wood and others frequently refer in speaking of our choral music.

Besides the compositions by Tomkins, mentioned above, in the collection made for lord Harley, British Museum, there are likewise several very learned and curious compositions by this author; particularly full anthems in eight, ten, and twelve real parts, *fugato*. About this time there was a rage for multiplying parts in musical compositions all over Europe; and Herculean labours of this kind, achieved by Tallis, Bird, Benevoli, and others, have been already mentioned.

TOMLINSON'S RUN, in *Geography*, a river of Virginia, which runs into the Ohio, N. lat. 40° 29'. W. long. 80° 41'.

TOMMASI, GUISEPPE-MARIA, in *Biography*, a learned cardinal, was born at Alicata, in Sicily, in 1649, and at the age of fifteen entered among the Theatines at Palermo. He finished his studies at Rome, where he devoted himself to ecclesiastical literature, and from the austerity of his mode of life, and the frequency of his devotional exercises, he was regarded as a model of the religious character. In order to the more successful prosecution of his favourite studies, he obtained access to the principal libraries at Rome, and in 1680 he published his "Codices Sacramentorum nongentis annis vetustiores," 4to. dedicated to Christina, queen of Sweden. This was followed by some other works, and particularly, in 1688, by his "Sacrorum Bibliorum Tituli, &c." 4to. in which he directed his attention to the ancient mode of dividing the Bible. Indefatigably employed in the kind of study to which he was addicted, he published several works in Latin and Italian, chiefly on subjects of religious worship. In consequence of these labours, Clement XI. raised him to the dignity of cardinal in 1712, against his own inclination; but though his revenue was thus increased, he retained his former mode of life, and devoted the residue of his income to the benefit of the needy. He was a regular preacher, a diligent instructor of the poor, and a zealous promoter of a general reformation of manners in Rome. But death prevented the full execution of his laudable purposes in 1713, in his 64th year. The sanctity of his life procured

different kinds, most of which were brought from Tartary. It was a pleasing circumstance to observe, also, among other goods, some English cloths, though in no considerable quantities; 10 miles E. of Peking. N. lat. $40^{\circ} 56'$. E. long. $116^{\circ} 20'$.—Alfo, a city of China, of the second rank, in Kiang-nan, at the mouth of the Yang-tse river; 347 miles S.S.E. of Peking. N. lat. 32° . E. long. $120^{\circ} 19'$.—Alfo, a city of China, of the second rank, in Ho-nan; 490 miles S.S.W. of Peking. N. lat. $32^{\circ} 48'$. E. long. $111^{\circ} 42'$.—Alfo, a city of China, of the second rank, in Chen-fi, on the river Lo; 447 miles S.W. of Peking. N. lat. $34^{\circ} 32'$. E. long. $109^{\circ} 30'$.—Alfo, a river of Benguela, which runs into the Atlantic, S. lat. $14^{\circ} 25'$.

TONGA ISLANDS, a cluster of islands in the South Pacific ocean, consisting of the island of Tonga, which gives name to the whole of the cluster called Hapae, and the island of Vavao. It is a part of the group to which captain Cook gave the name of Friendly islands, but he did not include in his chart Vavao or Vavaon, which he did not visit; though this is the largest, and now comparatively the most important of all those belonging to the same Archipelago, which, in his time, were under the same government, and still speak precisely the same language, and observe the same customs. An account has been lately published from documents furnished by Mr. William Mariner, four years resident in those islands; 2 vols. 8vo. 1817. See FEEJEE, FRIENDLY, HAPAE, TONGATABOO, VAVAO, &c.

TONGATABOO ISLAND, one of the Friendly islands in the South Pacific ocean, first discovered by Tasman, who called it Amsterdam; seen by captain Cook in the year 1773, and visited by him again in 1777. Tongataboo, or Tonga, is about sixty miles in circuit, somewhat oblong, though by much broadest at the E. end; and its greatest length from E. to W. The south shore is straight, and consists of coral rocks, eight or ten feet high, terminating perpendicularly, except in some places, where it is interrupted by small sandy beaches; on which, at low water, a range of black rocks may be seen. The west end is not above five or six miles broad, but has a shore somewhat like that of the south side; whereas the whole north side is environed with shoals and islands, and the shore within them low and sandy. The east side or end is most probably like the south; as the shore begins to assume a rocky appearance towards the north-east point, though not above seven or eight feet high. The island may with the greatest propriety be called a low one, as the trees on the west part, where captain Cook lay at anchor, only appeared; and the only eminent part which can be seen from a ship, is the south-east point; though many gentle rising and declining grounds are observable by one who is ashore. The general appearance of the country is that of great want of fertility. At a distance the surface seems entirely clothed with trees of various sizes; some of which are very large. But above the rest, the tall cocoa-palms always raised their tufted heads; and are a very considerable ornament to any country that produces them. The boogo, which is a species of fig, with narrow pointed leaves, is the largest tree of the island. The winds are, for the most part, from some point between south and east; and when moderate, are commonly attended with fine weather. The basis of the island, as far as it could be observed, is entirely a coral rock, which is the only fort that presents itself on the shore. Of cultivated fruits, the principal are plantains, of which they have fifteen different sorts or varieties; bread-fruit; two sorts of fruit found at Otaheite, and known there under the name of jambu and eeevee, the latter a kind of plum; and a vast number of shaddock, which however are found as often in a natural state as planted.

The roots are yams, of which are two sorts; one black, and so large that it often weighs twenty or thirty pounds; the other white and long, seldom weighing a pound; a large root, called kappe; one not unlike our white potatoes, called mawhaha; the talo, or cocos of other places; and another named jeejee. Besides great numbers of cocoa-nut trees, there are three other sorts of palms, two of which are very scarce. The only quadrupeds, besides hogs, are a few rats, and some dogs, which are not natives of the place, but produced from some left by captain Cook in the year 1773, and by others got from Feejee. Fowls, which are of a large breed, are domesticated here. Amongst the birds are parrots, somewhat smaller than the common grey ones, of an indifferent green on the back and wings, the tail blueish, and the rest of a sooty or chocolate brown; paroquets not larger than a sparrow, of a fine yellowish-green, with bright azure on the crown of the head, and the throat and belly red; besides another sort as large as a dove, with a blue crown and thighs, the throat and under part of the head crimson, as also part of the belly, and the rest a beautiful green; owls, cuckoos, king-fishers, and a bird of the thrush kind. The other land birds are rails, fly-catchers, and three sorts of pigeons. Of water-fowl, and such as frequent the sea, are ducks, blue and white herons, tropic birds, noddies, and white terns. The only noxious or disgusting animals of the reptile or insect tribe are sea-snakes, scorpions, and centipedes. The insects amount to about fifty different sorts. The sea abounds with fish, though the variety is less than might be expected. The most common sorts are mullets, several sorts of parrot-fish, silver-fish, and albicores; some sharks, rays, pipe-fish, a sort of pike, and some curious devil-fish. The many reefs and shoals on the north side of the island, afford shelter for an endless variety of shell-fish; amongst which are many that are esteemed precious in Europe, such as the hammer-oyster, of which, however, none could be obtained entire; a large indentated oyster and several others, but none of the common sort; panamas; cones; a sort of gigantic cockle, found also in the East Indies; pearl-shell oysters, and many others. There are likewise several sorts of sea-eggs, and many fine star-fish, besides a considerable variety of corals, amongst which are two red sorts, the one most elegantly branched, the other tubulous. And there is no less variety among the crabs and cray-fish, which are very numerous. To which may be added, several sorts of the sponge, the sea-hare, and the like. See TONGA. S. lat. $21^{\circ} 9'$. E. long. $185^{\circ} 14'$. Cook's Third Voyage, vol. i.

TONGATORE, a town of Hindoostan, in Golconda; 30 miles S.E. of Hydrabad.

TONGBLOW, a town of Burmah; 12 miles from Raynangong.

TONGE, NIEUWE, a town of Holland, in the island of Overflakée; 3 miles S. of Sommerdyck.

TONGE, Oude, a town of Holland, in the island of Overflakée; 4 miles S.E. of Sommerdyck.

TONGELREP, a river of Brabant, which runs into the Dommel, near Eyndhoven.

TONGEREN, or TONGRES, a town of France, in the department of the Lower Meuse, late in the bishopric of Liege. This town is ancient, and was formerly governed by dukes. The collegiate church of Tongres is very ancient; they say it was the first on this side the Alps, built by St. Materne, who was sent by St. Peter to preach the gospel in Lower Germany, and became the first bishop of Tongres; which was erected into a diocese. It has three parish churches, and several religious houses. The French, in the year 1677, committed a thousand sacrileges and infolencies,

lencies, without regard to age or sex, and set fire to the town-house, the churches, several convents, and above 600 houses: and their fury was again repeated, under a pretence that the inhabitants had refused their contributions, and assisted the troops of the allies; 9 miles N.N.W. of Liege. N. lat. $50^{\circ} 46'$. E. long. $5^{\circ} 28'$.

TONGERLOO, a town of France, in the department of the Dyle; 9 miles N. of Aerschot.—Also, a river of France, which runs into the Meuse, 3 miles below Maefyck.—Also, a town of France, in the department of the Lower Meuse; 4 miles N.W. of Stockem.

TONG-GIN, a city of China, of the first rank, in Koei-tcheou, on the borders of Houquang. In the environs are gold and copper mines; 850 miles S.S.W. of Peking. N. lat. $27^{\circ} 39'$. E. long. $108^{\circ} 37'$.

TONGHO, a town of Birma, and capital of a province, strongly fortified. Here are manufactures of cotton cloth, and the environs produce the best beetle in the empire.

TONGKEEL, one of the Sooloo islands. N. lat. $6^{\circ} 2'$. E. long. $121^{\circ} 50'$.

TONG-KIN-TSIN-FOU, a town of Corea; 48 miles W.S.W. of King-ki-tao.

TONG-LAI, a town of Corea; 70 miles S. of Koang-tcheou.

TONG-LAN, a town of China, of the second rank, in Quang-fi; 1077 miles S.S.W. of Peking. N. lat. $24^{\circ} 27'$. E. long. $106^{\circ} 26'$.

TONGOI-PATCHI, a town of Thibet; 30 miles N. of Oramtchi Hotun.

TONGOLORE, a town of Hindoostan, in the Carnatic; 10 miles S. of Ongole.

TONGOY, a river of Chili, which runs into the Pacific ocean, S. lat. $30^{\circ} 10'$.

TONG-PIN, a city of China, of the second rank, in Chan-tong, on the river Ta-tsin; 190 miles S. of Peking. N. lat. $36^{\circ} 6'$. E. long. $115^{\circ} 56'$.

TONGPOTRA, a town of Pegu; 50 miles S. of Lundfey.

TONG-TCHANG, a city of China, of the first rank, in Chan-tong, on the grand canal; 212 miles S. of Peking. N. lat. $36^{\circ} 34'$. E. long. $115^{\circ} 40'$.

TONG-TCHOUEN, a city of China, of the second rank, in Se-tchuen; 720 miles S.W. of Peking. N. lat. $31^{\circ} 6'$. E. long. $114^{\circ} 44'$.—Also, a city of China, of the first rank, in Se-tchuen. This city is strongly fortified, and is called a military city, because the inhabitants are all soldiers; the profession descending from father to son. Besides their pay, they have the lands which surround the city. These troops are disbanded in time of peace, and to make them amends, they are placed in all the garrisons that are in the frontiers of the empire; 1000 miles S.W. of Peking. N. lat. $26^{\circ} 20'$. E. long. $103^{\circ} 2'$.

TONG-TCHUEN, a town of Corea; 85 miles E.N.E. of King-ki-tao.

TONG-TIN-HOU, a lake of China, in the province of Hou-quang, more than 80 leagues in circumference.

TONGTREE, in *Rural Economy*, a term applied to the pole of an ox-cart, or that of a waggon, and perhaps some other forts of carriages.

TONGUE, LINGUA, in *Anatomy*, an oblong member, whose form and situation are sufficiently known, and whose use is to be the organ of taste, and the principal instrument of speech and deglutition. See DEGLUTITION.

The upper side of the tongue is covered with a papillary nervous substance, over which are spread two membranes. The outer of these membranes is pretty thick, and full of papillæ, of a pyramidal figure, especially towards the tip, which pa-

pillæ stand pointing towards the root of the tongue in a bending posture, which makes their figure to be concavo-convex. These apices, or papillæ, are so very minute and slender in men, that they make the coat appear on the upper part villous, especially as they approach nearer to the root. The figure of the papillæ, in human tongues, is not so plainly discernible to the naked eye as not to need the microscope. In brutes they are generally larger, stiffer, and more conspicuous; and in some almost cartilaginous, as may be felt in the tongues of cats and oxen, but more sensibly in lions. On the upper side, at a little distance from the tip, this membrane becomes thin, smooth, and glabrous, and, as it were, polished by the lower parts of the mouth on which it slides.

Under this lies a thin, soft, reticular kind of coat, punched through with innumerable holes, and always lined with a thick and white, or yellowish mucus. This membrane is so exceedingly tender, and full of mucus, that it is not to be examined by the naked eye, unless boiled; by which it grows tough, and easily separable from the external membrane, and from the nervous part of the tongue, which lies immediately under it. After boiling, it appears like a kind of gauze, between whose threads innumerable holes appear, through which the apices of the papillary body underneath it are exerted. This membrane on the upper side, next the outward, appears white, with a cast towards yellow, but is black on the side next the tongue.

Many authors do not allow this to be a membrane, and will only have it to be a mucus hardened by boiling; but since it has so much of the resemblance of a membrane, and that authors agree in allowing two membranes to the tongue, Dr. Drake does not scruple to number it among them, since there does not appear to be any other second membrane; reckoning, with Malpighi, the smooth part under the tongue a part of the outer membrane; some, however, have considered it as a continuation of a distinct membrane, which covers that of a papillary texture.

Immediately under this appears a nervous papillary body, spreading itself to a moderate thickness over the whole surface of the tongue. This body, on the under side, is every where level and smooth, except in some few places, where it is connected to the subjacent muscular part by some nervous twigs which it sends into it. Malpighi distinguishes the papillæ, which make the principal part hereof, into three kinds, from their different magnitudes and figures when observed with the microscope; of which those seated on the sides and tip are very singular, resembling little round pyramids, with globes on their tips like the horns of snails. All these papillæ, which are the immediate organs of tasting, send their apices, or extremities, through the mucous membrane into the pyramidal papillæ of the outer membrane, which are hollow to receive them, and seem to be nothing else but a kind of cases to defend these nervous papillæ from injuries, which the salts and asperities of those bodies which we might take into our mouths might do them. See TASTING.

However necessary an organ the tongue be in speech, &c. yet instances have occurred, in which persons, who have lost their tongues, have spoken distinctly.

We have had in England an instance of this kind in one Margaret Cutting. See Philof. Trans. N^o 464. or Abr. vol. ix. p. 126. Idem, vol. xlv. p. 621.

Another occurs in Lamberti's Memoirs, and another in the Memoirs of the Academy of Sciences.

To the instances briefly mentioned above, we may add the following account of a man at Montagu, in the Bas Poictou, who being seized with the small-pox in his fifth

or sixth year, lost his whole tongue by gangrene, or putrefaction; yet, notwithstanding, performed in perfection the five actions belonging to the tongue, *viz.* speaking, tasting, spitting, chewing, and swallowing; nature having, with infinite artifice, given a new conformation to the mouth, proper to supply the want of the lost organ. See Jac. Rolandi Aglossiographia, five Descriptio Oris sine Lingua quod perfecte loquitur et reliquas suas Functiones naturaliter exercet; first published in French at Saumur, in 1630, translated into Latin by Car. Ruycerus, and published in the Ephem. German. D. an. 3.

For speech, instead of the ordinary provision, the little fleshy part of the tongue remaining was inserted in the middle towards the palate, the teeth inverted, and long inwards, the muscoli buccinatores easily contracting between the dentes molares. In fine, there was a disposition in all the organs to produce speech without a tongue; for the breath issuing at the oval aperture of the larynx, was farther broken, and rendered vocal by the inflation of the fleshy body, the motion of the lips, the retraction of the buccinatores, the tremulous agitation of the uvula, and the commotion of the lower jaw. Lastly, by the inversion of the teeth, the depression of the palate, the abundance of saliva, and the capacity of the mouth, the sound was still farther modified and determined, so as to render it articulate. Habit, too, and the repeated attempts to speak at an age when the parts were easily flexible, had contributed greatly to the distinctness of it.

For tasting, it is evident from this, as well as other considerations, that the tongue is not the only organ of it, but that the palate is also a seat of this sense. For chewing, the office of turning the meat in the mouth was here performed by the lips and cheeks, the muscles of which repelled towards the maxillares such parts as in mastication might fall from one side to the other. For the first morsel he took, he could only chew on that side into which he put it with his hand; the second he put in like manner on the other side, and thus varied and supplied each alternately. For swallowing, the gravity of the food contributed something to this, which he farther promoted by stretching out his neck, inclining his head, and drawing back the buccinatores within his teeth; all which were seconded by the mouth and fauces being well moistened with plenty of saliva. In effect, divers animals, as the tortoise and the crocodile, stork, &c. swallow without any tongue; and fish, though their tongue is fixed immoveable to their palate. For spitting, it was performed by the lips, aided by the internal contraction of the mouth, and the retraction of the buccinatores over the grinders.

Roland's instance was singular at that time, but a parallel one has been since observed in a girl at Lisbon, fifteen years old; of which an account was given, in 1718, to the Royal Academy of Sciences, by M. de Jussieu. Upon inspecting the mouth of this girl, there appeared nothing in all that part ordinarily possessed by the tongue, but a little eminence in form of a papilla, between three and four lines high, in the middle of her mouth, scarcely perceivable by the eye. Upon pressing this with the finger, a kind of motion of contraction and dilatation was perceived in it, which shewed, that though the tongue was wanting, the muscles of which it was formed, and which were destined to give it motion, were nevertheless there. With the help of these she spoke as distinctly and easily as if nothing had been wanting: she distinguished tastes like other people. For mastication, it was chiefly effected by the motion of the lower jaw, which she drew nearer to, or farther from, the grinders of the upper, under which the food to be chewed was. In this

action she sometimes also made use of her fingers, but much more in the action of swallowing, in order to protrude the masticated food towards the orifice of the œsophagus. For drinking, she performed it like other people, excepting the attention she employed to prevent the liquor going down too fast; in order to which she kept her head a little inclined forwards. Lastly, the action of spitting was supplied by the muscles of the papilla, which filled the lower part of her mouth; these rising almost to a level with the teeth of the lower jaw, and the buccinatores approaching towards both jaws, expressed the saliva, and conducted it to the sphincter of the lips, from whence the air, driven with violence from the larynx, served as a vehicle to expel it out of the mouth. Mem. de l'Acad. Scienc. ann. 1718, p. 6—16. Jussieu, loc. cit. p. 7, seq.

Dr. Mortimer, from a MS. account of the life of the Rev. Mr. Henry Wharton, chaplain to archbishop Sancroft, informs us, that he was born with two tongues. Phil. Transf. vol. xlv. p. 232.

TONGUE, *Injuries and Diseases of.* Wounds of the tongue have generally been divided, by writers on *Surgery*, into longitudinal and transverse. The former rarely happen, and seldom demand any but ordinary treatment. The same may be said of punctured wounds of this organ; cases which are occasionally met with in practice.

The most frequent wounds of the tongue are those which are transverse. They are hardly ever produced by outward means; but usually by the teeth, when the lower jaw is forcibly and spasmodically brought against the upper one, while the tongue is out of the mouth, as sometimes happens in epilepsy and falls upon the chin. In this way, transverse wounds of considerable extent frequently happen, almost separating, in some instances, the apex from the body of the tongue. In such cases, the injury may easily be converted into a sort of cleft, which may remain for ever afterwards, and more or less interfere with the functions of the organ. This disagreeable consequence is more likely to happen, when no care is taken to keep the opposite sides of the wound in proper contact, and hinder them from becoming distant from each other.

Hence, certain writers on surgery have recommended all wounds of the tongue to be immediately closed with a future; and Richter, though by no means a constant advocate for this method, is candid enough to allow, that it has succeeded in the best manner, even in cases where the tongue was bitten nearly through. Anfanggr. der Wundurzn. b. iii. p. 24.

The application of a future to the tongue being attended with some pain and difficulty, a very simple bandage has been proposed for uniting transverse wounds of this part. (Pibrac, Mem. de l'Acad. de Chirurgie, tom. ix. p. 22. pl. 9. Le Blanc, Précis d'Opérations.) Richter maintains, however, that the invention referred to does not answer expectation. The main portion of it is a little sort of bag, in which the fore part of the tongue is confined. Thus all motions of this organ forwards, or laterally, may be effectually prevented; but the patient is not deprived of the power of drawing it backward, that very action, which has a direct tendency to make the sides of a transverse wound separate from each other. In some cases, indeed, as Richter observes, the apparatus seems rather to do harm. Children, to whom it proves exceedingly irksome, are made restless by it, so that they keep moving their tongue and jaw about, to the great irritation and disturbance of the wound.

Richter further objects to Pibrac's bandage, that it is decidedly unnecessary; for, such motions of the tongue, as it directly restrains, namely, those forwards, or to either side,

TONGUE.

sive, may be hindered by applying a bandage to the jaw, and making the patient refrain from talking and mastication. The same author affirms, that such treatment has answered as well as could be desired, in numerous cases, some of which were large transverse wounds in restless and unmanageable children. During the treatment, however, the patient is to be allowed only liquid nourishment, which must be imbibed through a tube.

Perhaps, however, on the whole, the propriety of employing a future must depend entirely on considerations of the following kind. When the transverse wound is deep, and extends quite across the dorsum of the tongue; when it is situated towards the apex, and is conveniently within reach; and when the patient is uncontrollable, and cannot be made to keep the tongue and lower jaw quiet; a future may be advantageous. On the other hand, when the wound is at the back part of the tongue, (a case by the bye that is unfrequent,) and a future must be difficult of application; when the wound is trivial, likely to heal of itself, and there is no risk of its occasioning any material cleft in the part; and when the patient is docile, and attentive to the advice given him; the most judicious practice is to apply such a bandage as is recommended for the fractured jaw, and to forbid all motion of the tongue and lower jaw, by fricking, masticating, &c. nothing but liquid food being allowed to be drunk through a tube.

If the wound should be so deep, as almost to separate the anterior part of the tongue from the rest of this organ, the remaining connection is not to be divided; but an endeavour made to bring about an union. There are numerous cases on record, encouraging the practitioner to expect the best consequences from the attempt. Richter's *Anfangsgr. der Wundarzn.* b. iv. p. 26.

With regard to other circumstances, relating to wounds of the tongue, the treatment of these cases does not differ from that of wounds in general.

Bleeding from the Tongue.—An hæmorrhage from the ranal vessels sometimes follows accidental wounds, and surgical operations on the tongue. When it is an artery that bleeds, the accident may prove dangerous, and even fatal, especially in children, who by moving the tongue and jaw about, and continually sucking, promote the hæmorrhage, and render the adoption of the measures necessary for its suppression extremely difficult. As, in these cases, a ligature, compression, and styptics, hardly admit of being applied, the bleeding cannot be stopped, without much trouble. Whether the ranal arteries can be tied in the manner suggested below, remains to be proved; but, certainly, they are rather too far out of reach to be tied in the common way. Nor can compression, as ordinarily performed, be trusted, since it operates against soft yielding parts, and not upon any fixed point. Strong styptics, even were they deemed worthy of trial, could not well be employed, since they would be apt to mix with the saliva, and be swallowed. Yet, there are some means, by which the most perilous bleedings of this sort have been stopped.

Among the most celebrated of these last methods is the actual cautery, which is preferred by several of the continental surgeons, and may, perhaps, in this solitary instance, seem almost justifiable to British surgeons, averse as they properly are to this barbarous practice.

Another plan is that of directing an assistant to keep a compress on the bleeding vessels, as long as necessary, with his finger; while, with his thumb, he takes care to make counterpressure under the jaw. M. Jourdain stopped a considerable hæmorrhage from the ranal vessels, by laying a piece of ice under the tongue. M. Petit was the inventor

of an apparatus for stopping such bleedings, which is at once simple, ingenious, and effectual. The surgeon is to get a piece of birch, and cut it through below the place where two branches of equal size unite. It is to be made to resemble a sort of fork, the prongs of which are to be about eight lines long, and the handle four. It is then to be covered all over with linen, and put under the tongue in such a way, that the end of the handle is to rest against the middle of the concavity of the arch of the jaw, while the prongs embrace the frænum, and compress the bleeding vessels. The middle of a roller is next to be applied to the dorsum of the tongue, as far back as possible; and the ends, after crossing each other under the chin, are to be pinned to the child's night-cap.

If a surgeon were to be averse to these plans, or find them unavailing, there is yet one resource left, namely, that of cutting down to, and tying the trunk of the lingual artery, just where it passes over the cornu of the os hyoides.

Hæmorrhage from the ranal vessels occasionally arises quite independently of a wound. In one such example, the bleeding proceeded from a varicose vessel under the tongue, and was effectually stopped with the cautery. See *Desault's Journ. de Chirurg.*

Dangerous Enlargement of the Tongue from Inflammation.— Sometimes when this organ is inflamed, it swells so prodigiously, that it protrudes between the teeth, entirely fills the cavity of the mouth, and obstructs speech, deglutition, and even respiration. In such a case, the most prompt assistance is demanded. Ordinary evacuations of blood, and other antiphlogistic measures, here seldom bring relief with sufficient celerity. According to surgical authors, the most certain plan consists in making two longitudinal cuts along the edges of the dorsum of the tongue, from one to two inches in length. A copious bleeding generally follows, which soon brings about a diminution of the swelling. No troublesome consequences are to be apprehended from such incisions, which heal with ease, and scarcely leave any scar behind. *De la Malle, Mem. de l'Acad. de Chir.* tom. v.

Jourdain succeeded in affording prompt relief, by taking blood from one of the ranal veins. This method seems liable to no objection, except perhaps that of being difficult, when the tongue is enormously swelled. *Traité des Maladies de la Bouche, &c.*

In one example, the disease resisted every means until a blister was applied to the throat. Richter's *Anfangsgr.* band. iv. p. 29.

Some inflammations of the tongue have been observed to originate from the lodgement of foreign bodies in it, which ought to be extracted; as, for instance, a fish-bone, or a needle. (*Jourdain, Traité des Mal. de la Bouche, &c.*) Other cases have arisen from the injudicious employment of mercury, and the excitement of a sudden and immoderate salivation. Many examples are connected with violent inflammation of the parts about the throat.

Sometimes inflammations of the tongue terminate in suppuration. Such abscesses rarely admit of being opened, and hardly allow the use of any means, except emollient gargles.

Cases have occurred, in which inflammation of the tongue has induced mortification, and the loss of the greater part of this organ. The treatment of such instances must conform to the general rules delivered in the article *GANGRENE*.

When, in consequence of any enlargement of the tongue, or other disease in the mouth, the necessary food and medicines are, for a considerable time, prevented from being taken, they may be injected into the stomach through an elastic

elastic catheter, which is to be passed through one of the nostrils into the œsophagus. It has been recommended to have the outer end of the instrument to turn upward out of the nostril, and shaped like a funnel, whereby it is supposed fluids might be more conveniently introduced. (Libouton, *Journal de Médecine*, tom. xxxiv.) But we do not consider this any material improvement, since all liquids may be easily injected with an elastic gum syringe, such as is used for injecting hydroceles, without having the external end of the catheter made in the manner above suggested.

Ulcers, Indurations, and Tumours of the Tongue.—Ulcers on the tongue, of an exceedingly painful, obstinate, and malignant looking nature, are sometimes produced by the sharp or rough edge of a tooth. This mechanical kind of cause is easily detected on examination with the finger. If the tooth be found, the projection or roughness must be filed off; if it be carious, the best plan is to extract it. When these objects are accomplished, the sore usually heals without further trouble.

Some very obstinate ulcers, which originate on the tongue, and are connected with disorder of the digestive organs, may be cured by a long perseverance in the use of the antim. tart. exhibited alternately in small doses, and then in larger ones, so as to excite vomiting.

Ulcers, deserving the epithets malignant and cancerous, not infrequently form on the tongue. Sometimes the malady, in its most incipient state, appears as a sore. Sometimes a circumscribed moveable, or immovable, scirrhus swelling is first observable, which gradually becomes painful, and ulcerates. In other instances, there is, in the beginning, only an induration in the substance of the tongue, without the smallest appearance of any swelling. The ulcers, under consideration, are always surrounded by hardness. They may make their first appearance either at the edges or at the apex of the tongue. In certain cases, the whole, or a large portion, of this organ is covered with numerous small scirrhus tubercles, which gradually fall into a state of ulceration. These we have seen greatly diminished by a gentle course of mercury. All the medicines, tried in other cases of cancer, may be exhibited in the present ones; but, on the whole, the timely employment of the knife merits the most confidence.

However, the following kinds of cases have yielded to particular remedies.

A malignant exceedingly painful ulcer on the tongue, surrounded with a good deal of inflammatory hardness, has been cured by the continued internal use of opium. The dose is to be gradually augmented; patients are stated to have taken, at last, eighteen grains in one day.

One species of malignant ulcer yields to the long continued exhibition of tartar emetic. The doses must be increased, in proportion to the time which elapses from the first taking of the medicine.

Very malignant and unyielding sores on the tongue are said to have been cured by repeatedly applying leeches to the under surface of this organ. *Med. Commen.* vol. ii.

It would be inexcusable to pass over in silence such ill-conditioned ulcers of the tongue, as originate during violent salivations. Sometimes similar sores, produced by the same cause, take place, at the same time, on the tonsils; and, in this circumstance, inexperienced surgeons, or mistaken practitioners, who are blinded with the fear of syphilis, are very apt to suppose the sores to be venereal ones. This error leads to the freer use of mercury: the sores frequently slough; and the patient's health becoming greatly deranged, he is thrown into a state of great peril. In this case, it is hardly necessary to observe, that the use of mercury must

be immediately omitted, and the mouth very frequently washed with a solution of alum.

Violent inflammations, followed by ulcerations of this sort, are particularly apt to occur, when patients catch cold, while they are under the influence of mercury.

For the removal of a cancerous portion of the tongue, a bistoury is the best instrument; and the patient's mouth should be kept open during the operation, by the interposition of something between the teeth. The hæmorrhage is generally what is most apprehended; but we have instances related of large portions, and even of the anterior half of the tongue, being amputated, and of the bleeding being easily suppressed, either by the actual cautery, or some of the ordinary means for the suppression of hæmorrhage. It appears to us, that a tolerably dexterous man might tie the mouth of an artery in this situation, with the assistance of two pair of forceps to tighten the ligature, when the noose has been put over the tenaculum round the bleeding point. Certainly, cancerous diseases of the tongue may have advanced to such a degree, that an operation cannot be prudently undertaken. The bleeding would be a serious objection; the whole distemper of the tongue itself might not be removeable; and the contaminated state of the adjacent lymphatic glands below the jaw, usually existing in this advanced state of the malady, would, according to received opinions, render a radical cure quite impracticable.

When the disease is not in the vicinity of the apex of the tongue, the operator may find it difficult to draw the part sufficiently forwards, and keep it in this position. In this circumstance, surgical authors recommend the employment of a pair of forceps for the purpose, the blades of which are to be covered with rag. Should this instrument be found ineffectual, they advise the surgeon to use a pair of forceps, the blades of which terminate in two short double hooks. As being painful, one should always avoid, if possible, the employment of such an instrument.

Here, as in all other cancerous cases, it is the duty of the surgeon to take care that no point, suspected of participating in the disease, be left behind. Unless this maxim be attended to, the operation will mostly be followed by a relapse.

Abroad, surgeons have sometimes effected a cure by applying the cautery, notwithstanding the wound after the operation had put on an unhealthy and fungous appearance. (*Journ. de Méd.* tom. xviii.) In this country, practitioners might hope for similar success from the cautious employment of caustic; for the revival of the cautery, under any circumstances, is an idea now almost intolerable to every British practitioner.

After the excision of a diseased portion of the tongue, local applications cannot be very well used; nor are they in general necessary, when the patient moves the part as little as possible, and avoids putting stimulating food and liquids into his mouth.

Cancerous portions of the tongue may also be extirpated, by passing a double ligature through this organ, and firmly tying one part of the ligature over each side of it.

This plan must be infinitely more painful, than the removal of the diseased part with a knife. To the latter method, the hæmorrhage is the only objection; and, notwithstanding all that has been said, we think no surgeon ought to venture to cut away a diseased tongue, without having first made up his mind respecting what method should be adopted for stopping the bleeding.

When much of the tongue has been lost, there certainly is reason to expect, that its functions will afterwards be performed in a very imperfect manner. However, there are

are on record several examples, in which the greater part of this organ was lost, and yet the patients retained the faculties of tasting, masticating, swallowing, and articulating words, with considerable perfection. See Mem. Physiolog. &c. fur la Langue par M. Louis in Mem. de l'Acad. de Chir. tom. xiv.

The removal of scirrhus and sarcomatous tumours of the tongue may be most conveniently accomplished with a scalpel and a tenaculum. Encysted swellings of this organ are generally of the meliceris kind, and ought, if possible, to be dissected out, without opening the cyst at all.

Authors relate examples, in which the tongue has been of extraordinary magnitude, either in consequence of original malformation, or a peculiar sort of disease. Excepting the deformity, arising from the projection of the part out of the mouth, some of these patients experienced no particular inconvenience, as they could speak, masticate, and swallow tolerably well. Under such circumstances, the removal of the redundant portion would not be advisable; but if the disfigurement were combined with much inconvenience, the operation would be proper, especially as the cut part would be so forward in the mouth, that the bleeding vessels could be tied. First Lines of the Practice of Surgery, by S. Cooper, edit. 3.

TONGUE-grafting. See ENGRAFTING.

TONGUE-tied, the popular name for a distemperature of the tongue in children, when it is tied down too close to the bottom of the mouth, by a ligament connected all along its middle, and called its frænulum, which requires to be divided to give the tongue its proper motion.

This is sometimes the case in adults, but oftener in children, who cannot then exert their tongues to suck. This is, however, by no means so common as the women usually imagine; not so much as one child in a thousand being afflicted with it; nor is the operation in cutting it of little consequence, since often bad accidents follow it, and sometimes the loss of a child's life. When the infant can put its tongue out of its mouth, the frænulum wants no incision; but when the tongue cannot be extended beyond the teeth, the operation is necessary.

To perform this, the end of the tongue should be covered with a linen rag, and held with the fingers to prevent its slipping, and the ligament of the tongue running between the ranular veins and internal salival ducts, is to be divided by a pair of obtuse pointed scissars, till it gives room enough for sucking or speaking; but in doing this, great care must be taken not to wound the salival ducts, or the proper veins and arteries of the tongue; for children have been known to perish upon the spot from cutting the ranular veins in this operation. Midwives often tear this ligament with their fingers as soon as the child is born; but this is a dangerous practice. Heister. See INFANTS.

TONGUE of Fish. All fish have either a perfect tongue, or the rudiments of one, in their mouth; but this organ is very different in the various species, in its figure, mobility, and other qualities and properties; as to the figure, it is in some pointed before, as in the clupeæ; in others it is rounded in this part, as the perch and clarix have it; and in others it is somewhat bifid, as in the pike. In some it is smooth on the upper part, as in the gadi, cyprini, and mackarel; in others it is rough and dentated in this part, as in the salmon, mullet, &c. In many fish, the tongue is immovable, adhering firmly to the bottom of the mouth, as in the perch, cyprinus, and, indeed, in the greater part of fish; in others it is loose, as in the whale.

In the cetaceous fish, the tongue being loose, as in quadrupeds, it is used by the animal in the same manner; but

in other fishes it is of no use in the moving of the food about in the mouth, nor is it the genuine organ of taste, being in many a cartilaginous substance, and therefore not proper for receiving the notices of that sense. The principal use of the tongue in these fish seems to be in its serving as an assistant organ of swallowing, its being more elevated than the other parts of the mouth, rendering it fit for the tossing of the food down the throat. The true use of the tongue in those fish which have it dentated is, that it serves to retain the prey from running out of the mouth, and afterwards in the swallowing of it: what renders them more fit for this use is, that they have always the prickles turning inwards. It is the opinion of Mr. Ray, that the tongues of the cartilaginous kinds have some sense of taste, and this is more probable, than that the more hard and rigid ones should have any such sense. Artedi de Piscib. See FISH.

TONGUE of a Mufele. What is vulgarly called the tongue in this fish from its shape, is truly an organ, by means of which it spins a sort of threads in the manner of spiders or caterpillars, to fix itself to the rocks by. See MUSCLE.

TONGUE, in the Manege. The aid of the tongue or voice, is a sort of agreeable clacking, or a certain sound formed by the cavalier, in striking his tongue against the roof of his mouth, when he means to animate the horse, and sustain him, and make him work well in the manège. See AID.

TONGUE, To swallow the. A horse is said to draw in, or swallow his tongue, when he turns it down his throat, which makes him wheeze as if he were short-winded. This fault is cured by giving him a bit with a liberty for the tongue.

TONGUE, Serpent's, in Botany. See ADDER'S Tongue.

TONGUES, Serpents', in Natural History. See SERPENTS' Tongues, and GLOSSOPTERA.

TONGUE, in Mast-making, the taper part at the lower end of a spindle, or of a scart. In Rigging, a short piece of rope spliced into the upper part of standing-backstays, &c. to the size of the top-mast-heads; it is served over with spun-yarn, and its use is to keep them open to the size of the mast-heads.

TONGUES, Confusion of. See CONFUSION.

TONGUE, in Geography, a town of Scotland, on the north coast of the county of Sutherland, situated on a bay called the Kyle of Tongue. N. lat. 58° 27'. W. long. 4° 14'.

TONGUE Island, a small island in the Mergui Archipelago. N. lat. 0° 52'.

TONGUEY. See TANGUEY.

TONGUNEMEW, a town of Birmah; 35 miles S. of Raynangong.

TONGURAHUA, a town of South America, in the province of Quito; 20 miles E.N.E. of Riobamba.

TONGUSY TARTARS. See TUNGUSES.

TONHOF, a lake of Norway, in the province of Aggerhuus; 55 miles N.W. of Christiania.

TONIATO, a small island in the St. Lawrence. N. lat. 44° 30'. W. long. 75° 53'.

TONIC, τονικος, formed from τενω, to stretch, in Medicine, is applied to a certain motion of the muscles, in which the fibres being extended, continue their extension in such manner, as that the part seems immovable, though in reality it be in motion. See MUSCLE.

Such is the case of a man standing, of birds planing or swimming through the air, &c. Galen says, that the muscles act even when at rest; for after having made any contraction to fix themselves in a certain state or disposition, the preserving of that contraction is what we call the tonic motion.

TONIC, in Music. See GENUS.

TONIC Accent. See ACCENT.

TONICAL Echo. See ECHO.

TONICHI, in *Geography*, a town of New Mexico, in the province of Hiacqui; 25 miles N. of Riochico.

TONIKAKY, an island in the East Indian ocean, near the north coast of Celebes. N. lat. $5^{\circ} 31'$. E. long. $99^{\circ} 30'$.

TONINA, in *Botany*, an unexplained name of Aublet's. See HYDRIDA.

TONIQUE, in *French Music*, is equal to key-note in English music, or the principal found of a composition which generates all the rest.

TONISKA, in *Geography*, a town of Russia, in the government of Irkutsk; 40 miles E.S.E. of Stretensk.

TONKER. See LASSA.

TONKER-SONG, a town of Tibet; 504 miles E. of Lassa. N. lat. $25^{\circ} 57'$. E. long. $99^{\circ} 46'$.

TONKEY, in *Agriculture*, a term provincially made use of to signify short-legged and deep-carcated, as is the case in the Chinese breed of swine. It is consequently a term sometimes applied to that breed of swine. See SWINE.

TONKIN, in *Geography*. See TONQUIN.

TONNA. See TAINNA.

TONNAGE, the weight of goods carried in a boat; also, the rates, tolls, or sums *per ton, per mile*, or otherwise, which are payable to the proprietors of the navigation for the liberty of using the same. See TUNNAGE.

TONNAGE, *Duty of*. See DUTY.

TONNAGE, in *Ship-building*, the cubical content, or burthen, of a ship in tons; which is commonly estimated by a given rule not answering the above purpose, but producing what is denominated the builder's tonnage. The real burthen a ship is to carry, when brought down in the water to the load-draught of water intended in the construction, may be nearly found by the rules given in the article SHIP-BUILDING (*Tonnage or Burthen*). See also BURDEN of a Ship.

The word is derived from a ton, or weight of water equal to 2000 pounds; for it appears that, anciently, a cubic foot of water, weighing $62\frac{1}{2}$ pounds, was assumed as a general standard for liquids. This cubic foot, multiplied by 32, gives 2000, the original weight of a ton. Hence eight cubic feet of water made a hoghead, and four hogheads a ton, in capacity and denomination as well as weight.

TONNAGHAN, or DONAGHAN, in *Geography*, a river of Canada which runs into lake Superior, on the side of which is found a quantity of virgin copper.

TONNAY-BOUTONNE, a town of France, in the department of the Lower Charente; 10 miles W. of Rochefort.

TONNAY-CHARENTE, a town of France, in the department of the Lower Charente; 3 miles E. of Rochefort.

TONNEAU, in *Commerce*, a measure of capacity in many parts of Germany, both for wine and dry commodities. The tonne, as a measure for corn, contains 8 scheffels, or 32 viertels, 100 of which tonnes yield about 49 English quarters. A tonne of beer contains 128 quarters, or 25 English beer gallons. At Konigsberg, a last contains 24 tonnes, $36\frac{1}{2}$ new scheffels, 60 old ditto, 240 viertels, or 960 metzens. A new scheffel contains 31½ English cubic inches, and 43 scheffels = 63 English bushels nearly, and 20 Konigsberg lasts = 207 English quarters. The last of Spanish and French salt is reckoned at 18 tonnes, or 6000 lbs.; the last of herrings at 12 tonnes; a last of green marbled soap at 3 tonnes, or 12 viertels. See TUN.

TONNEAT, a corn measure in some parts of France.—Also, a weight of 2000 lbs. French, by which the burden of ships is reckoned.—Also, a general term in France for a cask.

TONNEINS, in *Geography*, a town of France, and principal place of a district, in the department of the Lot and Garonne; $13\frac{1}{2}$ posts S.E. of Bourdeaux. N. lat. $44^{\circ} 23'$. E. long. $0^{\circ} 24'$.

TONNERRE, a town of France, and principal place of a district, in the department of the Yonne; 18 miles E.N.E. of Auxerre. N. lat. $47^{\circ} 51'$. E. long. $4^{\circ} 5'$.

TONNERRE, a mountain of France, which gives name to a department; 15 miles N.W. of Worms.

TONNING. See TUNNING.

TONNINGEN, in *Geography*, a seaport town of Denmark, in the duchy of Sleiswick, situated on a peninsula, formed by the Eider. In the year 1613, the harbour was enlarged and repaired at a considerable expence; but in 1675, during the war with Sweden, the duke, pursuant to the treaty of Rendiberg, was obliged to cede this town to the king, who caused the fortifications of it to be demolished. But when the duke recovered the town in the year 1679, they were repaired, and improved with additional works; so that when king Frederick IV. besieged it, he was not able to make himself master of it. In the year 1713, the Swedes were obliged to surrender themselves prisoners of war to Denmark; and in the year 1714, the king having got possession of the town, the fortifications were demolished a second time. Tonningen has been in a defenceless condition ever since that time. It had once a noble castle, but that was likewise demolished by the king's orders, in the year 1734; 57 miles N.N.W. of Hamburg. N. lat. $54^{\circ} 23'$. E. long. $9^{\circ} 0'$.

TONNOMAIA, one of the smaller Friendly islands; 11 miles S. of Annamooka.

TONO, a town of Chili; 70 miles S. of St. Yago de la Nouvelle Estremadura.

TONON. See THONON.

TONORIUM, in *Ancient History*. Roman orators, though not constantly accompanied by a flute, had their voices frequently regulated by an instrument which Quintilian calls a *tonorium*, Cicero, a *phthala*, and Plutarch, *τὸν ὄργανον*, or *styrax*, which is the same thing; and this instrument served as a kind of pitch-pipe. Both Cicero (De Orat. lib. iii.) and Plutarch (In Vit. C. Gracch.) relate the well-known story of the voice of the furious tribune, Caius Gracchus, being brought down to its natural pitch, after he had lost it in a transport of passion, by means of a fervent placed behind him with one of these instruments. Cicero tells us that this *styrax*, with his *stapper*, *qui fuerat vocalis post ipsum*, and was not seen by the people, does not confine his employment to appeasing the passion of his master; he was, upon occasion, to incite it: "Qui inflaret celeriter eum sonum, quo illum aut remissum excitaret, aut a constantione revocaret." It is not easy, however, to conceive of what use this expedient could be, unless rhetorical tones were regulated by those of music.

TONOS, a word used by Hippocrates, to express in general any nerve, whether arising from the brain or spinal marrow. It is also used to express a tension in any part.

TONOSA, in *Ancient Geography*, a town of Asia, situated on the river Melas, W. of Godais.

TONOSA, or *Tonosus*, a town of Asia, in Cappadocia, on the route from Sebaste to Coruson, between Sebaste and Ariarathia. Anton. Itin.

TONOUWAH, in *Geography*, a kingdom of Africa, S. of the Niger, the capital of which is Affentai (the Affenté of D'Anville,) situated midway between Kalanthee, a dependency of the kingdom of Tonouwah, and the sea-coast; that is, about eighteen days' journey from each. It is said that there is no communication between this coast (probably the Gold Coast) and the country of Gorjah; as the king of Affentai;

Assentai, who possesses the intervening space; prohibits his inland neighbours from passing through his country. On the other hand, a gentleman (Mr. Norris) who resided many years in Whydah, says, that there are other states (that is, the Fantees, and their confederates) lying between Assentai and the sea; and that the Assentais have often attempted, but without success, to open a communication with the coast, from that part of the Niger which forms the southern limit of the great empire of Calhna. In the kingdom of Tonou-wah, which is said to border on the coast of the Christians, and of which, as we have said, Assentai, or Assienté, is the capital, a succession of hills, among which are mountains of a stupendous height, diversifies, or constitutes the general face of the country. Some of the lands are cleared, but other districts are still incumbered with woods of a vast extent; and though for the most part the highlands are pastured by innumerable flocks of sheep, and by herds of cows and goats, and the vales exhibit the captivating view of successive villages, encompassed with corn and rice, and fruits of various kinds, yet these are places of native sterility and eternal barrenness.

TONQUIN, or TUNQUIN, signifying "the Court of the East," because when this country was a province of China, it was the imperial residence; though, with regard to its position with respect to China, it should rather be called "the Court of the West," and denominated by the natives *An-nam*, *Anam*, or *Ngan-nan*, *i. e.* the repose of the south, is separated from Cochin-china by a small river, and may now be considered as incorporated with it by conquest. It is bounded on the E. and N. by China, on the S. by Cochin-china, on the W. by the kingdoms of Laos and Baos, the latter being unknown to geographers. Tonquin may be regarded as consisting of eleven provinces; that of the North being the largest; its boundaries being Laos on the W., China on the N. and E., and Baos on the N.W. With regard to its aspect and surface, it may be divided into two portions, the mountains and the plain. Towards China, Cochin-china, and Laos, the mountains are extensive, but neither rocky nor precipitous; and they are partly covered with forests. In this part are found mines of gold, silver, and iron, and also of copper, which is in high estimation. The lower part of Tonquin much resembles Holland, being partly land and partly water, and intersected by canals and dykes, and also by numerous rivers and lakes. The province denominated "of the West" is watered by seven great rivers, which unite about fifteen leagues above the royal city, and form a kind of sea, or large lake, which sends out various branches. The southern part of the kingdom, though in the torrid zone, superabounds with waters covered with boats. A navigable river, called Songkoy, traverses the kingdom from N. to S., and receives various streams, which are also partly navigable; and canals which serve for the cultivation of rice are numerous. The rivers of Tonquin rise from the mountains of Yunnan, and in the rainy season, from May to September, inundate the adjacent country. The chief of these is the Holi Kian, which, after receiving the Li-sien, passes by Kecho the capital. The population of this country is said to be considerable. Although it has few towns, it has several villages which contain many inhabitants. The capital of the kingdom and royal residence is Kacho, Kecho, or *Kebo* (which see). The next remarkable town is Hean, containing about 2000 houses, situated on the right bank of the river, at the distance of four or five days from its entrance into the sea. Formerly the French had a factory in this place, and the trade was considerable. (See HEAN.) At the distance of five or six leagues from the mouth of the river is another town,

called Domea, much less than Hean. These towns, as well as most of the villages, and some houses belonging to persons of wealth, are surrounded with live hedges of bamboo; and to the houses and gardens are annexed alleys of areca trees, which exhibit a picturesque appearance. The high roads, which are scarcely passable in the wet season, are maintained at the public expence. The rich use horses, or litters carried by men. In the mountains the houses are dispersed, and the people almost savage. The chief product of agriculture is rice, which affords two harvests annually in the low country, but in the high lands only one. The rivers and canals abound with fish of various kinds: wheat and wine are unknown: the mulberry-tree is common: silk is in general use among the poorer people: the sugar-cane is indigenous, but the art of refining the juice is unknown. The plough used in agriculture, consists of three pieces of wood, a pole, a handle, and a third piece, almost at right angles with the last, for opening the ground, and they are simply fixed with straps of leather: this plough is drawn by oxen or buffaloes. The horses are small, but lively and robust: but they are little used, as the inhabitants prefer travelling by water. Asses and sheep are unknown; goats are few, and swine abundant. The people eat dogs, cats, and rats: poultry, ducks, and geese abound, and are found wild in the forests. The eggs of ducks are heated in ovens, and produce young, which swarm on the canals and ponds. The forests contain deer, boars, peacocks, a peculiar kind of partridge, and quails. The tigers are large and destructive; one of which is said to have entered a town, and to have destroyed eighty-five people. The wild elephants are also very dangerous: apes are found in these forests, and some of them of large size: these and the parrots are not a little destructive of the rice and fruits. The manners of the people are less civilized than those of the Chinese: they are in general of middle stature, with broad faces, not so flat as those of the Chinese; eyes and nose small, and long black hair. The men have little beard, and do not shave. Few of the people are deformed, and the women are rather handsome. The complexion of people of rank approaches that of the Portuguese and Spaniards. At the age of seventeen or eighteen they begin to blacken their teeth, regarding white teeth as the praise of dogs: like the Chinese, the fashion of suffering their nails to grow is restricted to the Mandarins, the men of letters, and other distinguished persons. The ladies tinge their nails with red, and sometimes their hands and feet. The dress of the men consists of a piece of silk, several yards long, wrapped about the loins, and a long robe with loose sleeves, thrown off in travelling or during labour. The women of the lower orders are modestly clothed in a long petticoat, and one or more robes like those of the men. They cover their bosoms with a piece of linen or silk in form of a heart: they use ear-rings and bracelets of gold or silver. They commonly appear with naked legs and feet, like the men; but the rich and persons of dignity wear long drawers. The most general colour of the silk and linen is white. Black is only worn by persons of distinction. The men and women fasten their hair behind in a knot; but in the presence of a superior they let it fall, in token of respect.

The people are indolent, and loaded with heavy taxes. The public services required from them occupy about six months in the year. The learned language in Tonquin is that of China, but it degenerates into a kind of dialect which cannot be understood by a Chinese, and the words are all in single syllables, and expressing different things according to the accents and mode of enunciation. The language of Tonquin, and also of Cochin-china, called

the Anam language, says Dr. Leyden, is simple, original, and monosyllabic. It has little affinity to the Mandarin or court language of China, to that of Canton, to the copious polysyllabic and inflected Japanese, or to any other of the Indo-Chinese languages. Barrow, in his voyage to Cochin-china, seems to consider it as a derivative from the Chinese; but Dr. Leyden perceives no similarity between the Chinese and Anam, unless that they are both monosyllabic languages, and that the signification of terms is regulated, in a great measure, by their accentuation. But though the same monosyllables occur, and though they are also accentuated frequently in a similar manner, yet even in this case, the signification of these monosyllables is for the most part totally different. In the syntax or construction of the two languages, there is also a very great difference. The Anam language has neither genders, numbers, nor cases, moods, tenses, nor conjugations; all which are supplied by the use of particles and the juxtaposition of words, as in the other monosyllabic languages. The same word has often the signification of both a noun and a verb, and its particular use, in such a case, is to be determined by the context, and the collocation of words in the sentence. The principles of collocation in sentences are equally simple as in the other monosyllabic languages; many instances of which are specified by Dr. Leyden. The accents in the Anam tongue are of such indispensable utility, that they have been very properly termed the soul of the language, while the primary monosyllables, varied by accent, have been made to represent its body. The Anam style is sometimes highly bold and figurative, and attains a degree of animation which is not very common among the Indo-Chinese nations of the continent. The ancient code of Tonquin laws possessed great celebrity, and was highly venerated previous to the conquest of that country by the Cochin-chinese. It is represented by the missionary Le Roy, as composed in the most elevated style of Chinese, and full of uncommon modes of expression. He also mentions, that it was printed with an Anam translation, composed by an ancient Tonquin Mandarin. The religion of the Anam nation is a modification of the Boddhisist system, nearly resembling that which prevails in China. Many local and peculiar superstitions, however, are blended with it, such as the worship of the dog and tiger, to the first of which human excrement, and to the second, human flesh is offered. Traces of this worship are found among the mountaineers on the borders of India, as well as in the proper Indo-Chinese countries. There the tiger is worshipped by the Hajin tribe, in the vicinity of the Garrows or Garadas.

The Quan-tô, an ancient race, as the name signifies, who inhabit Kaubang, or the mountainous range which divides the Anam countries from China, regard themselves as the original inhabitants of Tonquin and Cochin-china, and consider the Anam as a Chinese colony. The Quan-tô have a peculiar language, and write with a style, on the leaves of a plant, termed in Anam "jiwa." The Moi and Muong are also mountaineer tribes, who speak languages different from the Anam; but it is hitherto unknown, whether they are original races, or only branches of the Quan-tô. Asiatic Researches, vol. x.

Marriage is contracted without priest or ceremony, the consent of the parents forming the only ceremony. The husband may repudiate or sell his wife, but the wife cannot leave her husband without his consent. The right of primogeniture predominates, and daughters derive little benefit from the estate of their father. Polygamy is common; divorces are rare: children are not exposed as in China. The inhumanity of creditors equals that of ancient Rome,

and the accumulation of usury renders the state of debtors very perilous. An abominable and cruel custom prevails, which is that of putting some person to death at the beginning of a new year, and with this view they poison the fowls and fruit which are brought to market: examples of this horrid practice, which, it is thought, will secure them good fortune, are frequent, but the punishment is rare. The chief amusements are plays, dances, and cock-fighting. The general food is rice, and pulse is also in request. The nests of a species of swallow are also held here, as well as in China, in great esteem. The chief drink is derived from a kind of coarse tea, but arrack is also much prized.

The climate of Tonquin is not very hot. From the month of September till March, it is temperate and healthy; in January and February the weather is cold, but neither snow nor ice is seen, and hail is very rare; the temperature of the air becomes rather insalubrious in the months of April, May, and June, which is the season of fogs and heavy rains; and great heat is felt in July and August. In the flat country, and on part of the mountains, the winds regularly blow six months from the N. and six from the S., the first beginning in November. Among the maladies of this country, the most grievous is a kind of leprosy, which devours the extremities of the hands and feet. The funeral ceremonies resemble those of China: pieces of gold or silver, or small pearls, are put into the mouths of the dead, that they may not enter poor into another world. Their religion resembles that of the Chinese, but the sect of Foo is most regarded. Every town or village has a tutelary genius. Sometimes the supposed geni are vile animals, as serpents, dogs, cats, oxen, fish: but more frequently men, who have deserved well of their country. The natives are not a little addicted to magic. The sciences, like those in China, are chiefly sought in the writings of Confucius and his commentators; the principal branches being morality, mathematics, physics, and astronomy, with the history and laws of the country. Knowledge is highly esteemed: and the men of letters are regarded as the sole nobility in the kingdom. All the offices and dignities of the state are the recompense of literary merit. Printing is known here, as in China; but painting and sculpture are in a low state. The chief trade is with China, which supplies Tonquin with fine teas, porcelain, silks, and painted linens, prepared sugars, wheat and barley, flour, kitchen utensils, iron, spices, flax and lint, wax, cotton, glass, and toys. Strangers export from Tonquin varnish, silk raw or wrought, chiefly strong stuffs, beautiful cloth resembling linen, made of the bark of trees, different works of mother of pearl, ebony, ivory, tortoise-shell, cinnamon, copper, cottons, and several other articles. Calamine is also exported from Tonquin by the Dutch and carried to Japan, where it is used in the manufacture of brass. The interior commerce of Tonquin is considerable, consisting chiefly of fruits of different kinds, silk and cotton cloths, with those made of the inner bark of the paper-bearing mulberry. The cinnamon, duly cultivated, would be valuable. The trees that produce the varnish distil a juice resembling turpentine, and the quantity is increased by incisions. Sugar might form a considerable article, if the people knew how to prepare it. Paper, made of the bamboo, mulberry, elm, cotton-tree, and all kinds of white and sappy woods, is a considerable article. Salt procured from the sea, is a commodity of great demand in the interior of the country. The troops of Tonquin amount to about 140,000, of which about 8000 or 10,000 are cavalry. Elephants were formerly used in war, but the introduction of fire-arms has diminished their number. Since the revolution in Cochin-china, when the Chova rendered himself independent:

pendent of Tonquin, and assumed the royal title, a body of 10,000 men has been stationed on that frontier. Every governor of a province has at his disposal 700 men and one elephant. The remaining force, amounting to about 100,000, is placed in the royal city, or in an adjacent camp.

The arms of the Tonquinese are the ancient musket fired with a match, the modern firelock being unknown there, bows, fabres, pikes and half-pikes, and a defensive buckler. The troops of the king's household, which are reckoned among the best troops of the East, are clothed in blue and red. The navy amounts to about two or three hundred galleys, navigated with oars, and fitter for the rivers of the country than for the open sea. The king of Tonquin is reckoned among the rich sovereigns of the East; as he possesses valuable treasures and an ample revenue, derived from rice, a tax upon land, a capitation tax, the sale of dignities, and the duties on merchant-vessels, amounting to about one-tenth of the merchandize. The laws of Tonquin, like those of China, are founded on the single principle of paternal authority and filial obedience. The magistrates are denominated Mandarins, from the Portuguese *mandar*, to command, by the Europeans; but in the native languages both of China and Tonquin, the appellation is "Quan." The tenure of lands and right of inheritance are respected even by the sovereign; and the successions in land are determined by one tribunal, and that of houses and personal property by another. The judges are corrupt, and justice is sold. The military and civil offices are venal. Executions are rare, not exceeding through the whole kingdom twenty or thirty in a year. Decapitation is counted ignominious: princes and persons of rank have the privilege of strangulation. Female criminals are trampled to death by elephants. The dignity of public executioner is hereditary. Other punishments are exile, perpetual imprisonment, and personal chastisement, sometimes with the mutilation of a finger or ear. The prisons are said to be in a shocking state. On a general view of Tonquin, the country and the despot are extremely rich, and the people are very poor. The Jesuits, soon after the commencement of the 17th century, made an attempt to introduce into this country the Christian faith; but their efforts have not been very successful; several instances having occurred of the persecution of Christians.

In the gulf of Tonquin there is a small isle, which is said to afford the musk animal; and in the vicinity is a pearl fishery. The chief entrance of the river, called Domea by the Europeans, is obstructed by a bar, and requires the guidance of a native pilot. In this gulf, as well as the adjacent Chinese sea, the "typhoons," or "typhons," are tremendous. They are preceded by very fine weather; a presaging cloud appears in the N.E. black near the horizon, edged with copper-colour on the upper part, fading into a glaring white. It often exhibits a ghastly appearance twelve hours before the typhon bursts; its rage lasts many hours from the N.E., attended with dreadful claps of thunder, large and frequent flashes of lightning, and excessive hard rains: then it sinks into a dead calm, after which it begins again with redoubled rage from the S.W., and continues for an equal length of time. Abbé Richard's compilation from the papers of the abbé St. Phalle, a missionary in Tonquin for twelve years, who died at Paris in 1766; cited by Mr. Pinkerton, in his *Geography*, vol. ii. For an account of the revolutions in Tonquin from the earliest period of historical account, see *Grosier's China*, vol. i.

TONQUIN *Bean*, in *Botany*, sometimes called *Tongo* Bean, is the seed of *DIPTERYX odorata*. See that article.

TONQUIN *Medicine*. See HYDROPHOBIA.

TONS *de l'Eglise*, Fr.; *Tuoni ecclesiastici*, Ital.; the ecclesiastical modes or tones in canto fermo. See PLEIN-CHANT, CANTO FERMO; and *Ecclesiastical MODES*, AUTHENTIC and PLAGAL.

For the history of the establishment of the modes at Milan and at Rome, see *St. AMBROSE* and *St. GREGORY*.

The modes of the Roman church are eight: four authentic, and four plagal. The four authentic, or principal, are the odd numbers: 1st, 3d, 5th, and 7th; the plagal are the even numbers: 2d, 4th, 6th, and 8th; which answer to D and A minor, and C and D major, for the authentic; and G and A minor, and F and G major, for the plagal. These are described by Dr. Pepusch, Padre Martini, and Rousseau, and all their several scales may be seen in Burney's *General History of Music*, vol. ii.

We have drawn out the scales of all the eight modes or tones ascending and descending (see *Plates of Music*); by which it will appear from the imperfection of these scales in most of the tones, that they are only capable of melody; and in the common service of Roman Catholic churches, when the priests perform the duty without the assistance of professed musicians, no harmony is attempted to be given to mere canto fermo. In cathedrals, the motets and parts of the mass are sung by choirmen and children, as the anthems and services are in our cathedrals.

Notwithstanding the imperfection of the scales, and little variety of keys in the ecclesiastical chants, secular music seems for many ages to have had no other rules, but to have been strictly confined to a few keys in the diatonic genus, without the liberty of transpositions. Hence came the timorous pedantry of excluding all other keys and scales but those used in the church; which kept every kind of melody meagre and insipid, and in subjection to the rules of ecclesiastical chanting. For it appears, that the only major keys used in canto fermo are C and its two fifths F and G; and the only minor keys A, E, and D. And in four of these keys the scale is deficient, as there is no seventh or *note-sensible* to G, A, or D. This accounts for so small a number of the twenty-four keys which the general system and scale of modern music furnishes, having been used by the old composers; as well as for the temperament of the organs by which these modes were afterwards accompanied. And as all music in parts seems, for many ages after the first attempts at counterpoint, to have been composed for the service of religion upon canto fermo and its principles; it likewise accounts for the long infancy and childhood of the art, till it broke loose from the trammels of the church, by which it was bound in Gothic times: and by the cultivation of the musical drama sacred and secular, the ideas of composers were enlarged, and the talents of performers improved by new exertions, which brought the art nearer perfection during the two last centuries, than it had attained in seven hundred years from the time of Guido.

In implicit and religious obedience to the laws of canto fermo, no accidental flat or sharp was ever to appear; all the eight tones being rigidly in the diatonic genus in the keys of C and A natural, with no other semitones than from E to F, and B to C. When the scales of these tones are drawn out at full length, they seem nothing more than different species of octave.

All these scales descending, might, however, be made perfect by a single flat or sharp at the clef: as the first tone by a flat, the third by a sharp. The 2d is perfect, descending; the 4th wants a sharp or two at the clef to determine it to be in the key of E or B minor. A flat would make the 5th complete in the key of F; and a sharp the 7th in that of G. The

G. The 6th is in the key of C natural, ascending complete; and with a flat to B in the key of F, descending; the 8th with one sharp would be in G, and with two sharps in D major. But these were licences which no one thought of, or at least had the courage to practise, till counterpoint began to gain ground. And even then, the *musica fisa*, or false music, as that in transposed keys was called, no one dared to write till lately. Even the orthodox and good Padre Martini, at length vanquished his fears of the impiety of using an accidental flat or sharp in the inward parts of canto fermo.

Lorente, author of the famous Spanish treatise called "El porque de la Musica," without which Geminiani made Dr. Worgan believe it impossible for any one to understand counterpoint, has written the scales of the eight tones as we have done; but has not ventured to harmonize them, as accidental sharps and flats must have been expressed or understood in the additional parts.

TONSA, in *Geography*, a river of European Turkey, which runs into the Mariza, near Adrianople.

TONSÆ, among the *Romans*, the blades of oars, or that part of them which beats against the water.

TONSBERG, in *Geography*, a seaport town of Norway, in the province of Aggerhuus, situated on a bay of the Baltic; built upwards of 800 years since. It formerly contained nine churches, but now has only two. The inhabitants carry on a considerable trade in furs and butter. In the year 1536, it was laid in ashes by the Swedes, since which, it has greatly declined; 42 miles S. of Christiania. N. lat. 59° 23'. E. long. 10° 12'.

TONSELLA, in *Botany*, a name made by Schreber, out of the *Tontelea* of Aublet, which is itself taken from the Caribbean appellation of the same shrub, *Ravoua-tontelle*. Schreber perhaps meant to give the word a classical air, by approaching it either to *Tonsa*, an oar, or *Tonsilla*, a mooring post, or a cable, for which indeed there seems no foundation in any recorded use of the plant. Possibly he might have in view *tonsilis*, a word applied to the box, or other trees fit for clipping. This idea is, however, no less inapplicable to our *Tonsella* than the former.—Schreb. Gen. 34. Willd. Sp. Pl. v. 1. 194. Vahl. Enum. v. 2. 29. Mart. Mill. Dict. v. 4. (Tontelea; Aubl. Guian. v. 1. 31. Juss. 436. Lamarck Illustr. t. 26.)—Class and order, *Triandria Monogynia*. Nat. Ord. uncertain, Juss.—It seems akin to *Eurocygnus*, and therefore probably belongs to his *Rhamnii*.

Gen. Ch. Cal. Perianth inferior, of one leaf, bell-shaped, permanent, in five deep, ovate, acute segments. Cor. Petals five, ovate, thick, permanent, longer than the calyx, inserted into the receptacle. Nectary cup-shaped, entire, surrounding the germen. Stam. Filaments three, thread-shaped, reflexed, inserted into the inside of the nectary, rather shorter than the petals; anthers roundish. Pist. Germen superior, roundish, surrounded by the nectary; style cylindrical, shorter than the stamens; stigma simple. Peric. Berry spherical, seated on the permanent calyx and corolla, of one cell. Seeds four.

Eff. Ch. Calyx in five deep segments, permanent. Petals five. Nectary cup-shaped. Berry of one cell, with four seeds.

Obs. Jussieu appears to have been undetermined about the natural affinity of this genus, from having preconceived the germen to be inferior, which it surely is not.

1. *T. scandens*. Climbing *Tonsella*. Willd. n. 1. Vahl. Symb. v. 2. 17? (*T. scabra*; Vahl. Enum. n. 1. *Tontelea scandens*; Aubl. Guian. 31. t. 10.)—Leaves pointed, entire. Branches round, warty.—Gathered by Aublet in the forests of Guiana, near the river of Sinemari, thirty

leagues above its mouth; flowering in October.—Von Rohr is said to have found the same in the island of Trinidad. The former terms it a *shrub*, climbing to the tops of the loftiest trees, and covering them with its opposite, repeatedly compound *branches*, which at length become pendent, even to the ground. In his own specimen before us they are slender, round, covered with minute warts bursting through the cuticle, and bear several short opposite shoots, leafy at the extremity. We find no sign of hairiness. The *leaves* are opposite, on thick, channelled, smooth stalks elliptical, entire, two or three inches long, with a short blunt point; they are smooth on both sides, coriaceous, rather shining, with one rib, and many reticulated veins. *Flowers* green, very small, about the ends of the branches, in partly terminal, partly axillary, small clusters, whose partial stalks are opposite.

Vahl describes the plant of Von Rohr as a *tree*, whose *branches* have a purplish roughish bark, and are hairy in their upper part. The *leaves* are roughish on both sides; their veins villous at the back. *Flower-stalks* downy. *Calyx* and *petals* hoary; the latter fringed. We have seen no specimens of this, nor indeed of the *flowers* of Aublet's plant, but we cannot help supposing they may be different species, though we do not feel authorized to define them as such.

2. *T. africana*. Toothed African *Tonsella*. Willd. n. 2. Vahl. n. 3.—"Leaves obtuse, with glandular teeth."—Native of Guinea.—Similar to *T. scandens*, but different, having smaller and obtuse *leaves*, furnished with very distant glandular teeth; a larger *corolla*, and sessile *anthers*. *Berry*, according to Vahl, the size of an apricot, smooth, orange-coloured, globular with three slight angles, and from six to ten seeds.

3. *T. angulosa*. Entire-leaved African *Tonsella*.—Leaves pointed, entire. Branches angular, smooth.—Brought from Sierra Leone, by professor Afzelius. The dried specimens are of a peculiarly fresh light green, and quite smooth. *Branches* with four, not very prominent, angles, slender and wavy. *Leaves* two and a half inches long, elliptical, with a linear blunt point, quite entire, veiny. *Flowers* small, green, in small, axillary, stalked tufts, whose common stalks, like the *footstalks*, are about a quarter of an inch long. *Fruit* the size of a pea, apparently a tough-coated *berry*.

4. *T. decussata*. Cross-branched *Tonsella*. Vahl. n. 2. ("Anthodon decussatum; Fl. Peruv. v. 1. 45. t. 74. f. b.")—"Leaves oblong-ovate, obtusely serrated, polished. Panicles forked."—Native of woods upon the Andes. A *shrub*, with crossing greyish copious *branches*; purplish when young. *Leaves* pointed; smooth on both sides, on twisted stalks. *Flower-stalks* opposite, square, shorter than the *leaves*, compound, forked. *Flowers* small, yellow. *Fruit* unknown, but the affinity of the plant to *T. scandens* has induced Vahl to place it in the same genus.

5. *T. senegalensis*. Senegal *Tonsella*. Vahl. n. 4. (Hippocratea senegalensis; Lamarck Illustr. v. 1. 101.)—"Leaves oblong, pointed, smooth, polished; serrated towards the extremity. Stalks crowded, single-flowered. Branches rough."—Native of Senegal.—*Branches* alternate, destitute of hairiness. *Leaves* about an inch long, with a bluntish point, half as long as the nail, their margins obscurely serrated, and appearing under a magnifier to be bordered with a yellow thickened line. *Flower-stalks* capillary, about half an inch long, numerous, from a short axillary tubercle. *Petals* linear, smooth.

6. *T. madagascariensis*. Madagascari *Tonsella*. Vahl. n. 5. (Hippocratea madagascariensis; Lamarck Illustr. v. 1. 101.)—"Leaves lanceolate-oblong, pointed, smooth, polished,

polished, nearly entire. 'Stalks crowded, single-flowered. Branches rough.'—Native of Madagascar, as the uncouth name, which ought to have been changed, implies. The *branches* are said to be opposite, leprous, but not downy nor hairy. *Leaves* an inch and half long, or somewhat more, rather coriaceous, sometimes slightly toothed towards the end. *Flower-stalks* very numerous, from each axillary tubercle. *Flowers* drooping, smooth. *Petals* linear.

7. *T. multiflora*. Many-flowered Tonfella. Vahl, n. 6. (*Hippocratea multiflora*; Lamarck Illustr. v. 1. 101. H. obovata; Richard Act. Soc. Hist. Nat. Paris. v. 1. 106.)—"Leaves obovate, entire, polished. Stalks crowded, each bearing two or three flowers."—Found by Richard in Cayenne. *Branches* opposite, smooth. *Leaves* three or four inches long, sometimes oblong-ovate, very smooth, destitute of veins. *Flower-stalks* numerous, scarcely half an inch long, each divided into two or three simple partial stalks, about the same length, with minute *bractees* at the base of each. *Petals* oblong, smooth. The fruit of these three last plants has not been examined, but Vahl was induced, as in the similar case of our fourth species, to remove them hither, on account of their very close affinity to *T. africana*.

The author just mentioned considers this genus as very nearly related to the Linnæan SALACIA, see that article. This opinion is extremely probable, and if it be correct, the name of *Tonfella* must give place to *Salacia*. In the habit of the plants we find no grounds for any distinction.

TONSET, in *Geography*, a town of Norway, in the province of Aggerliuus; 145 miles N. of Christiania.

TONSILS, in *Anatomy*, the glandular bodies, also called from their size and shape *amygdale*, placed at the passage from the mouth to the pharynx. See DEGLUTITION.

TONSILS, *Diseases and Extirpation of*. The tonsils are exceedingly liable to inflame; and sometimes the swelling thus produced is so great as to obstruct deglutition and respiration in a very dangerous degree. Prompt succour is now most urgently required; and relief may commonly be obtained by scarifying the enlarged tonsils, and promoting the bleeding with warm gargles.

This operation may be done with an ordinary lancet, or with a broad one contained in a sheath, and constructed so that its point can only be pushed out to a certain distance. Pharyngotomus is the name usually given to this instrument. Abscesses in the tonsils are also to be opened, when the swelling causes serious inconvenience.

When scarifications cannot be made, the best means are venesection, applying leeches to the throat, exhibiting mercurial medicines, inhaling the steam of hot water, and using proper gargles.

Abscesses of the tonsils have been observed of considerable extent, not bursting in the mouth, as is usual, but in the Eustachian tube, or even the meatus auditorius externus, attended with caries of the mastoid process, deafness, and fistulæ. Such cases are frequently incurable.

The tonsils sometimes become enlarged, without being inflamed. This swelling is improperly termed scirrhus. The glands are only swollen and of moderate firmness. A portion of a tonsil, thus enlarged, may be cut off, without the least danger of the rest assuming a malignant nature. This preternatural swelling of the tonsils is mostly owing to repeated inflammations. Sometimes there is no palpable cause. The malady is constantly free from pain. When the tumefaction is considerable, it obstructs the speech, deglutition, and respiration.

Diluent and astringent applications here prove ineffectual. The tumour admits of being removed; but it is

unnecessary and improper to take away the whole tonsil, as a dangerous and even fatal hæmorrhage might be the consequence. Only so much of the swelling should be removed, as is sufficient to afford relief. The remaining portion in general heals, without the least difficulty: a clear proof that the disease is not of a malignant nor cancerous nature.

The extirpation of a part of a tonsil, thus diseased, has been accomplished with caustics, the actual cautery, the ligature, and cutting instruments. The first of these plans was successfully practised by Wiseman; but is now quite abandoned. The second is also relinquished, as no modern surgeons employ it, except now and then, with a view of destroying fungous excrescences, which, in a few instances, originate after a part of the tumour has been removed by some other operation.

A variety of instruments has been devised for putting a ligature round diseased tonsils.

There are very good surgeons, who still prefer tying diseased tonsils to cutting them away, and the mode to be adopted differs according as the swelling has a narrow or broad base. The ligature ought to be made of silver wire, or catgut. When the tumour has a narrow neck, the ligature is to be doubled, and introduced through the nostril, so that the noose may be seen in the throat. With the aid of a pair of forceps, the noose may then be easily placed round the neck of the tumour. The ends of the ligature are then to be brought through a double cannula, and the latter instrument introduced as far as the tonsil. The ligature on each side is then to be drawn tightly, and fastened round rings at the end of the cannula. The instrument may next be twisted, till a due degree of constriction is produced.

Default employed an instrument, called a *ferre-naud*, for putting the noose of the ligature over a diseased tonsil, and producing the necessary degree of constriction. The *ferre-naud* was nothing more than a little ring, mounted on a longitudinal, narrow piece of steel, about five inches long, the other end of which was grooved, or rather forked. The diseased tonsil was first taken hold of with a double hook. With the ring, the noose was conducted along the hook, and put over the tonsil; the ligature was then drawn out, while the ring pressed the noose downward and backward. Thus the due constriction was made, and it was next maintained by twisting the ends of the ligature round the forked extremity of the instrument, on the outside of the mouth. Default par Bichat, tom. ii. p. 233.

When the disease had a broad base, and was of a conical shape, so that the ligature was apt to slip off, Cheselden has recommended the use of an instrument like a crooked needle, set in a handle, with an eye near the point, threaded with a ligature, which is to be thrust through the bottom of the gland, and laid hold of with a hook. The needle is then to be withdrawn. The double ligature is next to be brought forwards, and one part tied above, the other below the tumour. The ligatures are now to be cut off near the knots.

We have already observed, that the removal of the whole enlarged tonsil is unnecessary, and therefore injudicious. We may now notice, that a portion of the tumour may be cut away, without any just ground for fearing a dangerous bleeding. The application of a ligature occasionally produces a most perilous swelling of the diseased tonsil, attended with such hazard of suffocation, as to compel the surgeon to cut and remove it. Bertrandi, and many other eminent surgeons, have been in the habit of cutting away enlarged tonsils, without ever meeting with an instance of danger from the subsequent bleeding.

Default sometimes employed a flat sheath, made of silver, and

and having a notch in it for the reception of the base of the tonsil. The latter part being thus taken hold of, a spring was touched, when a concealed blade immediately moved across the notch, and made the requisite division, without any risk of injuring the adjacent parts in the mouth.

The operation may be done with a pair of scissors, constructed with short blades and long handles; or it may be performed with a bistoury, which, in general, must be the best instrument.

The hæmorrhage may usually be stopped by repeatedly washing the mouth with very cold water.

When the enlargement of the tonsil is really of a fibrous nature, a case which is possible, though not common, an operation, performed so as to remove only a part of the indurated enlargement, would not be followed by success.

Calculous concretions have been known to form in the tonsils, occasioning troublesome coughing, sore-throats, &c. The propriety of extracting them, when their existence is clearly ascertained, is almost too obvious to require being mentioned. *Fur's Lines of the Practice of Surgery*, by Samuel Cooper, edit. 3.

TONSTALL, or FUNSTALL, CUTHBERT, in *Biography*, an English prelate, was the natural son of a gentleman of good family, and born at Hatchford, in the ancient Richmondshire, about the year 1474. Having studied both at Oxford and Cambridge, he travelled for farther improvement, and graduated doctor of laws at Padua. Recommended by his learning and character to archbishop Warham, he became his vicar-general, and was collated by the king to the rectory of Harrow, in Middlesex. Beside other preferments, he was appointed, in 1506, to the office of master of the rolls, and in this year accompanied Sir Thomas More as ambassador to Charles V. at Brussels, where he formed an intimacy with Erasmus. After obtaining other preferments, and accomplishing another embassy to the emperor, he was promoted, in 1522, to the see of London, and in 1529, to the office of keeper of the privy seal. He was afterwards employed in several missions of importance on civil affairs: and whilst he was at Antwerp, he manifested his religious zeal by buying all the ancient copies of Tyndale's translation of the Bible, in order to burn them at St. Paul's Cross. His zeal was similarly engaged in urging Erasmus to write against Luther, and in instituting prosecutions against heresy. In 1530, Tonstall was promoted, in recompence of his services, to the see of Durham. Fluctuating in his dispositions and politics, he first favoured and afterwards disapproved the divorce of Catharine of Arragon: he also defended Henry's assumed title of supreme head of the church, after having at first protested against it: and though he was not inattentive to the usurpations of the papal see, he was firmly attached to the doctrines of the church of Rome. Repenting, as we hope, of having burnt the Bible, he joined with Heath, bishop of Rochester, in revising an English translation of it in 1541. Under Edward VI. he conformed to all the ordinances relating to religion, whilst in parliament he protested against every change. At length his rich bishopric presented a temptation, which those who sought preferment could not resist, and therefore Tonstall was charged with misprision of treason, and a bill of attainder was brought into the house of lords, which, though opposed by Cranmer, passed that house, but was stopped in the commons, the evidence being thought insufficient. His enemies, however, determined to displace him, and a commission was appointed to examine him with regard to all conspiracies, &c.; and having been found guilty, he was deprived, and committed to the Tower, where he remained a prisoner to the end of this reign. The see of Durham was converted into a county palatine, and

granted to the duke of Northumberland. On the accession of Mary, he was restored to his see: and his temper being mild, he neither avenged himself on his enemies, nor were any persons brought to the stake in his diocese during this sanguinary reign. His whole conduct seems indeed to indicate a favourable change in his temper, for he discouraged persecution, and afforded an asylum to his nephew, Bernard Gilpin. (See his article.) When Elizabeth succeeded to the crown, hopes were entertained that his moderate principles would have led him to acquiesce in the reformation, but he preferred the surrender of his bishopric to compliances against which his conscience revolted. Refusing to take the oath of supremacy, he was deprived, and being committed to the custody of Parker, archbishop of Canterbury, he was treated with kindness, and by the prelate's reasoning induced to abandon some of the grosser errors of popery. He died in 1559, at the advanced age of eighty-five, and was interred, at the archbishop's expense, in the church of Lambeth. As to his general character, he was manly and attentive to his episcopal duties: and in his private life, exemplary and amiable. He was author of several works, among which was a treatise on arithmetic. Some of his letters are preserved in Erasmus's collection. *Biog. Brit.*

TONSÛRE, formed from *tondere*, to shear, the art or act of cutting the hair, and shaving the head. See **HAIR**.

The tonsure was anciently a mark of infamy in France: inasmuch that, when they would render any prince incapable of succeeding to the crown, they cut off his hair and shaved him. See **BEARD**.

TONSURE, in the Roman church, is used for the entrance or admission into holy orders.

In propriety, tonsure is the first ceremony used for devoting a person to God and the church, by presenting him to the bishop, who gives him the first degree of the clericate, by cutting off part of his hair, with certain prayers and benedictions.

Some hold the tonsure a particular order; others, as Loyseau, only the mark and form of ecclesiastical orders in general.

The tonsure suffices to make a clerk; the rest is only to qualify him for the holding of benefices. A person is capable of the tonsure at seven years of age; thence a benefice of simple tonsure is such an one as may be enjoyed by a child of seven years old. The tonsure is the basis of all the other orders.

TONSURE is also used for the corona, which priests, &c. wear, as the mark of their order, and of the rank they hold in the church. See **CROWN**.

The barbers have the measures and dimensions of the different kinds of tonsure, or clerical crowns, to be practised according to the different degrees and orders. A clerk's tonsure, a subdeacon's tonsure, a deacon's tonsure, a priest's tonsure, are each successively bigger than the other.

TONTANEA, in *Botany*, a word left unexplained by Aublet, but evidently of barbarous origin.—Aubl. Guian. 108. t. 42. Jul. 199. Lamarck Illustr. t. 64. (Bellardia; Schreb. Gen. 790? Willd. Sp. Pl. v. 3. 616.)—Clas and order, *Tournefortia Munzonia*. Nat. Ord. *Asclepiadaceæ*, Jul.

Gen. Ch. Cal. Perianth superior, of one leaf, in four deep, ovate, acute, equal, spreading segments. Cor. of one petal, funnel-shaped; tube thrice as long as the calyx; limb in four deep, ovate, acute, equal, spreading segments. *Stam.* Filaments four, thread-shaped, inserted into the throat of the corolla, between the segments, and about equal to them in length; anthers roundish, of two cells. *Pist.* Germen roundish, inferior, crowned with an annular disk; style rather

rather longer than the corolla, thread-shaped, divided half way down; stigmas distant, obtuse. *Peric.* Berry ovate, crowned with the withered calyx, of two cells, easily separable. *Seeds* numerous, convex on one side, concave on the other, winged, inserted into the transverse partition.

Eff. Ch. Corolla of one petal, funnel-shaped, four-cleft, acute. Berry of two cells, with many winged seeds.

1. *T. guianensis.* Aubl. t. 42.—Native of moist woods in Guiana and Cayenne, flowering, and bearing ripe fruit, nearly all the year. A trailing herbaceous perennial plant, creeping by means of fibrous radicles; the *stem* and *branches* round, slightly downy. *Leaves* opposite, stalked, ovate, fleshy, entire, hairy, an inch and half long, with a pair of intrafoliateous *stipulas*. *Flowers* white or blueish, three or four together, in little, axillary, stalked, solitary heads. *Berry* blue, with a viscid juice. Schreber's *Bellardia* was named in honour of Dr. Charles Louis Bellardi, the coadjutor of Allioni, and still living at Turin. His *Appendix ad Floram Pedemontanam*, and his *Osservazioni Botaniche*, prove him an able and observing botanist. *Bellardia* ought to have been noticed by one of our predecessors in its proper place. We should adopt it here, in the place of the above faulty name, *Tontanea*, were there not much doubt of the identity of the plants. Schreber describes his as having linear unequal segments to the *calyx*, a hairy or villous obtuse *corolla*, very short *stamens*, linear *anthers*, and a nearly globose *capsule*, not a *berry*. Neither does he notice a wing to the *seeds*, which he describes as acutely angular, and dotted. Had he not cited Aublet, no one would have supposed their genera to belong to each other; nor does Schreber himself decidedly assert it. Of his *Bellardia* nothing is known, except from his own generic character, because he never published a *Species Plantarum*, to clear up the obscurities attendant on his new genera.

TONTAPILLY, in *Geography*, a town of Hindoostan, in the circar of Rajamundry; 30 miles N.E. of Rajamundry.

TONTECO, a town of Africa, in Bambouk; 10 miles N. of Combregoudou.

TONTELEA, in *Botany*, Aubl. *Guian.* t. 10. See TONSELLA.

TONTI, or TONTY, in *Geography*, a river of Canada, which runs into lake Erie, nor far from the Orwell.

TONTINE, a loan raised on life-annuities, with the benefit of survivorship. Thus, an annuity after a certain rate of interest is granted to a number of subscribers, who are divided into classes according to their ages; and annually the whole fund of each class is shared among its survivors, till at last it falls to one, and on his death it reverts to the power that first established the tontine. The term is derived from the name of the inventor.

TON-TING, in *Geography*. See TONG-TIN-HOU.

TONTON, an African drum, which Pere Labat, in his voyage to Guinea, tom. ii. numbers among the musical instruments of the Negroes, and which is never used but upon the approach of an enemy, or on extraordinary occasions. It seems to surpass in force the Stenterophonic tube of Alexander the Great; as it is said that it can be heard at the distance of six or seven miles!

TONTORAL, CAPE, in *Geography*, a cape on the coast of Chili. S. lat. 27° 30'.

TONTRAVELLORE, a town of Hindoostan, in the circar of Condapilly; 25 miles W.N.W. of Mafulipatam.

TONVORE, a cape of Scotland, on the N.W. of the island of Ilay. N. lat. 55° 51'. W. long. 6° 27'.

TONYES, a town of Mexico, in the province of Cuiliacan; 60 miles N.E. of St. Migucl.

VOL. XXXVI.

TONYN'S ISLANDS, a cluster of small islands in the East Indian sea, near the S.W. coast of the island of Celebes. S. lat. 5° 31'. E. long. 119°.

TONZI, in *Ancient Geography*, a town of Thrace, on the coast of the Euxine sea, between Apollon and Peronticum. Ptol.

TONZOS, or TONZUS, a town in the interior of Thrace. Ptol.

TOOBIGAN, in *Geography*, a small island in the Sooloo Archipelago. N. lat. 6° 14'. E. long. 120° 44'.

TOOBOUAI ISLAND, one of the Society islands, in the South Pacific ocean. Its greatest extent, in any direction, exclusive of the reef, is not above five or six miles. Small as the island is, there are hills in it of a considerable elevation. At the foot of the hills is a narrow border of flat land, running quite round it, edged with a white sand beach. The hills are covered with grass, or some other herbage, except a few rocky cliffs at one part, with patches of trees interspersed to their summits; but the plantations are more numerous in some of the vallies, and the flat border is quite covered with high strong trees, whose different kinds could not be discerned, except some cocoa palms, and a few of the etoa. According to the information of some men whom captain Cook saw in the canoes, their island is stocked with hogs and fowls, and produces the several fruits and roots that are found at the other islands in this part of the Pacific ocean. This island is populous, and the inhabitants are more sedate than the natives of the Society islands, as well as less hospitable. Fletcher Christian, with his companions, mutineer of the *Bounty*, attempted to form a settlement here in the year 1789. They had a dispute with the islanders, and a severe engagement, in which one or two of the mutineers were wounded, and many of the natives were killed. Christian, after this, left the island of Toobouai, and failed to Otaheite, where some of the crew left him: nine only remaining on board, with some of the natives, men and women, with these Christian cut the cable, and put to sea, since which time he has not been heard of. The language is the same as that spoken at Otaheite. S. lat. 23° 25'. E. long. 210° 37'.

TOODAWAH, a town of Pegu; 35 miles S. of Lundfey.

TOODIGUNTLA, a town of Hindoostan, in Golconda; 25 miles E. of Damipetta.

TOODRY, a town of Hindoostan, in Canara, on the coast; 21 miles S. of Carwar.

TOOEE, a town of Hindoostan, in Bahar; 12 miles E. of Bahar.

TOOFOA, one of the Friendly islands, visible from Annamooka, by means of its height, and a volcano, which almost constantly emitted smoke, and sometimes threw up stones. Its shores are steep, and covered with black sand. The rocks are hollow, and in some places of a columnar form. The mountain, except in spots that appear to have been recently burned, is covered with verdure, shrubs, and trees. The coast is about five leagues in circuit. To the north-east of this island, and about two miles distant, is another of much less extent, but of thrice its height, which is called Kaō; it is a mountainous rock of a conical form. Both these were discovered by Tasman, and have been seen by every subsequent navigator of this group. Captain Cook passed between them, and had no soundings in the channel by which they were separated. Each island was understood to be inhabited, but no European had landed upon either, at the time when the mutiny suddenly occurred in the *Bounty* two days after the departure of that vessel from Annamooka. Lieutenant Bligh was forced into a boat with eighteen of his people, when ten leagues S.W. from Toofoa: he attempted

E

there-

therefore to get an immediate supply of bread-fruit and water at that island, which, as he understood, afforded those articles. The next morning, 28th of April, 1785, they landed in a cove, on the south-west coast: they climbed the heights, but obtained only some cocoa-nuts and plantains, and a few gallons of water from holes in the rocks. The weather being too boisterous to proceed, they fastened themselves by night in an adjacent cave. On the 1st of May, several of the inhabitants brought them a small supply, and retired peaceably in the evening. The next day their number greatly increased. Some principal persons also came round the north side of the island in canoes, and among them one of the chiefs whom captain Bligh had threatened to carry from Ananooka: they offered to accompany him to Tongataboo, when the weather should become moderate: but some symptoms appearing of a design to obtain by force the articles that he could not afford to barter with them, he determined to depart that evening, as they were not inclined to retire. They had previously sold to him some of their weapons, and they now allowed his people to carry their property into the boat: but they would not suffer him to embark, and a contest ensued, in which most of the English were wounded by stones, and one of them was killed. The rest escaped, and bore away towards New Holland, from whence they reached the East Indies in their boat, enduring extreme hardship, but so far from loss of lives.

TOOGAUM, a town of Hindoostan, in Baghlat: 16 miles S. of Junera.

TOOK, 2 towns of Perù, in the province of Cochabá; 40 miles E. of Tihafill.

TOOKE, JOHN HORNE, in Biography, the third son of a grocer in Newport-market, was born in Newport-street, Westminster, in June 1736, and having spent some years at Westminster and Eton schools, was admitted into St. John's college, Cambridge, in 1753, where he took the degree of B. A. After continuing for some time as an usher in a school at Blackheath, he took deacon's orders, in compliance with the wishes of his father, and served as a curate in Kent. But the law being the object of his choice, he entered in the Inner Temple in 1756. Nevertheless, in 1760, he was ordained a priest, and inducted into the chapel of New Beauford, purchased for him by his father. But as he entered very deeply and warmly into the political disputes of the period in which he lived, he ceased officiating as a clergyman, and took an active part in the transactions of that period. When Wilkes returned from his exile to France, and became a candidate for the representation of the county of Middlesex, Horne was his zealous adherent, and was thought to have contributed to the success of his election. It is said, that it was by his instigation that Mr. Beckford, lord mayor in 1770, made a verbal reply to his majesty's answer to a remonstrance from the city of London: and that he drew up that reply as inscribed on the pedestal of Mr. Beckford's statue in Guildhall. He is regarded also as the principal founder of the "Society for supporting the Bill of Rights," of which he was an active member: and by his exertions Bingley, a printer, who had been committed to prison by lord Mansfield for refusing to appear for the purpose of answering to interrogatories, was at length liberated. In the years 1770 and 1771, a quarrel took place between Wilkes and Horne, in the prosecution of which the latter lost popularity, without incurring any just charge against his political integrity. In 1771 he took his degree of M. A., though opposed by some members, among whom was Mr. Pultney. To him it was owing, that the publication of the debates in the House of Commons has been continued without interruption.

At that time he had a literary controversy with Junius, in which he was thought to have the advantage. In 1773 he threw off his clerical garb, and proposed to resume his legal studies with a view to the profession. But at this time an incident occurred, which was of material importance with respect to his future fortune. Mr. Tooke of Parry, in Surrey, had ineffectually opposed an enclosure bill, which was likely to be detrimental to his estate, and as this bill was passing rapidly through the commons, he applied to Horne for advice. After some deliberation he proposed to Mr. Tooke a remedy, which was to commence with a libel on the speaker, which he would undertake to write. Accordingly he stated the case, accompanying the statement with some severe reflections, and sent it to the Public Advertiser. When the paragraph was next day reported to the house and read, it occasioned great irritation, and a motion was made for calling the printer before the house. Mr. Horne, as the acknowledged writer, was called to the bar; he immediately obeyed the summons, and in a respectful manner confessed, that through hatred to opposition, and zeal to serve a friend, he had been urged beyond the bounds of discretion. After a long debate, he was remanded from the bar in custody of the sergeant at arms, and upon being brought up some days after, he was, by the good offices of some friends, discharged upon paying his fees. His purpose was answered: time was thus given for reconsidering the objectionable bill, and the exceptionable clauses were either altered or withdrawn.

Mr. Horne was an ardent opposer of the American war; and when the news of the battle of Lexington arrived, the Constitutional Society voted 100l. to the widows and children of the Americans who had fallen in it; and the resolution to this purpose, printed in the public papers, was signed John Horne. In this resolution, the sufferers were denominated "Englishmen who, preferring death to slavery, were, for that reason only, industriously murdered by the king's troops at Lexington." For this paragraph he was prosecuted, and tried at Guildhall in July 1777, and pleaded his own cause. Notwithstanding the spirit and animosity with which he defended himself, he was sentenced to twelve months' imprisonment, and to pay a fine of 1000l. In the course of this trial he first appeared before the public as a grammatical critic; and in 1778, he printed a letter to Mr. Dunning, which discussed the force and meaning of certain conjunctions and prepositions employed in his indictment, and which was the foundation of a larger work afterwards published. In the following year, he was disappointed in his expectation of being called to the bar; for though he was eminently qualified for the profession to which he aspired, he was rejected under the pretext of his being still a clergyman. This he felt as a very grievous disappointment, and with a mind not a little exasperated he devoted himself to politics. Accordingly, in 1780, he published a pamphlet, entitled "Facts," keenly reviewing lord North's administration, and containing two chapters on Finance, supplied by Dr. Price. Soon after the termination of the American war, parliamentary reform became a popular topic; and in 1784, Horne published a letter to Mr. Dunning (lord Ashburton) under the title of "A Letter to Parliamentary Reform, containing the Sketch of a Plan;" of which we shall merely say, that he disapproved of universal suffrage. Mr. Pitt was at this time a fellow advocate in the same cause. Horne now avowed himself the friend of Mr. Pitt, in opposition to Mr. Fox, whose coalition with lord North he very much disapproved. In 1786 Mr. Horne, having assumed the name of his friend Mr. Tooke, published his "Epea Proterea, or Dreamboat of Parley," so called from

from the country residence of his friend. Of this work, founded on his letter to Mr. Dunning, already mentioned, the most prominent subject of discussion was the derivation of conjunctions and prepositions from verbs and nouns, whence they acquired a determinate meaning, often different from that which has been arbitrarily imposed upon them. This work attracted the notice of philologists, and gave to the author a high rank among writers on the philosophy of language. (See GRAMMAR.) Politics, however, diverted his attention from subjects of this nature; and in 1788, he published "Two Pair of Portraits," the figures in which were the two Pitts, and the two Foxes, of the past and present generations. The first name was strongly illuminated, and the latter thrown into a dark shade. He might probably, however, at a later period, have adopted a different mode of colouring. In 1790 he opposed Mr. Fox and lord Hood at the election of representatives in parliament for Westminster; and professing himself unconnected with party, and determined neither to open a house nor to give away a single cockade, he polled near 1700, without solicitation or corruption. On occasion of his defeat, he presented a petition to the house, in support of which he freely indulged himself in very bitter sarcastic invective. In the year 1794 he was brought to a trial, under the charge of high treason. During the progress of this trial, he maintained the most perfect composure and self-possession; and as he had little to apprehend after the previous acquittal of Hardy, the jury brought in their verdict of "not guilty," after being only eight minutes out of court. In consequence, however, of this trial, he became more cautious in his conduct, and declined the visits at Wimbledon, where he resided, of persons known to be violent in their principles and conduct. Upon the death of Mr. Tooke of Purley, he inherited, in consequence of a previous agreement, half of the property left by that gentleman to his nephew. In 1796 he offered himself again as a candidate for Westminster, and suffered a second defeat, after having polled 2819 votes. He was chargeable, however, with some inconsistency in the acceptance of a seat, in 1801, for the noted borough of Old Sarum, on the nomination of lord Camelford. Some attempts were made to exclude him, under the plea of his being a clergyman; but a compromise being proposed by the minister, Mr. Addington, by determining the future ineligibility of persons in holy orders, he retained his seat till the dissolution of parliament. Having published by subscription a second edition in 4to. of his "Diversions of Purley," a second part in 4to. appeared in 1805, in which he chiefly adverted to etymology, and to adjectives and participles, and their formation, intermixing satirical strictures upon some literary characters of note. From this time his bodily infirmities, occasioned by a disorder to which he had been long subject, increased, though he retained his faculties in full vigour, and continued to enjoy life. His temper was little affected by mental or physical evil, and "no one more strenuously maintained," says one of his biographers, "the balance of good in human existence."—"His latter days," says the same writer, "were cheered by easy circumstances, and the attention of many friends, whom he entertained with great hospitality, and amused by his conversation, which was singularly pleasant and lively. With an unaltered brow, he could be either facetious or sarcastic, and his features seldom disclosed what was passing within. His manners were polished, and his appearance was that of a gentleman of the old school." His life at length terminated, by tedious and continued decay, in March 1812, in the 77th year of his age. As he was never married, his

property was bequeathed to his natural children. Stephens's Memoirs of John Horne Tooke.

TOOKOOK, in *Geography*, a town on the W. coast of Borneo. S. lat. $2^{\circ} 24'$. E. long. $109^{\circ} 46'$.

TOOLAJEE, a town of Hindoostan, in Guzerat; 20 miles S. of Gogo.

TOOLEN, or TULLEN, (*i. e.* the Isle of Seals,) a small island in the Caspian sea, near the W. coast. N. lat. $44^{\circ} 14'$.

TOOLIAPOUR, a town of Hindoostan, in the country of Dowlatabad; 45 miles E.S.E. of Perinda. N. lat. $18^{\circ} 20'$. E. long. $76^{\circ} 35'$.

TOOLLY, a town of Hindoostan, in Goondwana; 10 miles W. of Coomtah.

TOOLMEDIN, a town of Hindoostan, in the circle of Bopal; 25 miles S.W. of Bopaltol.

TOOLS, simple and popular instruments, used in the more obvious operations, and particularly in the making of other more complex instruments.

The term *tool* is particularly used by canal-makers, for a kind of strong curved spade or shovel employed in canal-works.

Tools are divided into *edge-tools*, *spring-tools*, *pointed-tools*, &c.

Mr. Parkes, in the fourth volume of his "Chemical Essays," has given a history of the origin and progressive improvement of edge-tools, and an account of the materials of which they were constructed. It appears from Goguet's "Origin of Laws," to which he refers, that as many of the ancient nations had no knowledge of iron, they used stones, flints, the horns and bones of various animals, the bones and shells of fish, reeds, and thorns for every purpose in which the moderns now use edge-tools of iron and steel. Spears and other instruments for exterminating wild beasts, and even implements of agriculture, were formerly made with gold and silver; and instead of these was afterwards substituted copper, as a metal more easily to be procured than malleable iron. The abundance of celts and other ancient instruments, found in various parts of the globe, shews that copper and brass were formerly in very general use. From the prodigious number of copper instruments of different kinds and sizes, which have been found in this country, such as axes, swords, spear-heads, arrow-heads, &c. known among antiquaries by the general name of celts, it is evident that our ancestors were well acquainted with the art of forming metallic copper in any way which they thought proper; whereas the use of metallic iron is comparatively of late introduction. At the time of the first Roman invasion, this metal was so rare, that the Britons fabricated their money with it, and even their ornamental trinkets. But the Romans having made themselves masters of the country, established imperial founderies for making iron, and constructed forges for manufacturing spears, lances, battle-axes, and implements of every kind, in different parts of the kingdom. (See Cæsar, de Bell. Gall. lib. v. c. 12. Henry's Hist. of Britain, vol. ii. p. 139, 140.) At the battle of Hamilton, in 1402, the repulse of the Scots appears to have been entirely owing to the excellent temper of the arrows which were employed by the English army. Swords also were then in use, and Sheffield was, even then, famous for its cutlery. Table-knives, it is said, were first made in London in 1563, by one Thomas Matthews of Fleet-bridge.

Good edge-tools cannot be made without steel; and of this there are various sorts (see STEEL); such as blistered, shear, spur, star, and cast steel; besides which there is a kind of German steel, made immediately from the iron ore, by simple fusions. (See also WOOTZ.) The cheapest

edge-tools, and other less important articles, are usually made with the first-mentioned kind, united to a large proportion of bar-iron. Clothiers' shears, firmer chisels, plane-irons, cooper's adzes, scythes, reaping-hooks, and large knives, are commonly made with shear-steel: for the method of manufacturing it, see STEEL. The spur and star steel are used only for particular purposes, according to the fancy of the master cutler. Cast-steel is used for the best penknives, scissars, and razors; and fine saws, surgical instruments, and all edge-tools which require a fine polish, and various other implements employed in cutting iron, are all made with cast-steel. The superior beauty of instruments made with cast-steel would have occasioned a very great consumption of this article, if it had not been for the difficulty of welding, or uniting it properly with iron, and which occasioned its being used at first only for those smaller instruments, such as lancets and penknives, which are generally made entirely of steel. But since the discovery made by Sir Thomas Frankland (for which see WELDING), cast-steel has been brought into more extensive use, and the instruments that are thus constructed, are much better than those which are made entirely of cast-steel. The circumstance of an instrument having its back made of iron, renders it not so apt to fly from the work to which the edge or steel part is applied, and eventually less liable to break.

Many artists, long after the invention of cast-steel, used to unite it to the iron by means of rivets. Hoes are still made by riveting or screwing the back, together with the eye, upon a blade made with cast-steel. We cannot minutely recite the various manipulations that are practised in the manufacture of different edge-tools. The reader will find information of a more ample kind in the work of Mr. Parkes, above cited. (See also our article CUTLERY.) We shall, however, select the following particulars: the cooper's adze and the carpenter's axe are first formed by the white-smith, in iron, together with the eye for the helve. The instrument is then heated again, and the edge of the cutting part is slit down with a chisel, and this slit is filled with a thin piece of steel, of a corresponding size and form. The iron, that has been slit upon, is folded down upon the steel, and the whole again heated to a welding heat, when the sledge-hammer quickly unites the iron and the steel into one compact mass. Scythes and such other large instruments are forged at the mill, by means of a large hammer, moved by water, and the process is called "skelping." Augers, gouges, large chisels, table-knives, razors, and other instruments of a similar bulk, are forged upon a large anvil by the principal workman, aided by an assistant called the "striker," who strikes occasionally with a sledge-hammer. Penknives, lancets, gravers, surgical instruments, and other small edge-tools, are generally forged on a small anvil firmly fixed within a large one, in order to give greater steadiness. These are usually fashioned out of steel only, and forged by one workman singly and alone. Scissars are also forged by a single hand; but the anvil on which they are fashioned is of a peculiar construction, having *bosses* or *dies*, and *beak* irons of various sizes occasionally adapted to it, so as to suit the different shapes and dimensions of the separate parts of these particular instruments.

It should have been noticed, that many other tools besides the axe and the adze are originally forged out of a piece of iron, with a little steel welded to it for the cutting part of the instrument.

The real Damascus sword-blades are said to be composed of slips or thin rods of iron and steel bound together with iron wire, and then firmly cemented together by welding.

It is well known that it is the circumstance of drawing

down the shear-steel under the tilt-hammer that gives it the superiority over common steel. (See *TILT-Hammer*, and *TILTING of Steel*.) Mr. Bingley therefore suggests in his patent, that, if he could roll out his steel much thinner than it had ever been done before, he should much improve its quality: and accordingly a very thin piece of steel is let into the face of a plane-iron made of cast-iron; and, as the steel for this particular purpose has to go through the rollers several times to make it sufficiently thin, it becomes of a peculiar texture, and the tool made with it is found to suit the joiner much better than the plane-irons heretofore in use.

In the manufacture of edge-tools, the process which immediately succeeds the forging is that of *hardening*. All these cutting instruments are therefore fashioned when the metal is in its original soft state; and when they have attained the intended forms, they are heated afresh to a particular temperature suitable to the article. When they have acquired that degree of heat, they are instantly plunged into cold water, which gives them great hardness, and renders them capable of cutting soft iron, or even steel. See TEMPERING.

- *TOOLS, Draining, in Agriculture*, the various kinds of tools which are employed in performing this sort of work, such as *spades, shovels, scoops, draining augers, boring augers or rods, sod-knives*, &c. See these heads.

TOOLS, Lopping or Pruning, in Rural Economy, the various tools, such as hedge-bills, large knives, axes, saws, chisels, &c. used in taking off the side-shoots and branches of forest-trees. And lately an instrument uniting several of these properties has been invented, which is very convenient, and readily dispatches the business. It is described as below in the first volume of the "Memoirs of the Caledonian Horticultural Society," where a representation of it is also given. It is perfectly simple in its form, having merely two edged hooks, projecting from a socket-shank three inches in length, the breadth of which, where the hooks spring off, is two inches and two-tenths of an inch; the hooks themselves project from the shank three inches; between them, and on the top or upper side, is placed a strong chisel, four inches in breadth, and one inch in depth; the whole tool or instrument being about eight inches in width. The length of the wooden handle must, of course, be in proportion to the height and size of the trees to be lopped or pruned, as in different lengths, from six to eighteen feet, which last is, it is said, as long as a man can well and properly manage them. Where trees require lopping or pruning to a greater height than the above length of shaft or handle, a ladder is to be made use of for the purpose, and one of the short-handled tools or instruments.

It is noticed, that the hook part is what is principally made use of, which cuts the branch from the upper side: the chisel is only employed when snags are left, and where branches are too strong for the hooks; in which cases, the chisel is first made to strike the branch from below; but a mallet is never used.

It is observed that fir-trees will certainly be greatly improved by lopping and pruning with this tool, both as to growth and quality of timber; but that care should be had not to over-cut or prune them. Larches will, it is said, always shew when that is the case with them, by breaking out into numerous unnatural branches; but that it may not be so soon noticed in Scotch Spruce, and other firs, which, however, have generally a stunted appearance for some years afterwards, and that it sometimes occasions their death. Four or five tiers of branches should always, it is thought, be left, particularly on young trees; and that on larches there should be still more.

TOOLS, Scraping, in Agriculture and Rural Economy, the several

Several sorts of tools and contrivances which are formed and made use of for cleaning and removing the mould, dirt, and other matters, that may adhere to different kinds of implements while they are in work, as those of the drill, roller, plough, and some other kinds; and to the surfaces in some other cases, as those of wheels, roads, &c.

In the drill and the roller, the scrapers mostly consist of thin bars of iron or wood, so constructed and fixed behind, as to take off the dirty or mouldy cloggy substances as they collect upon them. In ploughs it is usually done by a small sort of paddle, with a short handle used by the ploughman. The surfaces of wheels, in heavy carriages, are cleaned by tools of the scraping kind, properly contrived for the purpose. For tools of this sort, where the tires of the wheels, in such cases, are made concave, it has been advised that a small stem should be fixed to the body of the carriage, which may present a convex scraper; which, on account of the shifting of the wheel on its axis, sometimes a full inch or more at its perimeter, should be made to slide on the stem, having a kind of bracket to embrace the thickness of the felly; thus the thickness of the wheel having presented to it a convex scraper sliding on a square stem; which, allowing one or two inches of play, has at its outer end a bolt-head, the two arms of which forming a bracket, will always keep the scraper opposite to the groove, or hollow in the wheel.

It is suggested that the blade of the scraper should be very shallow, as it would otherwise operate as a lever upon the bar; and either wrench it, or ultimately round off the corners, so as to allow the tool to be turned out of its proper direction, which should be at an angle of five degrees under the horizon. But it is supposed that the tool for scraping the fore-wheel of a waggon will be more difficult to fix, with proper firmness, on account of its traversing. It might, however, it is thought, be effected by setting it on a segment attached to the body of the carriage; but the necessary length of stem would prove a formidable objection in such a case. The best mode would, it is thought, be to fasten it to the wooden axle, so as to move always with it, and consequently preserving its relative position to the edge of the wheel.

In other cases, other sorts of light iron plain scrapers may be fixed so as to allow them to act in removing the dirt from wheels where necessary.

In the scraping and cleaning of roads, tools of the cow-rake headed kind are used by the hand, and large machines in other shapes by horses. See *ROAD-Scraping Machine*.

TOOL, *Skimming*, in *Agriculture*, that sort which is employed in taking off the surface of the land in ploughing, in order to its being deposited in the bottom of the preceding furrow, and thus making neat clean tillage-work. Tools of this kind, with sharp paring and cutting edges, are differently formed, according to the purposes to which they are to be applied; but the mode of fixing them to a sort of fore-coulter in ploughs is considered by many as a great improvement, as they are found in that way to do the work much better than if attached to the common coulter, in which manner they sometimes do not work well. See **TILLAGE**.

TOOLUC, in *Geography*, a town of Hindoostan, in Mohurbunge; 36 miles N.W. of Harriopour.

TOOLUMBO, a town of Africa, in Bambarra. N. lat. 12° 55'. W. long. 5°.

TOOM, a river of Hindoostan, which runs into the Tungebadra, 15 miles S.E. of Sanore.

TOOMANUA. See **OROUN**.

TOOMBEWADY, a town of Hindoostan, in the Carnatic; 8 miles S.W. of Caroor.

TOOMBUCK, a town of some note on the Persian gulf, between Congou or Kungoon, a large and populous town, and Tzshire or Tahirie.

TOOMCOUR, a town of Hindoostan, in Mysore; 20 miles S.S.E. of Sera.

TOOME-BRIDGE, a post-town of the county of Antrim, Ireland, situated at the northern extremity of Lough Neagh, where there is a bridge over the narrow channel which separates that lake from Lough Beg. It is 97 miles N. by W. from Dublin, and 13 miles W. from Antrim.

TOOMISH, a town of Ireland, in the county of Kerry; 14 miles S. of Tralee.

TOOMRY, a town of Hindoostan, in the circar of Hindia; 24 miles N. of Hurdah.

TOOMSIR, a town of Hindoostan, in Goondwana; 38 miles N.E. of Nagpour.

TOON, a town of Persia, in the province of Cohestan; 90 miles N. of Tabaskili. N. lat. 34° 32'. E. long. 57° 35'.

TOONDY, a town of Bengal; 38 miles S.S.E. of Curruckdeah. N. lat. 23° 58'. E. long. 86° 34'.

TOONE, a river of Ireland, which runs into the Lee, 15 miles W. of Cork.

TOONG, a town of Hindoostan, in Dowlatabad; 26 miles W. of Poonah.

TOORAMBADDY, a town of Hindoostan, in Mysore; 13 miles W.N.W. of Aravacourchy.

TOORATTEO, a town on the south coast of Celebes. N. lat. 5° 33'. E. long. 120° 4'.

TOORDA, a town of Africa, in Kaarta; 24 miles N. of Kemmoo.

TOORGOODY, a town of Hindoostan, in the Carnatic; 10 miles S.E. of Trichinopoli.

TOORSHA, a river of Bengal, which, after its confluence with the Maunsi, assumes the name of Neelcoomar, and shaping its course through Baharbund, falls into the Berhampooter, properly (it is said) Brahmá pootra, offspring of Brahma.

TOOS, a town of Persia, in Khorassan; 25 miles S. of Meshid.

TOOSANG, a town on the west coast of Celebes. S. lat. 0° 30'. E. long. 119° 38'.

TOOSCHONDOLCH, an Indian village, on the west coast of North America; of importance in the fur trade. N. lat. 53° 2'.

TOOSHOOR, a town of Hindoostan, in Mysore; 5 miles E. of Nameul.

TOOSI, a town of Japan, on the south coast of the island of Nippon; 84 miles S.S.E. of Meaco. N. lat. 34° 35'. E. long. 137° 35'.

TOOSIMA, one of the small Japanese islands, near the N.W. coast of Nippon. N. lat. 40° 40'. E. long. 140° 40'.

TOOTH, DENS, in *Anatomy*. See **TEETH**.

TOOTH-Ache. See **TEETH, Diseases of**.

TOOTH-Drawing. See **TEETH**.

TOOTH, Wolf. See **WOLVES-Teeth**.

TOOTH, in the *Manege*. It is by a horse's teeth, chiefly, that his age is known. See **TEETH**, in *Rural Economy*.

TOOTH-Ache Tree, in *Botany*. See **ZANTHOXYLUM**.

TOOTH-Pick. See **DAUCUS**.

TOOTH-Wort, a name applied to several plants, on account of a resemblance in their roots to the human teeth.

This

This is very striking in *Lathraea Squamaria*, whose roots are furnished with smooth white scales, very accurately imitating, except in hardness, the *dentes incisores*, or fore-teeth. This resemblance is perceptible also, though less exact, in the roots of the various species of *DENTARIA*; see that article. *Ophrys Corallorrhiza* of Linnæus has, for a similar reason, been sometimes called *Dentaria*; which name, or *Dentillaria*, has also been given by Rondeletius to the *Plumbago*, because of the teeth of its corolla; a character found in many other genera. *DENTELLA*, see that article, owes its name to the last-mentioned circumstance. It is hardly necessary to advert to the reputed qualities of the above tooth-rooted plants, which were founded on the resemblance in question. On this subject more may be said when we come to speak of the *VIRTUES of Plants*.

TOOTHED, in *Botany and Vegetable Physiology*, *dentatus*, is properly applied to the margin of any leaf, petal, &c. when furnished with directly prominent teeth, which scarcely point either towards the base or the point of such leaf or petal, or of their segments. Yet this term is not always so strictly limited as it ought, being sometimes negligently used, when *serrated* would be more proper. *Stamens* however are said to be toothed, when they have any lateral prominence, or notch whatever, as in *Alyssum*.

TOOTOOCH, in *Geography*, a small island in Nootka sound, with an Indian village.

TOOTOONA. See *ERRONAN*.

TOP, or **TOPE**, in *Commerce*, a wine-measure at Breslau, and in other places of Germany. At Breslau, an eimer of wine contains 20 tops, 80 quarts, or 320 quartiers, and is equal to 14½ English gallons.

TOP, in *Geography*, a lake of Russia, in the government of Olonetz, about 4½ miles in length, and 8 in breadth; 256 miles N.N.W. of Petrovods. N. lat. 61°. E. long. 30° 14'.

TOP of a Ship, a sort of platform, surrounding the lower mast-head, from which it projects on all sides like a scaffold. Its principal intention is to extend the topmast-shrouds, so as to form a greater angle with the mast, and thereby give additional support to the latter. It is sustained by the tressel-trees and cross-trees. The top is also convenient for containing the materials necessary for extending the small sails, and for fixing or repairing the rigging machinery. In ships of war it serves as a kind of redoubt, and is accordingly fortified for attack and defence, being furnished with swivels, musquetry, and other fire-arms, and guarded by a thick fence of corded hammocks. It is also used as a place for looking out, either in the day or night. The frame of the top is either close-planked like a platform, or open like a grating. In all ships of war, and in the largest merchantmen, the top is fenced on the aft-side by a rail about three feet high, stretching across and supported by stanchions, between which a netting is usually constructed.

The outside of this netting is generally covered with red bays, or red painted canvas, extended from the rail down to the edge of the top, and called the *top-armour*. By this name it seems to have been considered as a sort of blind, behind which the men may conceal themselves from the aims of the enemy's fire-arms in time of action, whilst they are charging their own muskets, carbines, or swivels. The dimensions of tops in the royal navy are as follow: the breadth of the top athwart-ships is one-third of the length of its corresponding top-mast: the length of all tops, from the foremost to the after-edge, is equal to three-fourths of their breadth athwart; and the square hole in the middle is five inches to

a foot of those dimensions. The tressel-trees and cross-trees extend nearly to the edge of the tops.

The aft-side of the top is straight, and the fore and aft sides square from thence to the aft-side of the foremost cross-tree; from thence the fore-part breaks in with an elliptical curve. Tops in the navy are separated in the middle by a fore and aft line, which makes them much more convenient to be gotten over head.

By a late order in the navy, the under sides of tops are to be planed, and the after-part of the fore and main tops is to be eighteen inches wider, and the after-part of the mizen top, one foot wider than at the chain-plate for the foremost-forest: the inside of the tops on each side by the part called *lubber's-hole*, is to have a flap and hinges, so that a top-gallant yard, mast, or a top-sail, may pass inside of it.

Tops, to lay ropes from a six-thread ratline to the largest cables, are conical pieces of wood, with three or four grooves, or scores, from the butt to the end, for the strands to lie in, and form a triangle. If too broad at the butt, the rope will not close well, nor the strands work so close as they should. A hole is made through the centre of the top, one-third the length from the butt-end, for the staff or bolt to go through, round which are put pieces of old rope, called tails, for the layers to close the rope with, and lay it hard or slack, according to the use it is for. A hole is likewise made through the middle of the top lengthways, for laying ropes with a heart. A collar is put on to assist the layer when the work is too heavy, and to enable him to hold the tails, and close the rope well.

Tops, to lay ropes of three inches and upwards, have a staff under them, with a truck-wheel at the lower end. An iron bolt goes through the centre of the top, and is lashed down to the staff, on which the tails are put and rounded over the rope, being too heavy to be laid with the collar. A strap is put round the tails, with a woolder for the layer to close the rope with.

Tops, to lay cables, have a leg to support them, with a truck-wheel at the end to run on, besides the staff which the tails go over.

Tops, for laying lines of all sizes, are of box or hard wood, tapered at the after-part, that the line may close sharp. Those for fash-lines have four grooves, and for drum-lines eight grooves.

TOP and Butt, in *Ship-Building*, a method of working English plank, so as to make good conversion. As the plank runs very narrow at the top, clear of sap, this is done by disposing the top-end of every plank within six feet of the butt-end of the plank above or below it, letting every plank work as broad as it will hold clear of sap, by which method only can every other seam produce a fair edge.

TOP-Armour, in a *Ship of War*. See *TOP*, *supra*.

TOP-Block. See *BLOCK*.

TOP-Brim, a space in the middle of the foot of a top-sail, containing one-fifth of the number of its cloths. It is so called from its situation, being near the fore-part of the top when the sail is extended.

TOP-Chain, a chain to sling the sail-yards in the time of battle, in order to prevent them from falling down, when the ropes by which they are hung happen to be shot away, or rendered incapable of service. *Falconer*.

TOP-Hamber, any unnecessary weight aloft, either on the top-side of a ship, or about its tops and rigging.

TOP-Laniborn, a receptacle to hold three or more lights, made of tin and glass, placed in the aft-part of the top, in any ship where an admiral or commodore leads the van of a fleet.

Top-Lining, the lining sewed on the aft-side of top-fails, to preserve the fail from the chafing of the top.

Top-Mast, the second division of a mast, or that part which stands between the lower mast and the top-gallant mast. See *MAST-Making*.

By a late order in the navy, the blocks at the heels of top-masts (particularly in line-of-battle ships) are to be discontinued, and the top-masts made from as small sticks as possible: the sheave-hole is to be placed nearer the heel, by which means the several quarters will be brought nearer the butt, and the sizes of the sticks for making of top-masts diminished; and as some of the rough sticks will work one way larger than the other in the upper quarters, and thereby increase the circumference of the wood, where strength is so requisite, leave this additional wood, and make the mast oval: a hoop is to be placed below the sheave-hole, and above the fid-plate.

The caps of top-masts, also, are to have a semi-circle cut at the after-part, with an iron clamp to fit, so as to admit of getting a top-gallant-mast up abaft the top-mast, if necessary in chase.

The heels of jib-booms are also to be left square, to serve as substitutes for mizen-top-masts occasionally: and let the hearts be prepared conformable thereto.

Top-Gallant-Masts, are two, *viz.* *main-top-gallant-mast*, and *fore-top-gallant-mast*, which are small round pieces of timber, set on their respective top-masts; on the top of which masts are set the flag-staffs, on which the colours, as flags, pendants, &c. hang.

Top-Netting is fastened to the rail, shrouds, and top, to preserve the men from falling, &c.

Top-Rope, a rope employed to sway up a top-mast, or top-gallant-mast, in order to fix it in its place, or to lower it in tempestuous weather, or when it is no longer necessary. The rope used on this occasion for the top-masts is furnished with an assemblage of pulleys at its lower end, called the *top-tackle*; the effort of which in erecting the top-mast is communicated from the head of the lower-mast to the foot of the top-mast; and the upper end of the latter is accordingly guided into, and conveyed up through the holes between the tressel-trees and the cap. For this purpose, the top-rope, passing through a block which is hooked on one side of the cap, and afterwards through the holes, furnished with a sheave or pulley, in the lower end of the top-mast, is again brought upwards on the other side of the mast, where it is at length fastened to an eye-bolt in the cap, which is always on the side opposite to the top-block. To the lower end of the top-rope is fixed the top-tackle, the effort of which being transmitted to the top-rope, and thence to the heel of the top-mast, necessarily lifts the latter upward, parallel to the lower-mast. When the top-mast is raised to its proper height, the lower end of it becomes firmly wedged in the square hole, between the tressel-trees. A bar of wood or iron, called the *fid*, is then thrust through a hole in the heel of it, across the tressel-trees, by which the whole weight of the top-mast is supported. In the same manner the top-gallant-mast is erected, and fixed at the head of the top-mast. Falconer.

Top-Sail-Lifts. See *LIFTS*.

Top-Sails, and *Top-gallant-sails*, in a *Ship*, are those belonging to the top-masts, and top-gallant-masts. The former are extended across the top-mast by the top-fail-yard above, and by the yard attached to the lower-mast beneath; being fastened to the former by *robands*, and to the latter by means of two blocks fixed on its extremities, through which the top-fail sheets are inserted, passing from thence to two other blocks fixed on the inner part of the yard, close by

the mast; and from these latter the sheets lead downwards to the deck, where they may be slackened or extended at pleasure. The top-gallant-fails are expanded above the top-fail-yard in the same manner. Falconer. See *SAIL*.

Since the article *Sail-making* was printed, the following alterations concerning fails have been adopted in the navy: *viz.* top-fails are to be reduced by deducting four inches for every three feet in length of the top-mast, instead of three inches and an eighth, as at present.

Mizen-top-fails are to be hollowed in the foot a yard and a half, instead of twenty-seven inches, to prevent rubbing over the stay; and top-gallant-fails are to be hollowed two feet in the foot of the fail, for the above-mentioned purpose.

The main-top-mast-stay-fail is to have six inches gore in every cloth at the foot of the fail, and long gore at the clue.

Mizen-courses are not to be supplied to any ships under fifty guns, but two drivers in lieu.

Driver-booms, as used in 1806, are to be reduced two inches in every yard. The length of the gaff to be in proportion to the fail, and then three feet added thereto, to shew signals.

Drivers are to be cut with a deduction in length, to answer the reduction in length of the boom and gaff, as above. Drivers for line-of-battle ships, the leech is to be twice the length of the luff. For frigates, the length of the leech is to be once and two-thirds the depth of the luff.

Jib.—The after-leech rope is to be two inches and a half in ships of the line, and in forty-gun frigates two inches and a quarter: other ships above twenty guns two inches, and one inch and three-quarters all under.

White bolt-rope is to be used in making of fails, instead of the tarred rope at present in use.

Single clump-blocks of eight inches in size are to be strap-bound, clue-garnet fashion for reef-tackles in the leech of fails.

Top-Side, a name given to all that part of a ship's side above the main-wales.

Top-Timbers, the timbers which form the top-side of a ship. The first general tier which reach the top of the side are called the long top-timbers, and those the shift above are called the short top-timbers.

Top-Timber Half-breadth, a section containing one-half of the ship, at the height of the top-timber line, perpendicular to the plane of elevation.

Top-Timber Line, is the curve limiting the height of the sheer at the given breadth of the top-timbers.

Top-Timber Sweep, is that which forms the hollow of the top-timber. This hollow is, however, very often formed by a mould, so placed as to touch the upper-breadth sweep, and pass through the point limiting the half-breadth of the top-timber.

Top-a-Starboard, and *Top the Yard-arms*. See *TOPPING*.

Top-Bank, signifies the level of the top of a canal's bank; as *B C I K*, *Plate I. Canals*, *fig. 1.* &c. This is generally about one foot higher than the surface of the water *D K*.

Top-Soiling, the art of taking off the vegetable mould or top-soil before a canal is began, to be returned again upon the bank and new-made ground by the side of it.

Top-Water is the level line of the water's surface, as *D H* (*Plate I. Canals*, *figs. 14* and *15.*) in a canal *C F G I*.

Top-Draining, in *Agriculture*, a term sometimes applied to the practice of removing surface-wetness from land, either before it is to be prepared for the seed, or after that

has been put into the soil. In the latter of which cases, the furrows for the water are to be struck with the plough, so as to terminate in the drains which have been formed, and take it away. This should be done daily, as the field is gone over by the harrow. See *Surface-Draining*.

This is an useful sort of draining for ploughed lands that are inclined to be wet.

Top-Dressing, a term applied to such sorts of reduced and other manure as is laid upon the surface of land without being turned into it; and also to the practice of dressing the surface of grass-land, or that of other kinds of land and crops, with some sorts of highly reduced or powdery manure, that can be evenly spread out or sown equally over them by the hand.

In the cultivation and management of lands of these kinds, a great variety of substances is in use for this purpose, such as foot, ashes, the dung of rabbits, pigeons, and other birds, rape-dust, gypsum, malt-dust, and several others; the nature, uses, and benefits of which, are more particularly noticed under their different respective heads, which see.

The advantages which the Hertfordshire farmers derive from the practice of spring or top-dressing their lands and crops, are fully shown in the statements that have been given in the original report of the agriculture of that district: in which it is said, the spring or top-dressings of their lands are the leading features of the farming in that county, and consist of foot, ashes, malt-dust, and oil-cake dust, or pulverized oil-cake. The foot is generally used on the wheat-crops which have had no previous manure. It is laid in heaps on the crops in winter, and sown over them in the spring. But the other top-dressings are hoed, and kept dry till used in this way at the proper time. See *Soor*.

It has been observed in some of the early Essex agricultural reports, that the application of manure upon the surface, or what is generally called top-dressing, ought chiefly to be regulated by the following considerations: as, first, whether the soil is of such a nature as to require any correction in its temperament, to render it more or less tender, open, or friable: secondly, whether the manure proposed to be applied, is capable of operating to that end: thirdly, whether such manure is capable of affording nourishment to vegetables, unless it is brought into close and immediate contact with some other power or principle containing vegetable food in the soil: and, fourthly, whether the plant proposed to be fed by such manure, draws its nourishment principally from the ground, or in other ways.

It is said, that in the affirmative of all these cases it is plain the manure should only be slightly covered or lightly ploughed under. But that when the manure is of such a nature as to apply but lightly to such considerations: when it is capable of being dissolved on the surface, and conveyed by water downwards to the roots of the plants, or by conversion into vapour, to be absorbed by their stems or leaves, and that the plant is equally prone to receive its nourishment in both ways; the economy and effective operation of top-dressings are unquestionably the most highly beneficial and generally to be preferred.

These top or spring-dressings are peculiarly applicable to poor light sandy and gravelly lands, and of course to the production of the specially heavier corn; and they put such lands more on an equality, in point of annual value, with stronger and richer soils.

And in the Corrected Agricultural Report of the same district, it is stated that ashes as top-dressings, though they open and loosen the soil, do not feed a crop. They are supposed to last two crops, and to be of such benefit to wheat-

crops, that when tenants quit farms, they are allowed half the expense of sowing or top-dressing the clovers, which has been laid out, that the in-coming tenants are to sow with wheat: some few instances too are met with of sowing them over or on wheats. The usual time is the middle of winter, if the season be mild or moist. Moss is destroyed by some with this sort of top-dressing on park grass-land, who think they do little good to the wheat that follows the clover on which they are spread, otherwise than by improving the clover. They are decidedly of opinion that it is better husbandry to use foot on barley than this kind of top-dressing: as the former will do much good to the following clover, whereas the latter are of no more utility to the wheat than by increasing the quantity of the clover crop. The farmers in these cases sow from ten to sixteen sacks on clover.

In other parts of the same district, these sorts of top-dressings are said to be very beneficial; and that on being spread out on clover, they do as much good to the following wheat, as that of a top-dressing of the foot kind or soot would do. On a comparison of them, as sown in November and February on clover, over exactly the same spaces of land, in the same quantities: those used at the former period produced the best crop by about a fourth part of a load of this sort of hay on the acre. Some, however, in other places, do not much approve of such top-dressings, except on clay, to sharpen the soil, as they term it: they are supposed to do little good on arable chalky lands.

Top-dressings composed of the dusts of different cakes are found very useful, but often too expensive for the purpose. Some think those of the linseed-cake kind the best dressing they have seen for wheat in top-dressing, even so late as the month of May, with sheep fed on such cake in troughs. The dust of cakes of the rape kind has likewise been much employed in some places as top-dressings, even when the expense has been so high as twenty shillings the quarter. Mills are constructed for grinding it in the above district, and large quantities are imported from Ireland, and perhaps other places. Some have stones attached to threshing-mills for reducing it to dust as a manure, the use of which is greatly approved of in some cases. By some it has been found that it answers the best when spread on wheat. The quantity of this manure as a top-dressing is of from twelve to sixteen bushels on the acre, so as to add to the richness of the land or soil, already in a tolerable state of condition. It cannot be made use of for any crop better than for that of wheat. By having machinery for breaking and reducing it into a dusty state, the farmer is said to have the advantage not only of buying it in at any time of the year when it is the most reasonable, (for as the two seasons of using it come on, it often increases in price, and is again cheaper when they are past,) but of readily preparing it and keeping it free from any admixture of other matters. It is said that this substance is not now so good as formerly, as the manufacturers of oil from the seed of rape contrive to press it twice at present, whereas they formerly never pressed it more than once; and that, besides, they then only used horses, where they now use water, wind, and steam.

The two principal seasons for making use of these sorts of dusts as top-dressings, are in the very early spring, and in the early part of the autumn, when the weather is rather moist.

Top-dressings of the malt-dust kind, which chiefly consist of the unfermented sprouts of the grain, and probably contain saccharine matter, from the powerful nature of their effects

in some cases, should, as in the other dust-top-dressings, be made use of in as dry a condition as possible, and without undergoing any degree of fermentation. It is used in the first of the above counties for wheat, in nearly the same quantities as other such matters, in some places, at the rate of twelve shillings the quarter; and it works much the best, it is said, on lands that are inclined to be rather wet. See *GRASS-Land*, GYPSUM, SALT, &c.

Top-dressings of these kinds are often well suited to and admirably beneficial for recovering and restoring backward and stunted crops of different sorts, but particularly those of the grain and grass kinds.

Top-Folding, a term applied to the practice of feeding down some sorts of spring corn-crops with sheep, as those of the wheat, and occasionally the barley kinds, when too rank or luxuriant. It is a method of practice which is much in use in some parts of Hertfordshire, and which is said there to be very beneficial in its effects; it should, however, be employed with caution in most cases, and constantly in the early states of growth of the grain, as in the more advanced ones it must always be hazardous, and often hurtful and destructive of such crops. The feeding down in these cases must, of course, be nicely regulated, so as never to suffer the crops to be too much or too little eaten by the sheep, as in either extreme the consequences will be injurious to them.

Top-Up, a term used to signify the making up or topping the roofs of hay or corn-stacks or ricks. It is likewise sometimes made use of, in feeding and fattening bullocks, to imply full feeding, or to finish highly, as with cake, oats, &c.

Top-Wood, in *Rural Economy*, the boughs or branches which form the tops of timber, or other trees, or the wood which they contain. See *TIMBER* and *TREES*.

TOPAN, in *Ornithology*, a name by which some have called the horned-beaked Indian raven, more usually known by the name of the rhinoceros-avis.

TOPARCHY, formed from *τοπος*, *place*, and *αρχη*, *government*, a little state, or signory; consisting only of a few cities, or towns; or a petty country, governed and possessed by a toparch, or lord.

Judæa was anciently divided into ten toparchies. See Pliny, lib. v. cap. 14. and Joseph. lib. iii. cap. 2. de Bel. Jud. & lib. v. &c.

Procopius only gives the quality of toparchy to the kingdom of Edessa; to Abgarus, the toparch or lord of which, there is a tradition, that Jesus Christ sent his picture, with a letter.

TOPAYOS, in *Geography*, a river of Brasil, which runs into the river Amazon, with a fort at its mouth of the same name. S. lat. 2° 30'. W. long. 57° 6'.

TOPAYOS, a savage tribe in Brasil, the chief and most numerous of the kind. They are anthropophagi; and if a woman miscarry, will greedily devour the fœtus. Strangers to cultivation, they live upon fruits, and the animals they kill. The Topayan language is very widely diffused, and is divided into several dialects. Their nakedness, ferocity, vindictive spirit, war cries, and whole mode of existence, have been particularly described by Lery.

TOPAZ, in *Mineralogy*, a gem so called from Topazos, a small island in the Red sea, where the Romans formerly obtained a stone called by them the topaz, but which is the chrysolite of the moderns. The topaz is said to have been first found by Juba, king of Mauritania; but it was known to the Hebrews before, as appears from the 118th Psalm. The most valued topazes are those of Saxony, Siberia, and Brasil.

The principal colour of the topaz inclines to yellow, called by professor Jameson wine-yellow. The pale wine-yellow passes from various shades of yellowish and greenish-white to green. The dark wine-yellow passes from orange to cherry-red and even to blue, but the latter colour is very rare. The topaz sometimes occurs massive and in rolled pieces, but more frequently crystallized. The crystals are seldom very large. The primitive form of the crystal, according to Haüy, is a rectangular octahedron. The common forms of the secondary crystals are varieties of the oblique four-sided prism, terminated by four planes. The sides of the prism are longitudinally streaked, but the terminating planes are smooth. When the edges of the crystals are truncated, the truncated planes are also smooth. The Brasilian and Siberian topazes are more deeply streaked than the Saxon. The external lustre of the topaz is splendid, the internal vitreous. The longitudinal fracture is small, and imperfectly conchoidal; the cross fracture is straight, and exhibits a lamellar structure. The topaz is translucent or transparent, and refracts double: it scratches glass, but is scratched by spinel: it is easily frangible. The specific gravity varies from 3.464 to 3.641.

The Saxon topaz becomes colourless by a gentle heat, and in this state is sometimes sold for the diamond. A strong heat deprives it of its lustre and transparency. The Brasilian topaz, by exposure to a strong heat, becomes red; and in a still higher temperature, violet-blue; it is then sometimes sold for the ruby, or for pale spinel. The topaz is infusible by the blowpipe, but melts with the addition of borax. The topazes of Brasil, Siberia, and Asia Minor, become electrical by heating. The constituent parts of this gem appear to vary considerably in different specimens.

	Saxon.	Brasilian.
Silex	35	29
Alumine	59	50
Fluoric acid	5	19

The topaz is found in various parts of Europe and Asia, and in South America. It occurs in large quantities in a rock denominated by Werner the topaz rock, which is an aggregate of massive topaz, quartz, and schorl, in which there are frequently small cavities lined with crystals of these three substances, and portions of lithomarge. This rock is situated at Schneckenstein, in Saxony.

It occurs also in veins of quartz at St. Michael's mount, in Cornwall, and with tin-stone at St. Anne's, in the same county. The topaz has recently been found, in large crystals and rolled pieces, in alluvial soil in the primitive country of the upper part of Aberdeenshire; indeed it is stated, in the first volume of the Wernerian Memoirs, that a specimen of topaz, weighing one pound three ounces eight drachms troy weight, has been obtained from that part of Scotland. The largest specimen of Brasilian topaz in the museum of natural history at Paris, weighs four ounces two gros. In this museum there is also a superb Indian Bacchus engraved on topaz. Tavernier mentions a topaz, in the possession of the great Mogul, weighing one hundred and fifty-seven carats, which cost 20,300l. sterling: and Boetius de Boot, in his treatise of precious stones, affirms to have seen in the cabinet of the emperor Rudolphus, whose physician he was, a topaz above three feet long, and six inches broad. Probably, it might be some other stone a little transparent, of a topaz colour. This gem was much prized by the ancients. Yellow-coloured rock-crystal has not been unfrequently imposed on the ignorant for topaz.

The oriental topazes, which have a deep rich orange-colour, are highly valued at present. The Brasilian topaz

has not so rich and fine a colour as the former. The Saxon topaz is distinguished by its wine-yellow colour, and when cut, often exhibits a lustre equal to that of the finest oriental varieties. The mountain-green varieties of topaz, which are found in Siberia, are included under the name of aqua marine. The Brazilian ruby and sapphire include the red and blue Brazilian topaz.

The topaz may generally be distinguished from all other minerals by the rhomboidal base of its crystals, the fracture, and cross lamellar structure, and by the longitudinal streaks on its side planes. It is less hard and heavy than yellow sapphire, and the latter does not become electric by heating. The same characters distinguish it from spinel: it is further distinguished from spinel by its double refraction. Green-coloured topaz is distinguished from beryl by its greater specific gravity, that of topaz being 3.5, and of beryl only 2.7. The latter cleaves in the direction of its lateral planes, which the topaz does not.

The following minerals have been denominated topazes, when colour was considered as affording the most certain character of precious stones.

1. Yellowish-white sapphire	} mistaken for	Oriental topaz.
2. Zircon		Hyaline and yellowish-red topaz.
3. Chrysolite		Yellowish-green topaz.
4. Yellowish beryl		Siberian topaz.
5. Yellow rock-crystal		Bohemian or Occidental topaz.
6. Clove-brown and brown rock-crystal		Smoke topaz.

Names given to varieties of the topaz.

1. Mountain green topaz	} called	Aqua marine.
2. Blue topaz		Sapphire.
3. Yellow topaz		Chrysolite.
4. Wine-yellow inclining to red topaz		Rubicele.
5. Red topaz		Brazilian or Balais ruby.
6. Yellowish-green topaz		Saxon chrysolite.

See SAPPHIRE, RUBY, and GEM.

A peculiar property of the topaz was discovered by Vauquelin, that the powder of this gem changes the syrup of violets to green if it remain in the liquor two or three hours, and this property is common to all the varieties of the topaz.

Mr. Canton, in 1760, found that the Brazil topaz has the electrical properties of the tourmalin.

The topaz is easily counterfeited; and there are factitious ones, which, to the eye, are not inferior to the natural ones.

To counterfeit the topaz in glass, see GLASS resembling Topaz.

To counterfeit the oriental topaz in paste: Take crystal prepared, two ounces; ordinary minium, or red lead, seven ounces: put these into a crucible luted, and bake them twenty-four hours in a potter's kiln. If the mass is not sufficiently clear and fine, cover it up again, and give a second baking, and it will come out of a fine topaz colour. See PASTE.

If we might believe the ancients, the topaz has very notable virtues; but those are now in discredit. See GEM.

TOPAZOS, or TOPAZIUS, in *Ancient Geography*, an island placed by Pliny in the Red sea, 300 stadia from the continent.

TOPDALS, in *Geography*, a town of Norway, in the province of Christianland; 32 miles N. of Christianland.

TOPE, in *Ichthyology*, an English name for a species of the squalus, according to the Ardeian system, the *squalus galeus* of Linnæus, distinguished from the other squali by the nostrils being placed extremely near the mouth, and by certain foramina, or apertures, near the eyes. It is the fish called by the ancients γαλιος κυων, *galeus canis* and *caniculata*. See SQUALUS.

TOPEL, or TAPL, in *Geography*, a town of Bohemia, in the circle of Pilsen; 56 miles W. of Prague. N. lat. 49° 58'. E. long. 12° 57'.—Also, a river of Bohemia, which runs into the Egra, near Carlsbad.

TOPERS HAT, a small island in a bay on the N. coast of New Guinea. S. lat. 3° 5'. E. long. 135° 33'.

TOPETINA, a town of Mexico, in the province of Mechoacan, at the mouth of a river near the Pacific ocean; 50 miles N.W. of Zacatula. N. lat. 18° 56'. W. long. 103° 44'.

TOPETRY, a town of Hindoostan, in the Carnatic; 50 miles S.E. of Tanjore.

TOPHATH, in *Ancient Geography*, a place in the Land of Paradise, near the Dead sea. Josiah destroyed this place on the abolition of idolatry.

TOPHUS, a kind of node, or swelling of the periosteum. Also, the sort of concretion found in the joints of gouty persons.

TOPHIUS, in *Natural History*, is a species of sand-stone, called also *porus*, mostly of a grey colour; but it is also found of other colours, as whitish, brownish, &c. according to the soil in which it is imbedded. It much resembles the pumice in texture, being rough and brittle, and composed of a large angular grit, cemented by a very coarse terrene crystalline substance. It is too soft to strike fire with steel. It is common in Italy and in Germany, where it is used for building, chiefly for cellars and turning arches. Da Costa's Hist. Fossils, p. 136.

TOPI, in *Geography*, a small island in the Mediterranean, near the N. coast of the island of Elba. N. lat. 42° 51'. E. long. 11° 30'.

TOPIA, a town of Mexico, in the province of Culiacan; 80 miles N. of Culiacan. N. lat. 25° 44'. W. long. 108°.

TOPIA, the chief chain of mountains in Spanish North America, commencing in the neighbourhood of Guadalupe, and extending north to New Mexico, a distance of 150 leagues, or, according to our maps, more than 700 British miles; while the breadth of all the ridges is, according to Alcedo, sometimes 40 leagues, or 160 miles. This chain is of such a height as to be comparable with the Andes of Peru, and abounds with precipices of the most profound and terrible aspect. It is almost universally densely clothed with large and lofty pines, and other trees which afford sustenance to birds of very variegated and beautiful appearance. On the summit the cold is intense, but the temperature on the sides varies according to climate and exposure. It is the source of many rivers flowing into the Atlantic and Pacific, and subject, on the melting of the snow, to very considerable inundations. During the rains, which last from June to September, the rivers become terrible in their devastations to the distance of two or three leagues, and the mosquitoes become intolerable. Among the animals in these regions, are bears, lions, and tigers, as well as squirrels of various kinds. This chain is prolific in silver, yielding about a mark for each quintal of earth. It received its name from a savage tribe, which was converted by the Jesuits in 1590; but the mines, on account of their distance from the capital, have been mostly abandoned. The ridge of Topia is also called the "Sierra Madre," or mother-chain, and embraces the singular province of Nayarit, which remained

remained Pagan till the year 1718. Towards the N. the extent of this chain has not been precisely ascertained; but the Moquis, on the W. of Santa Fé, and under the same parallel, are positively classed among its inhabitants; and it probably forms one chain with that of Nabajo, and the Sierra Azul, or Blue Ridge, of Alzete, and the stony mountains of North-west America, sending off a branch called Gemes on the W. of New Mexico, while on the E. of that province is the inferior ridge of Namhi. In the viceroyalty, the general distance of the Topian chain from the western shore is about 140 British miles, but in some parts not above half that space. Pinkerton.

TOPIARIA, in *Botany*, a name by which some authors have called the acanthus, or bear's-breech, a plant common in the gardens of the curious.

TOPIC, in *Rhetoric*, a probable argument, drawn from the several circumstances and places of a fact, &c. See ARGUMENT and LOCUS.

TOPICE, *τοπικη*, *Topica*, expresses the art or manner of inventing and managing all kinds of probable argumentations.

The word is formed from the Greek, *τοπικος*, of *τοπος*, *place*, its subject being the places, which Aristotle calls the *seats* of arguments.

Aristotle has written "Topics;" and Cicero a kind of comment on them, to his friend Trebatius, who, it seems, did not understand them. But the critics observe, that the "Topica" of Cicero agree so little with those eight books of Topics which pass under the name of Aristotle, that it follows necessarily, either that Cicero was much mistaken, which is not very probable; or that the books of Topics, now attributed to Aristotle, are not wholly his.

Cicero defines *topica*, or *topice*, to be the art of finding arguments, "disciplina inveniendorum argumentorum."

Rhetoric is sometimes divided into two parts; judgment, called also *dialectice*; and invention, called *topice*.

TOPICS, formed from *τοπος*, *place*, or *topical remedies*, in *Medicine*, are commonly used for what we otherwise call *external remedies*, *i. e.* such as are applied outwardly to some particular diseased and painful part.

Such are plasters, cataplasms, blisters, unguents, felves, collyriums, &c.

Topics are such medicines, as by the smallness and mobility of their particles, attended for the most part with gentle acrimony, are able to make their way into the substance of the parts to which they are applied, without eroding or wounding any of the solids; and thence are justly called *penetrating topics*.

It may be a question how topics in medicine act. It is commonly said, that this or that medicine penetrates the pores; but the ideas annexed to such expressions do not seem very distinct. Writers on this subject have seldom been at the pains to tell us what pores they mean. We have an essay on this subject in the *Med. Ess. Edinb. vol. ii. art. 4.* by Dr. Armstrong, who thinks that the effects of such medicines are not owing to the particles entering the orifices of the absorbent veins; nor to the opening of the exhalent vessels on the surface of the body by these medicines; nor will he allow the particles of penetrating topics to force their way through the coats of the vessels; but he supposes that subtle medicines are conveyed, by the exhalent vessels of the skin, to those parts of the smaller arteries, where the circulation is choaked by obstruction.

The gout is never cured by topics; they may assuage the pain for a time; but for a cure, the source of the evil must be attacked with internals.

TOPINAM BARANAS, in *Geography*, a town of Brasil,

in the government of Para, on the river of the Amazons; 80 miles S.W. of Pauxis. S. lat. $2^{\circ} 42'$.

TOPINAMBOS, a considerable tribe of anthropophagi in Brazil.

TOPINO, a river of Italy, which runs into the Tiber, 5 miles S. of Perugia.

TOPIRIA, in *Ancient Geography*, a town situated in the interior of Thrace. Pliny and Ptolemy.

TOPLITZ, in *Geography*, a town of Bohemia, in the circle of Leitmeritz, near which the Austrians defeated the Prussians in the year 1762; 14 miles W.N.W. of Leitmeritz. N. lat. $50^{\circ} 37'$. E. long. $13^{\circ} 51'$.

TOPLIWODA, a town of Silesia, in the principality of Munsterberg; 7 miles N.W. of Munsterberg.

TOPLOCZA, a town of Hungary; 14 miles S.E. of St. Crot.

TOPLUC, a town of Hungary; 20 miles S.S.W. of Podoliez.

TOPOBEA, in *Botany*, Aubl. Guian. 476. t. 189. Juss. 329, is probably not generically distinct from MELASTOMA; see that article, and the natural order of MELASTOMÆ.

TOPODURTY, in *Geography*, a town of Hindoostan, in Myfore; 24 miles W. of Tademeri.

TOPOGRAPHY, formed from *τοπος*, *place*, and *γραφω*, *I describe*, a description or draught of some particular place, or small tract of land; as that of a city or town, manor or tenement, field, garden, house, castle, or the like; such as surveyors set out in their plots, or make draughts of, for the information and satisfaction of the proprietors.

Topography differs from *chorography*, as a particular from a more general.

TOPOLEVA, in *Geography*, a fortress of Russia, in the government of Caucasus, on the Ural; 40 miles N. of Guriev.

TOPOLITZA, a town of European Turkey, in Moldavia; 12 miles S.W. of Niemez.

TOPOLTZAN, a town of Hungary; 52 miles N.E. of Presburg. N. lat. $48^{\circ} 34'$. E. long. $18^{\circ} 25'$.

TOPOLTZAN, (*Kis*), a town and castle of Hungary; 12 miles N.W. of Bukans.

TOPOROW, a town of Austrian Poland, in Galicia; 35 miles N.E. of Lemberg.

TOPPARPOUR, a town of Hindoostan, in Oude; 25 miles E. of Bahraitch.

TOPPING of *Trees*, in *Rural Economy*, the practice of cutting or lopping off the heads of them, especially of the different sorts of hedge-row trees, which, in this last case, is a disgusting and disgraceful custom, now on the decline. See POLLARD *Trees*.

Where, however, this sort of work is to be performed, it should, in all cases, be executed in the autumn, or very early in the spring months.

In topping fallen trees, the different parts should be cut out and put together into separate lots, as the large arms into one, the smaller branches into another, and the small brush, or faggot-wood, into a third. Thus the whole may be readily disposed of, or converted to its proper use.

TOPPING the *Lifts*, aboard a *Ship*, the same as hauling the top-sail-lifts, by slackening one of them, and pulling upon the opposite one, so as to place the yard at a greater or less obliquity with the masts. See LIFTS.

TOPPING-*Lift*, a large and strong tackle, employed to suspend or top the outer end of a gaff, or of the boom of a main-sail and fore-sail; such as are used in brigs, sloops, or schooners. Falconer.

TOPRAK-KALA, in *Geography*, a town of Turkish Armenia; 6 miles S. of Kars.

TOPRAK-KALAH, a town of Asiatic Turkey, in the province of Diarbekir; 60 miles S. of Mosul.

TOPSAIL INLET, a channel between two small islands on the coast of North Carolina. N. lat. $34^{\circ} 18'$. W. long. $77^{\circ} 48'$.

TOPSFIELD, a township of Massachusetts, in the county of Essex, containing 815 inhabitants; 24 miles N.E. of Boston.

TOPSHAM, a market-town in the hundred of Wonford, and county of Devon, England; is situated at the confluence of the rivers Clyst and Exe, 3 miles S.E. from Exeter, and 170 miles W.S.W. from London. Leland, speaking of this town, says, "Here is the great trade and rode for shippes that usith this haven, and especially for the shippes and merchant-mannes goodes of Excester. Men of Excester contende to make the haven cum up to Excester self: at this time shippes cum not further up but to Apsam." The manor was the property of the Courtenays, earls of Exeter, one of whom procured for the town the privilege of a market, and an annual fair, which are still held; the market-day being Saturday. The town consists principally of one long street, of irregular breadth, chiefly extending north and south along the eastern bank of the Exe. Many of the houses are handsome, but the greatest number have but a mean appearance. The southern extremity, called the Strand, is the most pleasant, the river flowing within a short distance of the houses, and is chiefly inhabited by persons of fortune: the view from it is extensive and beautiful. The quay is spacious and convenient, and now belongs to the chamber of Exeter, who purchased it about the year 1778. Most of the inhabitants are employed in the shipping business; the total number, as returned under the act of the year 1811, was 2871; the number of houses was 620. The church stands near the centre of the town, on a high cliff, which affords an extensive view of a noble river, distant shipping, churches glimmering through groups of trees, a fertile vale, and a fine range of mountains, rising above each other in beautiful perspective, as far as the eye can reach.

In the vicinity of Topsham is Nutwell, the seat of lord Heathfield, nephew and successor to sir Francis Drake. According to Risdon, the manor-house was a castle, till lord Dinham, about the time of Edward IV., converted it into a stately dwelling-house. Sir Francis Drake made many alterations; and it has been nearly rebuilt by the present possessor on a more ample scale, and at a very great expence.—*Beauties of England and Wales*, vol. iv. Devonshire, by J. Britton and E. W. Brayley, 1803. *Polwhele's History*, &c. of Devonshire, fol. 1797.

TOPSHAM, a township of the province of Maine, in the county of Lincoln, containing 1271 inhabitants; 156 miles N.E. of Boston.—Also, a town of Vermont, in the county of Orange, containing 814 inhabitants.

TOR, a sea-port of Arabia, on the coast of the Red sea, formerly a place of consequence, and strong, but at present in a ruinous state and without a garrison. Near it is a ruined castle, inhabited by the Arabs; the Greeks call this place "Raitho," which might have its name from being inhabited by some of those people called by Ptolemy "Raitheni," towards the mountains of Arabia Felix; it is inhabited by Arabs, and about twenty families of the Greek church. The monks of mount Sinai have a convent here, to which they have sometimes retired when they could not conveniently stay at mount Sinai; only one priest resides in it for the service of the church. About a league north of Tor is a well of very good water, and about it are a great number

of date-trees, and several springs of salt-water, especially to the south-east, where the monks have their garden. Near it are several springs, and a bath or two, which are called "the Baths of Moses;" the Greeks as well as some others are of opinion that this is Elim. The greatest curiosities of Tor are the productions of the Red sea; the shell-fish of it are different from those of the seas to the north of it; but what are most peculiar to it, are the several stone vegetables, the madreporæ, a sort of coral; the fungi, or mushrooms; and the red pipe coral. In 1540, Tor was taken by the Portuguese. N. lat. $28^{\circ} 10'$. E. long. $33^{\circ} 37'$.

TOR, a town of Africa, in the country of the Foulahs. N. lat. $16^{\circ} 30'$.

TOR ALBA, a town of the island of Sardinia; 20 miles E.N.E. of Algeri.—Also, a town of the island of Sardinia; 13 miles S. of Oristagni.

TOR DI CANE, a town of Naples, in the province of Bari; 9 miles S.E. of Monopoli.

TOR POINT, or *Hope's Nose*, a cape of England, on the coast of Devonshire, forming the north point of Torbay.

TORA, a town of Egypt, on the Nile; 8 miles S. of Cairo.—Also, a town of Naples; 9 miles N.N.E. of Sezza.

TORACA, or BUTUA, a province of Africa, in the empire of Mocaranga.

TORADOR. See *BULL-Fighting*.

TORAITO, in *Geography*, a town of Thibet; 30 miles N.E. of Tchontori.

TORAL, EL, a sea-port of Chili. S. lat. $27^{\circ} 55'$.

TORALIBA, in *Ancient Geography*, an island of the Indian sea, near the mouth of the river Indus, and 9 miles from the island of Bybaga. Pliny.

TORAR, in *Geography*, a town of Hindoostan, in the circar of Surgooja; 30 miles E.S.E. of Surgooja.

TORBAY, is a commodious bay or sea-road, five miles from Dartmouth, on the coast of Devonshire, England. It is formed by two capes, that on the east called Bob's-Nose, that on the west, Berry-Head. Its general shape is semi-lunar, inclosing a circumference of about twelve miles. The winding shores on both sides are screened with great ramparts of rock; between which, in the central part, the ground from the country, forming a gentle vale, falls easily to the water's edge. Wood grows all round the bay, even on its rocky sides, where it can get footing and shelter; but in the central part with great luxuriance. This noble bay has often afforded protection to the fleets of England, which, in their full array, ride safely within its ample bosom. The prince of Orange, afterwards king William III., landed here on the 5th of November, 1688, to effect the ever memorable revolution. Near this bay is a remarkable place called Kent's-Hole, consisting of many caverns entered by subterraneous passages, but having only one external entrance.

Tor Abbey, the seat of George Cary, esq. is finely situated amidst some ancient and noble trees, and commands an interesting prospect of Torbay, and the rocky tors in the vicinity. The house is mostly modern; though some parts of the old abbey are still preserved. It consists of a centre and two wings; one of which is connected with a castellated gateway, having octagonal towers and battlements. Beyond this gateway is a large barn, which formerly belonged to the Abbey. It is overspread with a venerable mantle of ivy, and decorated with loop-holes, and numerous buttresses. The ancient religious house of this place was erected by William, lord Briwere, or Bruer, in the time of king John, and endowed by him with considerable revenues, which were afterwards much augmented by his son. It was appropriated for canons of the Premonstratensian order. After the Bruers, Tor

Abbey came into the Mohun family, who were succeeded by the Ridgeways, and these by the Carys, who now enjoy it. At the dissolution, the revenues amounted to 396*l.* 11*s.*—Gilpin's Observations on the Western Counties, 8vo. Beauties of England and Wales, vol. iv. Devonshire, by J. Britton and E. W. Brayley, 1803.

TORREY, a bay of the North Atlantic, on the east coast of Newfoundland. N. lat. 47° 48'. W. long. 52° 20'.—Also, a town and bay on the south coast of Nova Scotia. N. lat. 45° 8'. W. long. 61° 15'.

TORBEK, a town on the south coast of Hispaniola; 9 miles N.W. of Vache island.

TORBIA, a town of France, in the department of the Maritime Alps, called by the Romans *Trophæa Augusti*, with an ancient Gothic tower. In the environs are found many remains of monuments erected by the Romans, trophies and fragments of a statue of Augustus; 7 miles E. of Nice.

TORBIDO, FRANCESCO, called *Il Moro*, in *Biography*, was born, about the year 1500, at Verona, and perhaps rather before it, as he is said to have had, for a short time, the advantage of receiving instruction from Giorgione. He afterwards became the pupil of Liberale, and his own style is a compound of those of his masters, partaking of the glow of the former, with the elaborate finish of the latter. His principal occupation was in portrait, yet he left several historical pictures of considerable merit. Amongst them are some frescoes, representing the life of the Virgin, in the cathedral at Verona; and a picture in oil of the Transfiguration, in the church of S. Maria Maggiore, at Venice. He died at the age of 81, but the exact date is unknown.

TORBIDO, in *Geography*, a river of Naples, which runs into the Crate, near Bisignano.

TORBISCON, a town of Spain, in the province of Grenada; 14 miles N.E. of Motril.

TORBOLE, a town of the Tyrolese, on the north-east coast of lake Garda. In 1796, this town was taken by the French; 17 miles N. of Garda.

TORBUS. See TUBUREO.

TORC, a mountain of Ireland, in the county of Kerry, on the south side of Lough Lane, whence the southern part is called Lough Torc.

TORCELLO, a small island in the gulf of Venice, with a town of the same name, the see of a bishop, suffragan of Venice. The town of Torcello is in a flourishing state, which it owes to the inhabitants of Altino, who were driven out of that place by Attila, and fled hither; it has also been the see of the bishop of Altino, in consequence of the bishop Paolo having emigrated to the first-mentioned place. His successor, Mauro, or Maurizio, obtained from pope Severino the confirmation of his new see, and built here several churches, together with the elegant nunnery S. Giovanni di Torcello. More churches were built by his successor Giuliano; and Diadato, the fourth bishop, erected finally, in the year 697, the principal church of Santa Maria; which was rebuilt from the ground, in the eleventh century, by the bishop Orso; 3 miles N. of Venice.

TORCH, Τῆδα, a sort of luminary, properly a stick of fir, or other resinous and combustible matter, as pine, linden, &c. more or less thick, and long; encompassed at one end with six wax candles, which being lighted, yield a kind of gloomy brightness.

Torches are used in some church ceremonies, particularly at the processions of the holy sacrament in the Romish church, and at the interments of the poorer people.

Formerly they were used at the funerals of those of the first rank; but tapers and flambeaux are now introduced in their stead; and frequently also called by their name.

TORCH-*Thistle*, in *Botany*. See CERESUS.

TORCHÈNES, in the *Manege*, a long stick with a hole at the end of it, through which a strap of leather is run, the two ends of which being tied together, serve to straighten and closely tie up a horse's nose as long as the stick is stayed upon the halter or snaffle. This is done to keep the horse from being unruly when he is dressed, or upon any other occasion.

TORCHIARA ROCCA, in *Geography*, a town of the duchy of Parma; 5 miles S. of Parma.

TORCHILLI, JONAS, in *Biography*, the descendant of a respectable family in Iceland, was born in the district of Guldbringe in 1697, and sent in 1718 to the university of Copenhagen, from whence he proceeded to Holstein, completing his studies at the university of Kiel. In 1728 he returned to Iceland, and became rector of the school of Skalholt, which he resigned in 1736, quitting his country on account of some troubles which ensued from his speaking his sentiments too freely. At Copenhagen, whither he withdrew, he made some unfavourable reports of the clergy in Iceland, and was sent thither as secretary to Harboe, afterwards bishop of Zealand, who was deputed to examine the state of the Icelandic church. Having finished this business, Torchilli retired to Copenhagen, and died there in 1759. His works, besides some others, are, "The Augsburg Confession, translated into Icelandic," 1742, 12mo.; "Biblia Islandica ab eo Mendis Typographicis purgata," Havn. 1746; "An Appendix to Anderson's Account of Iceland, in Danish," 1748, 8vo.; "Chrysois, five Descriptio Tractus Guldbringentis;" "A Supplement to Runolf Jonæ's Icelandic Grammar;" "Versio Latina Odæ Havamal Carminis Sapphice expressa;" "Lexicon Islandico-Latinum." Tiraboschi. Gen. Biog.

TORCOLA, in *Geography*, a small island in the Adriatic. N. lat. 43° 27'. E. long. 16° 54'.

TORCULAR, a bandage, or instrument, used to check hæmorrhage. See TOURNIQUET.

TORCULAR *Herophili*, in *Anatomy*, a name given to one of the sinuses of the brain. See VEIN.

TORCY le Grand, in *Geography*, a town of France, in the department of the Lower Seine; 3 miles S. of Arques.

TORDA, or TORENBURG, a town of Transylvania, famous for its salt-works. The Hungarian language is said to be spoken with the greatest purity in this town; 15 miles W.N.W. of Clausenburg. N. lat. 46° 42'. E. long. 23° 24'.

TORDEHUMOS, a town of Spain, in the province of Leon; 5 miles W.S.W. of Rio Seco.

TORDERA, a river of Spain, in Catalonia, which runs into the sea, near Blanes.

TORDESILLAS, a town of Spain, in the province of Leon, on the Duero; 13 miles S.W. of Valladolid.

TORDINO, a river of Naples, which crosses Abruzzo Ultra, passes by Teramo, and runs into the Adriatic, N. lat. 42° 40'. E. long. 14°.

TORDINO, in *Ornithology*, a name by which the Venetians call a bird of the lark kind, common in their markets, and called by authors *spinoletta*.

TORDO MARINO, the name of a bird of the starling kind, called also the *codiroffo maggiore*, or *ruticilla major*, and by the Austrians the *lein-reitling*. Aldrovandus has named it the *merula saxatilis*, or *rock-blackbird*. It is of the size of our starling, and much resembles it in figure; its breast is greyish, and has a black transverse streak, and behind that the whole is of a yellowish hue; its head and back are of a blackish hue, with some slight variegations of grey, from the tip

tip of the feathers being of that colour: the tail is long and of a reddish-orange colour, and the under-feathers of the wings are of the same hue; the females are of a less elegant colour than the males, viz. a mouse-colour, variegated with white on the back, and ash-colour on the belly: what is yellow in the male birds, is also very pale in the females: it is not uncommon in Germany, and may be taught, like the starling, to imitate the human voice. Ray.

TORDYLIUM, in *Botany*, τὸ δῆλον of the Greeks, probably the very plant of Dioscorides, is supposed by Linnæus to owe its name to the neat orbicular figure of its seeds, which seem as if artificially wrought, or turned. The same idea is hinted by Bodæus a Saapel, in his edition of Theophrastus, 1125; but Linnæus appears to have been more particularly led by Ambrosinus, to resolve the word into τὸ γῆρας, a turning laibe, and δῆλον, to turn. The latter seems superfluous. De Theis is dissatisfied with this etymology. We can only say, in its support, that those philologists who have not traced the word to its origin, nevertheless consider it as applying particularly to the seed of the plant.—Linn. Gen. 150. Schreb. 181. Willd. Sp. Pl. v. 1. 1381. Mart. Mill. Dict. v. 2. Sm. Fl. Brit. 294. Prodr. Fl. Græc. Sibth. v. 1. 180. Ait. Hort. Kew. v. 2. 124. Spreng. Prodr. Umbellif. 11. Juss. 224. Tourn. t. 170. Lamarck Illustr. t. 193. Gærtn. t. 21.—Class and order, *Pentandria Digynia*. Nat. Ord. *Umbellifera*.

Gen. Ch. *General Umbel* of many unequal rays; *partial* of many unequal very short ones, flat. *General involucre* of several slender undivided leaves, mostly as long as the umbel; *partial* unequal, exceeding the partial umbel in length at its outside. *Perianth* of five teeth. *Cor.* *Universal* irregular, radiant; all the florets fertile; *partial* of the disc with five equal petals, whose inflexed points render them heart-shaped: of the radius similar, but its outermost petals are very large, and deeply divided. *Stam.* in all the florets, Filaments five, capillary; anthers simple, roundish. *Pist.* in all the florets, Germen roundish, inferior; styles two, small, erect; stigmas obtuse. *Peric.* Fruit nearly orbicular, compressed, crenate at the edge, separable into two parts. *Seeds* two, nearly orbicular, almost flat, with a thickened, finely crenate, margin.

Eff. Ch. *Involucre* long and undivided. *Corolla* radiant. Flowers all perfect. Fruit nearly orbicular, compressed almost flat, with a crenate margin.

Obs. Linnæus points out the presence of efficient stamens and pistils in all the florets as the most important difference between this genus and CAUCALIS, see that article. But the seeds of the latter being ovate, striated, and beset with rigid bristles, afford, as he afterwards justly thought, a more constant and satisfactory character.

1. *T. syriacum*. Syrian Hart-wort. Linn. Sp. Pl. 345. Willd. n. 1. Ait. n. 1. Jacq. Hort. Vind. v. 1. 21. t. 54. Rivin. Pentap. Irr. t. 3. (T. minus syriacum, feminis limbo granulato; Moris. sect. 9. t. 16. f. 7. Gingidium latifolium; Ger. Em. 1042.)—*Partial involucre* many times longer than the nearly sessile flowers.—Native of Syria and Caria. A hardy annual in our botanic gardens, flowering in July. The whole herb is hoary with short close hairs, which render it soft to the touch. *Stem* twelve or eighteen inches high, angular, leafy, somewhat branched, zigzag, spreading. *Leaves* stalked, pinnate, of three or five broad, obtuse, rounded, notched leaflets; the odd one largest, slightly three-lobed, an inch and half long. *Umbels* lateral and terminal, on long, spreading, furrowed stalks. *Flowers* white, few and small; but the leaves of the *partial involucre* are remarkable for being about an inch in length, obovato-lanceolate, leafy, exceeding those of the

general one in size. The seeds are bristly and viscid, with a crisped margin.

2. *T. officinale*. Official Hart-wort. Linn. Sp. Pl. 345. Willd. n. 2. Fl. Brit. n. 1. Engl. Bot. t. 2440. Ait. n. 2. Sm. Fl. Græc. Sibth. t. 267, unpublished. (Seseli creticum minus; Bauh. Pin. 161. Ger. Em. 1050. Caucaelis minor, pulchro femine, five Bellonii; Bauh. Hist. v. 3. p. 2. 84. Small Hartwort; Petiv. Herb. Brit. t. 24. f. 6.)—*Partial involucre* full as long as the flowers. Leaflets ovate, cut, crenate. Radiant petals two together, unequally lobed.—Native of the south of France, Italy, Sicily, and the Levant. Dr. Sibthorp found this plant in various parts of Greece and the neighbouring islands. He judged it, with great probability, to be the identical τὸ δῆλον of Dioscorides. As a British plant it rests on the authority of Doody, who gathered specimens about Isleworth, and communicated them to Ray. The latter could not mistake the species, but he hints, in his *Synopsis*, ed. 2. 102, that the seeds probably escaped from some garden. This is an annual, more erect than the foregoing, but, like that, downy, not bristly. The leaflets are ovate, sometimes rather oblong, sometimes roundish-heart-shaped, from three to nine; stalked and lobed in the larger more luxuriant leaves, but generally unequally crenate only: the upper ones are lanceolate or oblong. *Flowers* large, white or pale flesh-coloured, numerous; the two outer petals, especially of the marginal flowers, remarkably radiant, one lobe of each being disproportionately large. *General* and *partial involucre* of narrow awl-shaped leaves, the latter smallest. *Seeds* smooth, with an elegant, broad, thick crenate border. This plant was formerly cultivated for the sake of its seeds, supposed to promote urine and other excretions, but now out of use. The *T. apulum minimum*, Column. Ecphr. 122. t. 124. f. 1, seems to us a scarved variety, different, as Jacquin well remarks, in Hort. Vind. v. 3. 2, from the following, though he errs in taking it for the true *apulum*, which is what he originally so called. See the next species.

3. *T. apulum*. Smaller Hart-wort. Linn. Sp. Pl. 345. Willd. n. 4. Ait. n. 4. Prodr. Fl. Græc. n. 631, excluding the synonyms. Rivin. Pentap. Irr. t. 2. Jacq. Hort. Vind. v. 1. 21. t. 55. Spreng. n. 3. (T. humile; Desfont. Atlant. v. 1. 255. t. 58.)—*Partial involucre* shorter than the flowers. Leaflets lacinated; the upper ones narrow. Radiant petals solitary, of two equal lobes.—Native of cultivated fields in Italy, Barbary, and Greece. A smaller plant than the foregoing, annual like that, but with several stems, whose lower part, as well as the sheaths of each *foxtail*, is shaggy, with long white woolly hairs. The leaflets of the lower leaves, about seven, are rounded, variously jagged and notched; those of the upper still more various in figure, narrow, mostly wedge-shaped, often deeply, and very acutely, three-lobed. *Umbels* of usually five rays, sometimes more, four times as long as the *general involucre*. *Flowers* white, radiant, but not in the manner of the foregoing, they having but one greatly enlarged petal, whose two obovate lobes are nearly equal. The seeds have a broader, striated, granulated disk, with a thick, but not so broad, border as in *T. officinale*. The synonyms of Bauhin, *Seseli creticum minimum*, as well as those of Tournefort, Ray and Morison, cited in Sp. Pl. and Hort. Cliss., all depending on Columna's plant mentioned under our last species, are to be transferred to that.

4. *T. fistulosum*. Red Dwarf Hart-wort. Scop. Carn. v. 1. 194. t. 8. Willd. n. 6. Spreng. Prodr. 11.—*General involucre* of one or two leaves. Leaflets ovate, lobed and notched, nearly uniform. Radiant petals solitary, of two equal lobes. Fruit bristly.—Native of the alps of Carniola.

Carniola. This appears to be nearly related to the last, nor can we discern why professor Sprengel marks it as a doubtful species. We have seen no specimens. The faithful Scopoli describes it as about a foot high, with uniform *leaves*, composed of two pair of obliquely ovate, or half-heart-shaped, sessile, notched leaflets, and a terminal one, broader, deeply three-lobed. The *flowers* are red, or pink. *Fruit* oval, compressed, with a thick bristly border, not described as crenate, whence perhaps the doubts of professor Sprengel.

5. *T. maximum.* Great Hart-wort. Linn. Sp. Pl. 345. Willd. n. 5. Fl. Brit. n. 2. Engl. Bot. t. 1173. Jacq. Austr. t. 142. Scop. Carn. v. 1. 195. Tourn. Inst. 320. (*Tordylium*; Rivin. Pentap. Irr. t. 1. Sefeli creticum majus; Bauh. Pin. 161. Ger. Em. 1050. *Caucalis major*; Cluf. Hist. v. 2. 201. Ger. Em. 1021, bad. *Heraclium Tordylium*; Spreng. Prodr. 12.)—Umbels dense. Leaflets lanceolate, deeply serrated. Stem rough with deflexed bristles; umbels and fruit with erect ones.—Native of waste ground, banks and hedges, in Italy, Switzerland, Germany, and, though very rarely, England, flowering from June to August. It has long been observed under the hedge on the north side of the parks, at Oxford; and was gathered by Mr. Gotobed near Eton. Dr. Sibthorp met with this plant in Greece and about Constantinople. The *root* is annual, tapering. *Stem* three or four feet high, erect, branched, leafy, furrowed, clothed all over with short, rigid, pungent bristles, which point strongly downward; while the rays of the *umbels*, the *involutral leaves*, which are all short and awl-shaped, and the *germen*, as well as *fruit*, are equally rough, with erect bristles. The lower *leaves* consist of about five broad, ovate leaflets, deeply and irregularly notched; the upper of about three elongated narrow ones, strongly serrated; all rough with close-pressed rigid hairs. *Flowers* small, reddish, with unequal *petals*, but not strikingly radiant. *Calyx-teeth* elongated, unequal. *Fruit* nearly orbicular, bristly, with a thick, pale, rugged border, less crisped than in the first three species, and a slightly tumid ribbed disk. The presence of a general as well as partial *involutrum*, does not agree with Sprengel's character of *Heraclium*, nor do the *seeds* answer to his description of that genus.

6. *T. peregrinum.* Oriental Hart-wort. Linn. Mant. 55. Willd. n. 3. Ait. n. 3. (*Conium dichotomum*; Desfont. Atlant. v. 1. 246. t. 66. *Caucalis Hispanica*; Camer. Hort. 37. t. 11. *Cachrys peregrina*; Spreng. Prodr. n. 11, and *C. dichotoma*; *ibid.* n. 12.)—Leaves repeatedly compound, smooth, with linear decurrent segments. *Fruit* elliptical, furrowed, with crisped ribs and margin.—Native of the Levant. *Herb* annual, smooth, with a branched spreading *stem*, and very finely divided, thrice compound *leaves*. *General umbels* of scarcely more than three or four stout smooth rays; *partial* small and dense. *General involutrum* of one or two small, ovate, pointed, white-edged *leaves*; *partial* of several similar unequal ones. *Flowers* small, scarcely, if at all, radiant, white, or slightly reddish. *Fruit* thick, almost sessile, more elliptical and acute than in the rest of the genus, having a thick, crisped edge, and three greatly elevated, less strongly corrugated, ribs at each side. The genus of this plant is certainly very ambiguous. It might perhaps be safely referred to *Conium*, with which its habit more accords, especially as the *fruit* answers but indifferently to the idea or definition of a *Tordylium*.

T. latifolium, *Anthriscus* and *nodosum* of Linnæus are now generally referred to *Caucalis*. Sprengel however has restored the genus *TORILIS* of Adanson and Gærtner; see that article, to which the two latter belong.

We shall have occasion to speak of the difficulties frequent

in the generic distribution of this tribe, when we come to the article *UMBELLIFERÆ*.

TORÉ, TORUS, in *Architecture*, a large round moulding, used in the bases of columns.

Daviler derives the word from the Greek, *τοπος*, a cable, to which it bears some resemblance; or from the Latin *torus*, a bed, as being supposed to represent the edge of a bed or quilt, swelled out with the weight of the incumbent column.

The toré is also called *gros baton*, and *tondin*. It is the bigness that distinguishes the torus from the astragal.

The bases of Tuscan and Doric columns have but one toré, which is between the plinth and the listel. In the Attic base there are two; the *upper*, which is the smaller; and an *under*, or bigger.

TORÉE, in *Geography*, a circar of Bengal, bounded on the north by Palamow, Koonda, and Ramgur; on the east by Ramgur; on the south by Chuta and Nagpour; and on the west by Palamow; about 32 miles long, and 24 broad. Torée is the capital.—Also, a town of Hindoostan, and capital of a circar of the same name, in Bengal; 210 miles W. of Calcutta. N. lat. 22° 37'. E. long. 84° 53'.

TORÉK, a town of Hungary, near the Theyffe; 40 miles W.S.W. of Debreczin.

TORELLI, LELIO, in *Biography*, a learned jurist, was born at Fano in 1489. Having studied Greek and Latin at Ferrara, he graduated at Perugia, where he studied law. The last respectable office of magistracy which he occupied, was that of grand chancellor and first secretary to the dukes of Tuscany, Cosmo, and his son Francesco. He was also advanced to the rank of Florentine nobility, and the title of senator, and was consul to the academy of Florence, where he died in 1576, universally esteemed for his mental and moral qualities. He amused himself with polite literature, in which he was a proficient, and with writing Latin and Italian poetry; but the subject of his serious study was jurisprudence. He was the author of several works on the law; but he was principally engaged in preparing a new and correct edition of the Pandects, availing himself of the Pisan or Florentine MS. This magnificent edition appeared from the Torrentian press in 1553, in three large volumes folio. His son Francesco was his associate in the labour of this work; but the son died before the father. Gen. Biog.

TORELLI, POMPONIO, a poet and man of letters, and count of Montechiarugola, was educated at Padua, where he resided eleven years. Upon his return to his native place he married, and in 1584 was sent on a mission to Spain; and having succeeded in the object of it, he afterwards employed himself chiefly in literary compositions. His works were numerous, among which we may reckon a treatise "De Debito del Cavaliero," 1596; five tragedies, *viz.* "La Merope," "Il Tancredi," "La Galatea," "La Vittoria," and "Il Polidoro." His MSS., which were also numerous, are preserved at Reggio. He died in 1608. Tiraboschi. Gen. Biog.

TORELLI, GIUSEPPE, a native of Verona, member of the Philharmonic society, and principal violin of San Petronio, at Bologna. In 1701 he was concert-master at the court of Anspach, and his performance on the violin acquired him great reputation. He was a voluminous composer for that instrument. His productions, however, are so superannuated, as almost to cease to be music; for having little original melody, and no uncommon stock of harmony or modulation, there is nothing left to make amends for the want of novelty and elegance. This composer, besides the numerous works which he published for violins during his life,

life, of which the titles are recorded in Walther, left behind him an inedited work, which was published in 1709 by his brother, Felice Torelli, after the author's decease, under the title of "Concerti grossi con una pastorale per il fantissimo natale," consisting of twelve concertos in eight parts. These concertos have been thought the best of his productions, and the model of grand concertos for a numerous band. Quantz, *Arte de la Flute*.

TORELLO, in *Geography*, a town of Naples, in Principato Ultra; 3 miles W.N.W. of Conza.—Also, a town of Spain, in Catalonia. In the year 1694, a battle was fought near this town between the French and Spaniards, in which the former were victorious; 6 miles N. of Vique.

TORENATE, a town of New Navarre; 100 miles S.S.E. of Casa Grande.

TORENIA, in *Botany*, was so called by Linnæus, after his pupil, the Rev. Olof Torén, or Toreen, chaplain of a ship in the service of the Swedish East India Company, who studied at Upsal, in order the better to qualify himself, as a naturalist, for a voyage to China. He communicated to his great botanical preceptor many scarce plants, and addressed to him a series of letters, descriptive of the voyage, in which, though various other subjects are touched upon, natural history makes a principal figure. These were published at the end of Osbeck's Voyage, (see OSBECKIA,) and translated with that work into English, by Dr. Forster. Soon after they were written, the author died, apparently at an early age, near Nafing, in Sweden, Aug. 17, 1753.—Linn. Gen. 311. Schreb. 407. Willd. Sp. Pl. v. 3. 265. Mart. Mill. Dict. v. 4. Brown Prodr. Nov. Holl. v. 1. 440? Juss. 122. Lamarck. Illustr. t. 523.—Class and order, *Didymia Angiospermia*. Nat. Ord. *Personate*, Linn. *Scrophularia*, Juss.

Gen. Ch. Cal. Perianth inferior, of one leaf, tubular, angular, permanent, two-lipped; the lips toothed, unequal. Cor. of one petal, ringent, twice the length of the calyx; its upper lip nearly entire; lower three-cleft, the middle segment most prominent. Stam. Filaments four; the two uppermost simple; two lowermost longest, with a lateral branch or tooth; anthers of two vertical, oblong, rather distant lobes, converging in pairs, their respective lobes closely contiguous. Pist. Germen superior, elliptic-oblong; style thread-shaped, swelling upwards; stigma of two parallel flat plates. Peric. Capsule elliptic-oblong, of two cells, and two undivided valves, with a parallel unconnected partition. Seeds numerous, roundish, attached to the partition.

Ess. Ch. Calyx tubular, angular, with two lips. Corolla ringent. Two of the filaments with a lateral branch. Anthers connected in pairs, by their opposite lobes. Capsule of two cells, with a parallel partition. Seeds numerous.

Obs. We take our characters of this genus principally from the original Linnæan species, and therefore hesitate to admit, after the example of our learned friend Mr. Brown, any species with a regular five-toothed calyx, such as *Capraria crustacea*, Linn. and *Torenia scabra* of Brown. We also omit *T. flaccida* of the last-mentioned author, and *Antirrhinum hexandrum* of Forster, because we have not seen them. The strange name of the latter probably alludes to the lateral branches of two of the filaments, by which therefore it should seem to be a good *Torenia*. Yet these appendages appear to be wanting in *T. cordifolia* of Roxburgh, if we may trust the figure, nor do we find them clearly in our *T. obtusifolia*. The two-lipped tubular calyx seems to us the most important mark.

1. *T. asiatica*. Smooth Creeping *Torenia*. Linn. Sp.

Pl. 862. Willd. n. 1. Osbeck's Travels, English edition, v. 1. 337. Lamarck f. 1. (*T. glabra*; Osbeck It. 210. "Kaka-pu; Rheede Hort. Mal. v. 9. 103. t. 53.")—Smooth, with a creeping stem. Leaves stalked, ovate, acute, ferrated.—Native of China, in watery places, flowering in September. The whole herb is smooth, except a few hairs about the joints, and at the insertion of the leaves. Stem a span long, branched, square, leafy, creeping by means of fibrous roots, which seem to be perennial. Leaves hardly an inch long, opposite, smooth, with shallow serratures; on stalks about half their own length. Flowers axillary, solitary, opposite; on long simple stalks, purple, large and handsome, not unlike those of MAURANDIA; see that article. The small teeth, or points, of the calyx are narrow, close together, and its angles are winged.

2. *T. hirsuta*. Hairy *Torenia*. Willd. n. 2. Lamarck f. 2. Mart. Mill. Dict. n. 2.—Hairy, with an erect stem. Leaves ovate, ferrated, on short stalks.—Native of China. Linnæus thought it a variety of the first species, but it is much more hairy, with smaller flowers; the calyx scarcely winged, except at the very base. The teeth of that part appear to become more deeply separated as the capsule enlarges.

3. *T. ciliaris*. Fringed *Torenia*.—Leaves ovate, acute, slightly hairy, ferrated, on long stalks. Angles of the calyx broadly winged, fringed.—Native of the Nicobar islands. Communicated by the Right Hon. Sir Joseph Banks. The stem appears to be erect. The leaves are an inch and half long, strongly ferrated, slightly besprinkled with hairs, oblique at the base. Footstalks nearly half the length of the leaves, channelled, hairy. Flowers opposite, about as large as the first species. Calyx remarkable for its broad wings, fringed with short upright hairs; its teeth slender and hairy.

4. *T. cordifolia*. Heart-leaved *Torenia*. Roxb. Coromand. v. 2. 32. t. 161. Mart. Mill. Dict. n. 3.—Nearly smooth. Stem branched, spreading. Leaves ovate-heart-shaped, ferrated. Calyx without wings.—Native of the East Indies. Found by Dr. Roxburgh, in the moist pasture lands about Samulcotah, flowering during the cold season. The root is fibrous, simple, apparently annual. Stem erect, six inches high, square, leafy, with numerous cross branches. Leaves an inch long, paler beneath, on stalks half that length. Flowers about the tops of the branches, axillary, on long slender stalks. Calyx rather swelling, angular, but destitute of wings, two-lipped, with five small teeth. Corolla pale purple, twice the length of the calyx. Stamens, according to Roxburgh, without any lateral branch or tooth.

5. *T. obtusifolia*. Blunt-leaved *Torenia*.—Leaves roundish-ovate, obtuse, stalked, wavy, somewhat toothed, smooth. Stem creeping. Lips of the calyx unequal, abrupt.—Sent from Mexico by Mutis to Linnæus. The specimens were laid into the genus *Gratiola*, but seem never to have been described. The whole herb is smooth, branched, succulent, creeping; in habit not unlike *Veronica Beccabunga*, like which plant it seems to grow in swampy places. Leaves ribbed, broad, an inch long. Flowers axillary, stalked, solitary, the size of *T. cordifolia*. Calyx angular, not winged, oblique at the mouth; its upper lip prominent, obtuse, slightly emarginate; lower much shorter, abrupt, with three small distant teeth. Corolla twice the length of the calyx, white or yellowish; internally somewhat hairy. The insertion of two of the stamens into the upper part of the corolla agrees with *T. asiatica*; we are not sure whether the other pair has any lateral teeth, but there is some appearance of such appendages, conglutinated as it were

were with the corolla. The *anthers* are roundish, combined in pairs. *Germen* ovate, pointed. *Stigma* between the anthers, of two thin plates. The parts of the flower in our specimens scarcely admit of sufficient examination to determine the genus of this plant with certainty, but it appears to agree with *Torenia* better than with any other.

TORRENTO, in *Geography*. See YORK.

TOREUMATOGRAPHY, a Greek term, signifying the knowledge, or rather description, of ancient sculptures, and basso-relievos.

The invention of toreumatography is owing to Phidias, and its perfection to Polyclethus: the Italian graveurs have let a great deal of light into the toreumatography.

TOREUTICE, *τορευτικη*, formed from the Greek *τορευος*, *lath*, of *τορειω*, *terebro*, *perforo*, that part of sculpture called *turning*.

TORFÆUS, THORMODUS, or THORMOD TORVESEN, in *Biography*, an eminent historian, was born in a small island called Engoe, on the southern coast of Iceland; and having laid the foundation of his education at the school of Skalholt, he spent three years, from 1654 to 1657, in the university of Copenhagen. In the spring of 1659 he was captured, in a voyage from Christianland on board a Dutch vessel, by a Swedish cruizer, and carried to Jutland. Upon his release and arrival at Copenhagen, he was appointed the king's interpreter for Icelandic antiquities. In 1662 he visited Iceland, for the purpose of collecting old MSS.; and in the accomplishment of his object was much encouraged and assisted by the bishop of Skalholt. In 1663 he returned to Denmark with a variety of valuable materials; in 1664 he was made secretary to the district of Stavanger; and in the following year he married; but in 1667 he resigned his office, and was appointed antiquary to the king. Upon the death of his father and brother he made a voyage to Iceland, for the purpose of securing his property; and in the same year he went to Amsterdam; but on his return he was shipwrecked at Skagen, and obliged to travel to Aarhus by land. Embarking for Zealand, he encountered a storm near the island of Samfoe, and landed at Senas, where he was wantonly attacked by an Icelander, and in self-defence killed his antagonist. Upon this he was arrested, tried, and condemned to suffer death. Upon an appeal first to a superior court in 1672, and afterwards to the king, it was ultimately determined that he should pay a fine of 100 dollars, and be released. The king, however, was displeased, and deprived him of his salary and office; upon which he retired to Norway, where he lived without any employment till the year 1682, when he was appointed royal historiographer and assessor in the consistory, with a stipend of 600 dollars *per annum*. Thus circumstanced, he commenced his history of Norway; but in 1706 he was obliged to desist from the prosecution of it by a severe illness, after he had brought it down to the union of Calmar, and to resign the completion of it to professor Reitzer. Having lost his wife in 1695, he married a second in 1709; and in 1719 died without issue. Torfæus was a man of considerable learning, and particularly conversant with ancient history and antiquities; and he was much respected by the northern sovereigns, Frederick III., Christian V., and Frederick IV. His works, actually published and left in MS., were very numerous. The collection of his MSS., relating more especially to the history of Iceland, amounts to several volumes folio, and is preserved in the king's library at Copenhagen. Gen. Biog.

In connection with Torfæus, we shall here mention the learned and eminent Arnas Magnæus, the son of an obscure country priest in the western part of Iceland, and more con-

spicuous for his devotion to literary pursuits than Torfæus. Raised from a humble and obscure situation by extraordinary efforts of talent and industry, he attained, in 1694, at the age of 31 years, the honourable station of professor of philology in the university of Copenhagen; and a few years afterwards, he was invested with the offices of professor of northern antiquities and secretary of the royal archives. Incessant in his literary labours, he composed several important works, and collected at great expence a magnificent library, serving to illustrate the literature and antiquities of the North, and more especially the literature of his native island. The greater part of this library was unhappily consumed by the fire which happened at Copenhagen in 1728; and the unfortunate Magnæus was witness to the almost total destruction of the fruits of many years' labour. He died two years after this disastrous event, and bequeathed to the library of the university the remnant of his literary treasures. His friend and favourite pupil, Finnur Jenfon, was another of the eminent Icelanders, who, during the last century, have contributed to preserve unimpaired the character and respectability of their country. Created bishop of Skalholt in 1754, he retained this office during the remainder of a long life, wholly devoted to the improvement and happiness of his fellow-citizens. In his admirable work, the "Ecclesiastical History of Iceland," written in elegant Latin, and published at Copenhagen in 4 vols. 4to. he has bequeathed to his countrymen a monument of extensive erudition, genuine piety, and warm patriotic feelings, which will continue as one of the most illustrious monuments of their literature. Mackenzie's Travels in Iceland.

TORFVE, in *Geography*, a town of Sweden, in West Gothland; 75 miles N.E. of Uddevalla.

TORGA, a town of the principality of Georgia, in the province of Caket; 85 miles S.E. of Tefsis.

TORGAU, or TORGAW, a town of Saxony, in the marggrate of Meissen, on the Elbe. It was anciently the head place of a peculiar feigniory, which passed in fief from the electors of Saxony, of the Ascanian line. In the year 1530, the seventeen articles of the Protestant doctrine were presented at this place, to the elector John; and in 1576, the Torgau writing was made here, out of the Swabian Concordat and the Maulbrun Formula; from which writing, the year following, the Formula Concordiæ was drawn up at Kloster Bergen. In the year 1745, the Prussians passed the Elbe here; in the year 1756, they fixed their military office at this place; and in the year 1757, they broke down the bridge thrown over the Elbe. In the year 1760, the Austrians, under marshal Daun, were defeated by the Prussians, commanded by the king in person. The Austrians lost 200 officers, and 7000 men prisoners. Marshal Daun himself was wounded. The Prussians had 2500 men killed, and 4000 wounded; 28 miles E.N.E. of Leipsic. N. lat. 51° 32'. E. long. 13° 3'.

TORGAU, *Convocation of*. See FORM OF CONCORD.

TORGEISKOI, in *Geography*, a town of Russia, in the government of Irkutsk; 24 miles N.N.W. of Nertchinsk.

TORGEL, a small island in the North sea, near the coast of Norway. N. lat. 65° 30'.

TORGELÖW, a town of Anterior Pomerania, on the Ucker; 9 miles N. of Pasewalk.

TORGOCH, in *Ichthyology*. See CHARR.

TORGOTS, in *Geography*, a tribe of the Mongoles, who formed themselves into a distinct horde much later than the other Kalmuck branches. Removing at first from the restless Soongares, they marched westward till they came to the steppes on the Volga, where they finally settled, and

received from the Ruffians the name of the Volgaic Kalmucks. In 1616, this horde is said to have submitted to the Russian empire; and on crossing the Ural in 1662, their number amounted to 50,000 kibitkies. In 1761, the Russian government entered into an agreement with this opulent and powerful horde, which restricted the authority of the khans to narrower bounds, and excited such discontents, that they returned in the winter of 1770 and 1771, to the amount of between 55,000 and 60,000 kibitkies, over the ice of the river Ural, across the Kirghisan steppe, into the Soongarey. The greater part of the Soongares took part in this migration; only some few ainaks of the Torgots remained behind; but the Tartars in subjection to the horde refused to follow them. The fugitives were pursued by order of the Russian government; but most of them made their escape. Numbers indeed perished on their journey; many were taken prisoners by the Kirghises; and those who reached the place of their destination, put themselves under the protection of the Chinese government, who gave them a kind reception, but afterwards, for political reasons, treated them with great severity. The Torgots, with the Khofchotes and Soongares, who staid behind or were brought back from their flight, are distributed among the Derbets; and wander, with their flocks and herds, in the steppes between the Don and Volga, from the line of Tzeritzin as far as Caucasus, and between the Volga and the river Ural, from the Irghis quite to the Caspian: consequently in the governments of Saratof and Astrakhan, and in the seats of the Cossacks of the Don. Tooke's Russia, vol. i.

TORGOWITZA, a town of Russian Poland, in the palatinate of Braclwa, 20 miles E. of Human.

TORSAKER, a town of Sweden, in the province of Angermannland; 25 miles N. of Hernofand.

TORHOUT, a town of France, in the department of the Lys; 10 miles S. of Bruges.

TORIES, or TORYS, a party or faction in England, opposite to the Whigs.

These two celebrated parties, which have so long divided our country, will make a considerable article in the English history, nothing inferior, in many respects, to that of the Guelfs and Gibellins. The division has gone so deep, that it is presumed, no Englishman, who has any concern or principles at all, but inclines more to one side than the other; for which reason, we shall borrow our account of them from the mouths of foreigners, who may be supposed more impartial; and particularly from M. de Cize, a French officer, some time in the service of England, who has written the History of Whiggism and Toryism, printed at Leipzig, anno 1717; and M. Rapin, whose Dissertation sur les Weighs & les Torys, printed at the Hague the same year, is well known: and reprinted at the close of the second volume of his History of England, fol. ed.

During the unhappy war which brought king Charles I. to the scaffold, the adherents of that king were first called *Cavaliers*, and those of the parliament *Round-heads*; which two names were afterwards changed into those of Tories and Whigs, on the following occasion.

A kind of robbers, or banditti, in Ireland, who kept on the mountains, or in the islands formed by the vast bogs of that country, being called Tories, a name they still bear indifferently with that of Rapparees; the king's enemies accusing him of favouring the rebellion in Ireland, which broke out about that time, gave his partisans the name of *Tories*; and on the other hand, the Tories, to be even with their enemies, who were closely leagued with the Scots, gave them the name of *Whigs*, who living in the fields and

woods, fed much on milk; *whig* signifying *whay*. But for a more probable etymology of whig, see WHIGS.

The Cavaliers, or Tories, had then principally in view the political interests of the king, the crown, and the church of England; and the Round-heads, or Whigs, proposed chiefly the maintaining of the rights and interests of the people, and of Protestantism. Nor have the two factions yet lost their first views; though their first names, Cavalier and Round-head, be now entirely disused.

This is the most popular account; and yet it is certain the names Whig and Tory were but little known till about the middle of the reign of king Charles II. M. de Cize relates, that it was in the year 1678, that the whole nation was first observed to be divided into Whigs and Tories; and that on occasion of the famous deposition of Titus Oates, who accused the Catholics of having conspired against the king and the state,—the appellation Whig was given to such as believed the plot real; and Tory to those who held it fictitious.

When we compare, says Mr. Hume (E. S. ix.), the factions of Whig and Tory with those of Round-head and Cavalier, which were merely parties of principle, the most obvious difference that appears between them, consists in the principles of "passive obedience" and "indefeasible right," which were but little heard of among the Cavaliers, but became the Universal doctrine, and were esteemed the true characteristics of a Tory. If these principles were pushed into their most obvious consequences, they imply a formal renunciation of all our liberties, and an avowal of absolute monarchy; since nothing can be a greater absurdity than a limited power which must not be resisted, even when it exceeds its limitations. But as the most rational principles are often but a weak counterpoise to passion; it is no wonder that these absurd principles were found too weak for that effect. The Tories, as men, were enemies to oppression; and also as Englishmen, says Hume, they were enemies to arbitrary power. Their zeal for liberty was, perhaps (says this partial writer), less fervent than that of their antagonists; but was sufficient to make them forget all their general principles, when they saw themselves openly threatened with a subversion of the ancient government. From these sentiments arose the Revolution; an event of mighty consequence, and the firmest foundation of British liberty. The conduct of the Tories, during that event and after it, will afford us a true insight into the nature of that party. In the *first* place, they appear to have had the genuine sentiments of Britons in their affection for liberty, and in their determined resolution not to sacrifice it to any abstract principle whatsoever, or to any imaginary rights of princes. This part of their character might justly have been doubted of before the Revolution, from the obvious tendency of their avowed principles, and from their compliances with a court, which seemed to make little secret of its arbitrary designs. The Revolution shewed them to have been, in this respect, nothing but a genuine "court party," such as might be expected in a *British* government: that is, "lovers of liberty, but greater lovers of monarchy." It must, however, be confessed, that they carried their monarchical principles further, even in practice, but more so in theory, than was in any degree consistent with a limited government. *Secondly*: Neither their principles nor affections concurred, entirely or heartily, with the settlement made at the Revolution, or with that which has since taken place. This part of their character may seem opposite to the former; since any other settlement in those circumstances of the nation, must probably have been dangerous, if not fatal, to liberty. But the

TORIES.

heart of man, says our author, is made to reconcile contradictions; and this contradiction is not greater than that between "passive obedience," and the resistance employed at the Revolution. A Tory, therefore, since the Revolution, may be defined in a few words to be "a lover of monarchy, though without abandoning liberty; and a partizan of the family of Stuart;" as a Whig may be defined to be "a lover of liberty, though without renouncing monarchy; and a friend to the settlement in the Protestant line."

Some, who will not venture to assert, that the *real* difference between Whig and Tory was lost at the Revolution, seem inclined to think, that the difference is now abolished, and that affairs are so far returned to their natural state, that there are at present no other parties among us but *Court* and *Country*; that is, men who, by interest or principle, are attached either to monarchy or liberty. The Tories have been so long obliged to talk in the republican style, that they seem to have made converts of themselves by their hypocrisy, and to have embraced the sentiments, as well as language of their adversaries. There are, however, very considerable remains of that party in England, with all their old prejudices.

The precise difference, says an anonymous writer (Edinb. Rev. N^o L.), between a moderate Tory and a moderate Whig is, "that a Tory is more influenced by loyalty, and a Whig by the love of liberty; that a Tory considers liberty as the second interest of society, while a Whig regards it as the first." Loyalty is denominated by Mr. Hume "that noble and generous principle, inferior only in excellence to the more enlightened affection towards a legal constitution."

We should here confine ourselves to the *Tories*; and for what regards the *Whigs*, refer to that article; but since, by comparing and confronting the two parties together, both the one and the other will appear in the stronger light, it would be imprudent to separate them; so that we rather choose to say the less under the word *Whigs*, and refer thence hither.

The factions we are speaking of, may be considered either with regard to the *state*, or to *religion*. The *state* Tories are either violent or moderate: the first would have the sovereign to be absolute in England, as in other countries, and his will to be a law. This party, which is not very numerous, has yet been considerable. 1. On account of its leaders, who have been lords of the first rank, and generally ministers and favourites. 2. In that, being thus in the ministry, it engaged the church Tories to maintain stiffly the doctrine of passive obedience. 3. Because they have been frequently supported by the crown.

The moderate Tories would not suffer the king to lose any of his prerogatives; but neither would they sacrifice those of the people.

The *state* Whigs, again, are republican or moderate: the first, according to our author, are the remains of the Long parliament, who took in hand to change the monarchy into a commonwealth: these make so slender a figure, that they only serve to strengthen the party of the other Whigs. The Tories would persuade the world, that all the Whigs are of this kind; as the Whigs would make us believe, that all the Tories are violent.

The moderate *state* Whigs are much in the same sentiments as the moderate Tories; and desire the government may be maintained on its ancient foundation, and that the king may be reduced to an incapacity of abusing his power, by leaving him the possession of his just rights: all the difference is, that the moderate Tories lean a little more

to the side of the king, and the moderate Whigs to that of the parliament and people.

Before we consider our two parties with regard to religion, it must be observed, that the Reformation, as carried on to a greater or less length, divided the English into Episcopalians and Presbyterians or Puritans: the first contended, that the episcopal jurisdiction should be continued on the same footing, and the church in the same form, as before the Reformation: the latter maintained, that all ministers or priests had equal authority; and that the church ought to be governed by presbyteries, or consistories of priests and lay-elders. See PURITANS.

After long disputes, the more moderate of each party relaxed a little of their stiffness; and thus formed two branches of moderate Whigs, and moderate Tories, with regard to religion; but there were others who kept to their principles with inconceivable firmness: and these constituted two branches of rigid Episcopalians and Presbyterians, comprised under the general names of Whigs and Tories; in regard, the first join the Tories, and the latter the Whigs.

The former consisted of rigid churchmen, who were against the least change in the discipline of the church, while the more moderate among the ecclesiastical Tories were less scrupulous and obstinate, and may be called the low or moderate churchmen. See HIGH CHURCH and NON-JURORS.

The latter were the rigid Presbyterians, who would be contented with nothing less than the destruction of the hierarchy, while the more moderate among them would have been satisfied with much less, and put up, says Mr. Rapin, with a bare toleration.

From what has been observed, we may conclude, that as the names *Tory* and *Whig* have a regard to two different objects, they are equivocal, and of consequence ought never to be applied without expressing in which sense it is done; for the same person may be, in different respects, both Whig and Tory.

For the rest, the general motives that have formed and kept up the two parties, appear in the main to be no other than the private motives of particular persons: self-interest is the *primum mobile* of their actions: ever since the rise of these factions, each has struggled earnestly to get the advantage over the other; inasmuch as from such superiority accrue places, and honours, and promotions, &c. which the prevailing party usually distributes among its own members, exclusive of the contrary party.

There are, however, men belonging to each of these parties, though the distinction is almost worn out, who act from conviction; some of whom are for the extension, and others for the limitation of royal prerogative, with a view to the good of the state, as their principles lead them to form different notions of the most effectual method of promoting it. The names, it is true, are almost sunk into oblivion; but the operation of the distinguishing sentiments of Whigs and Tories is discoverable in every period of the English history: and the true interest of a limited monarchy, always inseparably connected with the rights of the people, renders the distinction of importance, and should prevent its ever being disregarded.

It is with the Whigs and Tories on those points, which have discriminated the two parties, says Dr. Gregory Sharpe, as it is with all other sects of men under the agitation of hope and fear, ambition and interest; they tighten or relax their principles as suits best their convenience. When the Tories have had the exercise of the powers of the prerogative, they have been eager to extend those powers; when

when the edge has been turned against them, they have been as eager in the defence of popular liberty: and in like manner the Whigs, who withstood the storm, have melted in the sun-shine, so that in point of court complaisance, the administrations of the one have differed very little from those of the other. Holberg's Int. to Universal History, by Sharpe, p. 26c.

As to the characters commonly attributed to the Whigs and Tories; the Tories, says M. Rapin, appear fierce and haughty: they treat the Whigs with the greatest contempt, and even sometimes with rigour, when they have the advantage over them: they are very hot and vehement, and proceed with a rapidity, which yet is not always the effect of heat and transport, but has its foundation sometimes in good policy: they are very subject to change their principles, as their party prevails or is humbled.

If the rigid Presbyterians prevailed in the Whig party, it would not be less hot and zealous than that of the Tories; but it is said they have not the direction thereof; which gives room to affirm, that those at the head of the Whig party are much more moderate than the chiefs of the Tories: add, that they usually conduct themselves on fixed principles, proceed to their end gradually, and without violence; and their slowness is not less founded on good policy, than the hastiness and precipitation of the Tories. Thus much says our author may be said to the advantage of the moderate Whigs, that, in the general, they maintain a good cause, viz. the constitution of the government as by law established.

TORIESDALE HEAD, in *Geography*, a cape on the N. coast of Scotland. N. lat. $58^{\circ} 30'$. W. long. $4^{\circ} 10'$.

TORILIS, in *Botany*, a genus of Adanson's, whose name perhaps may have been fabricated from *τοριζω*, to carve or emboss, in allusion to the seeds, which, however, answer less to this idea than those of many neighbouring genera.—Adans. Fam. v. 2. 99. Spreng. Prod. Umbellif. 24. Gært. t. 20.—Class and order, *Pentandria Digynia*. Nat. Ord. *Umbellifera*.

Adanson distinguishes this genus from *CAUCALIS*, (see that article,) by the want of a general involucrium, and the slenderness of the leaves which compose the partial ones. These are principles of Artedi and Linnæus, but not generally reckoned among their best. Gærtner, and more recently Sprengel, distinguish *Torilis* by the bristles of the fruit being scattered equally over its whole surface; not, as in *Caucalis*, ranged along its ribs. As one of the species, *Anthriscus*, usually, if not constantly, is furnished with a general involucrium, and another, *nodosa*, is not always destitute of one; and as the insertion of the bristles is a very obscure, if not precarious, character; which appears by the disagreement between Gærtner and Sprengel, concerning the species supposed to compose this genus, we prefer leaving our three British ones at least in *Caucalis*, where they are placed in the *Flora Britannica*.

TORIM, in *Geography*, a town of New Mexico, in the province of Hiaqui; 35 miles S.W. of Riochico.

TORIN ROCKS, a cluster of rocks near the S.W. coast of the island of Mull. N. lat. $56^{\circ} 16'$. W. long. $6^{\circ} 28'$.

TORISA, a river of European Turkey, which runs into the Mariza, at Adrianople.

TORKESEY, JOHN, in *Biography*, author of one of the most important tracts in the MS. of Waltham Holy Cross, at present in the possession of the marquis of Lansdowne. This tract, which is the fifth in the collection, has been already described. See POWER, LIONEL.

TORLA, in *Geography*, a town of Spain, in Aragon; 16 miles E. of Jaca.

TORM, ERIC OLAVIUS, in *Biography*, a Danish writer, was born in 1607, and educated in the school of Viborg. Having finished his education, and spent several years in the capacity of private tutor, he set out on his travels with a view to further improvement; and visited Oxford, Leyden, and Paris; and in 1736 he was appointed professor of mathematics in the university of Copenhagen, and afterwards librarian and preacher in one of the churches. He died in 1667. He was the author of many works, chiefly mathematical and historical. Gen. Biog.

TORME, in *Geography*, a town of Spain, in Old Castile; 15 miles N. of Frias.

TORMENT, CAPE, a cape on the coast of Canada; 24 miles below Quebec.

TORMENTILLA, in *Botany*, a diminutive of *tormentum*, a pain or griping, supposed to have been chosen to designate this little astringent plant, because it served to alleviate pains of the teeth, or of the bowels, *tormina*. But it may simply perhaps apply to that astringency, which, considering the primary sense of the above words, the name seems to indicate.—Linn. Gen. Pl. 256. Willd. Sp. Pl. v. 2. 1112. Mart. Mill. Dict. v. 4. Sm. Fl. Brit. 552. Juss. 337. Tourn. t. 153. Lamarck Illustr. t. 444.—Class and order, *Tecofandria Polygynia*. Nat. Ord. *Senticose*, Linn. *Rosaceae*, Juss.

Gen. Ch. Cal. Perianth inferior, of one leaf, flat, cut half way down into eight segments, of which four alternate ones are smaller and more acute. Cor. Petals four, inversely heart-shaped, flat, spreading, their claws inserted into the calyx. Stam. Filaments sixteen, awl-shaped, half the length of the petals, inserted into the calyx; anthers roundish, simple. Pist. Germens eight, small, collected into a little round head; styles thread-shaped, the length of the stamens, inserted laterally into the germens; stigmas obtuse. Peric. none. Receptacle of the seeds dry, minute, covered entirely by them, and enclosed in the calyx. Seeds eight, roundish-oblong, corrugated, bluntly pointed.

Ess. Ch. Calyx inferior, in eight segments. Petals four. Seeds roundish, naked, wrinkled, attached to a small dry receptacle.

Obs. Linnæus remarks, that this genus differs from *POTENTILLA*, (see that article,) in characters founded on number only, and therefore they might be united. Schreber, and recently Dr. Nestler of Strasburgh, have adopted this measure, the latter uniting *Comarum* also to *Potentilla*. As the numerical differences are extended throughout the parts of fructification, though some of them are acknowledged to vary, and the two species of *Tormentilla* accord so well in habit, we are induced to follow Linnæus, Tournefort, and Jussieu, in retaining the genus; for if number were in this case entirely overlooked, we do not perceive how *SIBBALDIA* could be supported. (See that article, *COMARUM*, and *ROSACEÆ*.) It has been asserted, that botanists who retain such genera as this, viz. Ray, Tournefort, Linnæus, and Jussieu, will not gain much fame with posterity; but of this, we humbly presume, posterity will be the judge.

1. *T. officinalis*. Common Tormentil, or Septfoil. Curt. Lond. fasc. 5. t. 35. Fl. Brit. n. 1. Engl. Bot. t. 863. (*T. erecta*; Linn. Sp. Pl. 716. Willd. n. 1. Woodv. Med. Bot. t. 9. Fl. Dan. t. 589. Tormentilla; Ger. Em. 992. Camer. Epit. 685. Matth. Valgr. v. 2. 297. Brunf. Herb. v. 1. 85.)—Stem ascending, branched. Leaves sessile.—Common in dry barren pastures, especially on bushy heaths, throughout Europe, flowering in summer. The root is perennial, large, and woody, very astringent, used by the Laplanders to dye leather red. (See Linnæus's Tour to Lapland, v. 1. 155.) Stems weak, slender and wiry,

wiry, often procumbent. *Leaves* ternate, lanceolate, rather hairy, deeply ferrated, with a pair of deeply cut *stipulas*. *Flowers* bright yellow, on long, simple, solitary, lateral stalks. The late Miss Johnes of Hafod found one plant in that romantic spot, whose flowers were double, a rare instance.

2. *T. reptans*. Trailing Tormentil. Linn. Sp. Pl. 716. Willd. n. 2. Fl. Brit. n. 2. Engl. Bot. t. 864. (*Pentaphyllum reptans alatum, foliis profundius ferratis*; Plot. Oxford. t. 9. f. 5.)—Stem prostrate. Leaves stalked.—Native of banks and shady places, in England and Germany, but not common. We once gathered it in a lane at Brighoufe, near Halifax, Yorkshire, in the middle of summer. The *root*, though perennial, is much smaller and slenderer than in the foregoing. *Stems* few, eighteen or twenty inches long, often simple, entirely prostrate, but not creeping. Whole *herb* finely hairy, of a light green. Radical *leaves* on long stalks, of five, obovate, deeply ferrated leaflets; those on the stem of three only, on shorter stalks; the floral ones sessile, narrow, and often entire. *Stipulas* united to the base of the footstalks. *Flowers* twice as large as the foregoing, on very long stalks, opposite to the leaves.

TORMENTILLA, in the *Materia Medica*. The root of the common tormentil, or upright septfoil, tormentilla erecta, is the only part that is used in medicine. It is knotty, externally blackish, and internally reddish. It has a strong styptic taste, but imparts no peculiar sapid flavour. As a proof of its powerful astringency, it has been substituted for oak-bark in the tanning of skins for leather. Its active matter is therefore chiefly tannin; the infusion in boiling water being copiously precipitated by solution of isinglass, and striking a deep black with sulphate of iron. This root has been long held in high estimation by physicians, as a very useful astringent; and having little resin, it becomes peculiarly adapted to cases where the heating and stimulating medicines of this class are less proper, as phthical diarrhœas, diarrhœa cruenta, &c. Dr. Cullen thinks it has been justly commended for every virtue that is competent to astringents; and he adds, that he has found it, both by itself and as joined with gentian, cure intermittent fevers, when given in substance and in large quantities. It gives out its astringency both to water and rectified spirit, but most perfectly to the latter: the extracts, particularly the spirituous, obtained by inspissation, are intensely styptic. The root is generally given in powder, from half a drachm to one or more for a dose; but it is more generally given in decoction: an ounce and a half of the powdered root may be boiled in three pints of water to a quart, adding, toward the end of the boiling, a drachm of cinnamon: of the strained liquor, sweetened with an ounce of any agreeable syrup, two ounces or more may be taken four or five times a day. As a local remedy, it may be used with advantage in the form of gargle and lotion in ulcerations of the tongue and mouth, against spongy gums, and as an application to foetid ill-conditioned sores; but it is seldom used. Lewis. Woodville.

TORMENTING, in *Agriculture*, a term signifying in tillage cultivation an imperfect sort of horse-hoeing or ploughing, or what is sometimes, in some districts, termed sub-hoeing or sub-ploughing. It is occasionally too used as a term of reproach for bad tillage of any kind.

TORMENTOR, an implement of the tillage kind, used for breaking down and reducing the parts of stiff soils. It is a powerful tool of this sort which is much employed in Devonshire, Cornwall, and some other counties; in the first of which for the purpose of cross-cutting the balks of whole

ground, left after the velling and skirting operations for beat-burning, or paring and burning the surface-turf. It is indeed useful in working lands in almost all cases of bringing them into cultivation, and into a fine state of mould. See **SKIRTING**, **TILLAGE**, and **VELLING**.

This sort of implement is constructed in different modes and forms, as in a kind of long triangular shape, the beam part being lengthened out before, in which is fastened, by a sort of shank, a small wheel, which is capable of being raised or let down at pleasure, so as to regulate the depth of working of the tool. At or near the extremity of the frame behind are fixed two large wheels, so as to allow the triangular pointed shares or hoes to work in the ground. The whole is strongly framed together in three pieces; the middle or beam, and the two outside pieces. The number of shares or hoes is usually about nine. The same tool is sometimes contrived with two wheels in the front, and with a crane neck, being the same in all other respects.

The spill of iron which passes through the beam in the front, and supports the fore-wheel, has a number of iron rings on it, by which the depth of stirring is regulated. The length of the beam is six feet nine inches. The breadth or width of the back-piece, where the large wheels are placed, is three feet seven inches. The large wheels are three feet in diameter. The small fore-wheel is ten inches in diameter. The side-pieces of wood of which the frame is made, are four inches square, and the beam thereabouts. The shares or hoes, which are fixed upon shanks, with smaller parts to pass through the frame parts and be fastened above, are fifteen inches in length.

The construction of the tool is consequently very simple, and easily accomplished by any common workman, so that the farmer need never be at a loss for so powerful and effective an implement in the cultivation of tillage land.

TORMES, in *Geography*, a river of Spain, which rises in Old Castile, and crossing the province of Leon, passes by Alva de Tormes, Salamanca, &c. and enters the Duero a few leagues below Miranda de Duero.

TORMINA, in *Medicine*, a term sometimes used to express pains in the general; but more particularly a species of pain, called *tormina ventris*, or *alvi*; in English, the *gripes*; which see. See also **DYSENTERY**.

Young children are very often troubled with gripes; it is upon this account that nurses, in order to prevent or remedy them, usually mix with their spoon-meats a little brandy, or some carminative seeds, as caraway-seeds, &c.

Some children breed their teeth with violent gripes, which are apt to bring on convulsions of the bowels.

In adults, the dry gripes are usually cured by the exhibition of warm cathartics, such as tincture of hiera picra, elixir salutis, tincture of rhubarb, &c. with the assistance of opiates.

TORMIS, **TORMES**, in *Ancient Geography*, a river of Hispania, in Lusitania, which united with the Durus. See **TORMES**.

TORNA, in *Geography*, a town of Hungary, and capital of a county; 14 miles S.W. of Caschau.—Also, a town of Saxony; 3 miles S. of Pirna.

TORNADO, or **TURNADO**, a sudden and violent gust of wind rising suddenly from the shore, and afterwards veering round all points of the compass like a hurricane; very frequent on the coast of Guinea. These winds frequently shift suddenly from one quarter of the horizon to another, and then come again to the former point. Before a tornado comes, it calms the constant easterly winds; and when they are past, the easterly wind gathers force again, and the weather clears up fair. See **HURRICANE** and **WHIRLWIND**.

* **TORNADOTUS**, or **PHYSCUS**, in *Ancient Geography*, the same with the *Gorgus*, now *Odorneh*, a river of Asia, on the left of the Tigris, and near it, into which it discharged itself near the place where the town of Opis was situated. Xenophon called it Phycus, and Ptolemy Gorgus.

TORNARECCIO, in *Geography*, a town of Naples, in Abruzzo Citra; 13 miles N.N.E. of Civita Borello.

TORNARSUK, an island near the west coast of West Greenland. N. lat. $61^{\circ} 50'$. W. long. $47^{\circ} 30'$.

TORNAVA, a town of Sweden, in the government of Ulea; 15 miles S.S.E. of Ulea.

TORNEA, a river of Sweden, which rises from a lake in Lapland, and runs into the gulf of Bothnia, at Tornea.

TORNEA, or *Torne*, a town of Sweden, in West Bothnia, situated on a small island, formed by a river of the same name at its mouth, near the gulf of Bothnia, and said to be the oldest town in the country, and the farthest towards the north. It has three streets, running in parallel lines from north to south, which are intersected at right angles by fourteen cross-streets or lanes. Tornea, though built on a uniform plan, consists mostly of detached cottages, and contains only 600 inhabitants. The streets are very broad, and not being paved, are overgrown with grass, on which the cows regularly pasture. The inhabitants, being a mixture of Finns and Swedes, have the character of being idle, and addicted to drunkenness; yet the adjacent country, chiefly by the industry of the Finnish settlers, is rapidly improving: and the population of the province of Lapmark appears to have advanced much faster than that of any other part of Europe. In the year 1750, this, according to baron Hermelin, was 27,000; in 1777, it had increased to 31,000; but in 1801, it amounted to 52,000. The church is built with timber, and stands at a little distance from the other buildings, but within the palisades which inclose the town, and a pretty large piece of arable land. Divine service is performed here in the Swedish language, which is used by the burghers. There is another church, built with stone, on an island called Biorkhon, which lies near the town, in which the service is performed in the Finnish language, for the benefit of the burgher servants, and the inhabitants of the adjacent country. A very considerable trade is carried on here, not only by the Swedes and Laplanders, but the Russians and Norwegians, who also resort to the trading and bartering places of Tornea, in order to traffic. In the year 1694, this town was honoured with the presence of king Charles XI. who, being accompanied by several persons of distinction and learning, took a view of the sun, at midnight, if it may be called so, from the church tower, at Tornea. In this town, and the adjacent country from hence to Kites, observations were made in 1736 by M. Maupertuis, and some other members of the Academy of Sciences at Paris, in order to determine the measure of a degree of, and consequently the figure of the earth, and its ratification and extension by Ivanborg in 1799. N. lat. $65^{\circ} 48'$. E. long. $24^{\circ} 2'$.

TORNEA Ofver, a town of Sweden, in West Bothnia; 3 miles N. of Tornea.

TORNESE, a cape on the coast of the Morea; 8 miles S.S.E. of Chiarenza.

TORNESOL. See **TURNESOL**.

TORNESS, a cape on the south coast of the island of Stromfa. N. lat. $58^{\circ} 56'$. W. long. $2^{\circ} 29'$.

TORNIELLI, **AGOSTINO**, in *Biography*, a learned ecclesiastic, was born at Novara in 1543, and having entered into the society of Barnabites, he became general of this society. He undertook to write an ecclesiastical history from the beginning of the world to the time of Christ, in the form of annals, and executed the work with very laudable saga-

city and correctness, furnishing the reader by his chronological and geographical observations, with a valuable commentary on the books of the Old Testament. It was first printed at Milan in 1610, and afterwards frequently reprinted. Father Negri published an enlarged edition, with valuable notes, in 1757, at Lucca, in four vols. folio. He declined the offer of the bishopric of Mantua, and chose to remain in the Barnabite college at Milan, where he died in 1622. Dupin.

TORNIT, in *Geography*, a town of Germany, in the principality of Anhalt Zerbit; 3 miles W. of Zerbit.

TORNOVO, a town of Italy; 18 miles S. of Venice.

TORO, an island in the Baltic, near the coast of Sweden. N. lat. $58^{\circ} 49'$. E. long. $17^{\circ} 40'$.—Also, a town of Naples, in the county of Molise; 15 miles S.E. of Molise.—Also, a town of Spain, in the province of Leon, situated on the summit of a hill above the Duero, over which is a bridge of twenty-two arches. It is the see of a bishop, and one of the most ancient in the kingdom. Here are the remains of an ancient Moorish castle, forming a square of 143 feet, with a round tower at each angle. In the year 1476, a battle was fought here, by which Ferdinand, prince of Aragon, obtained the kingdom of Castile from Alphonso, king of Portugal; 17 miles E. of Zamora. N. lat. $41^{\circ} 45'$. W. long. $5^{\circ} 37'$.—Also, a town of New Mexico, in the province of Cinaloa; 50 miles N. of Cinaloa.

TORO, II, a small island in the Mediterranean, near the south coast of Sardinia. N. lat. 39° . E. long. $8^{\circ} 34'$.

TOROCCA, in *Ancient Geography*, a town in the interior of European Sarmatia, near the river Carcinites. Ptol.

TOROLLA, in *Geography*, a town of Spain, in Aragon; 18 miles N.W. of Jaca.

TOROM, a river of Russia, which runs into the Oby; 24 miles E. of Surget.

TORON, a town of European Turkey, in Macedonia, situated on a neck of land which projects into the Archipelago, between the gulf of Monte Santo and the gulf of Cassandra; 60 miles S.E. of Saloniki. N. lat. 40° . E. long. $23^{\circ} 54'$.

TORONÆUS or **TORONÆICUS Sinus**, in *Ancient Geography*, a gulf of the Ægean sea, on the coast of Macedonia, and separated from the Singitic and Thermæan gulfs by two large peninsulæ. Tacitus. Pliny calls this gulf Mecerbiænicus.

TORONE, a town of Macedonia, upon the Toronæic gulf, to which this gulf owes its name. Ptolemy places it in the Paraxia, and Thucydides fixes it in Chalcidia. About three stadia from this town was a temple of Castor and Pollux.—Also, a town of Epirus.

TORONTO, in *Geography*, a settlement of Canada, on the N.W. bank of lake Ontario, now called York. See **YORK**.

TOROPALCA, a town of Peru; 60 miles S. of Potofi.

TOROPETZ, a town of Russia, in the government of Pskov; 156 miles S.E. of Pskov. N. lat. $56^{\circ} 25'$. E. long. $32^{\circ} 24'$.

TOROSAY, a town on the island of Mull. N. lat. $56^{\circ} 35'$. W. long. $6^{\circ} 5'$.

TOROSKO, a town of Transylvania, in the environs of which are mines of iron and silver; 19 miles N. of Weifsemburg.

TOROSUS, in *Botany*, is sometimes used to express an inequality of surface, like the brawny swellings of a muscular limb; as in the capsule of *Papaver hybridum*.

TORP, in *Geography*, a town of Sweden, in West Gothland;

TORPEDO.

land; 11 miles N. of Uddevalla.—Also, a town of Sweden, in Warmeland; 11 miles N. of Carlstadt.

TORPEDO, *Cramp-Fish*, or *Electric Ray*, the *raja torpedo* of Linnæus, in *Ichthyology*, a sea-fish, famed, both among the ancient and modern naturalists, for a remarkable numbness with which it strikes the arm of such as touch it. See *RAJA Torpedo*.

This species is found in the Mediterranean, on the Atlantic coast of France, in the English seas, particularly at Torbay, near Waterford, on the coast of Ireland, and in other places. See Anson's *Voyage*, p. 266.

It is generally taken with the trawl, but an instance occurs of its taking a bait, which vindicates a fine account which Oppian has left us of this fish. It commonly lies in water about the depth of forty fathoms, in company with the congenerous rays; but its more frequent and favourite situation is the sand, in which it will bury itself by flapping its extremities, and throwing the sand in a light shower over its back. In this situation the torpedo gives his most forcible shock, which throws down the astonished passenger who inadvertently treads upon him. The food of the torpedo is fish, and they probably stupefy their prey by the shock they give them; and yet the sea-leech and common sea-crab will venture to annoy them.

This fish is so far amphibious as to live in air twenty-four hours, and but little longer in fresh water. The best method of preserving them is in well-boats kept in salt-water, and not put into much motion.

Rondelet speaks unfavourably of the torpedo as food, and tells us, that at Venice the prefect of health forbids it to be sold in the market; but in deeming it wholesome food, we have the sanction of Hippocrates and Galen, and it is sold in the markets of France. The electrical organs, indeed, which make one half of the animal, though wholesome, are an insipid mucilage; but its muscular part is, at least, as palatable as the flesh of the other rays: among these, the old and overgrown are always in little request.

The torpedo brings forth its young at the autumnal equinox, as affirmed by Aristotle, though questioned by Lorenzini. In one dissected at La Rochelle, on the 10th of September, were found in the matrices several of the fœtuses quite formed, and nine eggs in no state of forwardness; superfetation seems to be, therefore, a property of this fish; the eggs seemed to be destined for the spring brood, as they produce about the vernal as well as the autumnal equinox. There may be also another production at midsummer, but it principally takes place at the two equinoxes.

Upon touching this fish with the fingers, it frequently, though not always, happens, that the person feels an unusual painful numbness, which suddenly seizes the arm up to the elbow, and sometimes to the very shoulder and head.

The pain is of a very particular species, and is not to be described by any words; yet MM. Lorenzini, Borelli, Redi, and Reaumur, who all felt it severely, observe it to bear some resemblance to that painful sensation felt in the arm, upon striking the elbow violently against a hard body: though M. Reaumur assures us, this gives but a very faint idea of it.

Its chief force is at the instant it begins; it lasts but a few moments, and then vanishes entirely. If a man do not actually touch the torpedo, how near soever he holds his hand, he feels nothing: if he touch it with a stick, he feels a feint effect: if he touch it through the interposition of any pretty thin body, the numbness is felt very considerably; if the hand be pressed very strong against it, the numbness is

the less, but still strong enough to oblige a man speedily to let go.

Oppian affirms, that it will numb the astonished fisherman, even through the whole length of line and rod. See the passage cited and translated by Pennant, *Brit. Zool.* vol. iii. p. 39.

But great as are the powers of this fish when in vigour, they are impaired as it declines in strength, and totally cease when it expires. The shocks in water are apprehended to be near a fourth of the force of those at the surface of the water, and not much more than a fourth of those entirely in air. This strange power, with which the torpedo is endued, and which we shall presently explain, seems to have a double use; the one, when it is exerted as a means of defence against voracious fish, who are by a touch deprived of all power of seizing their prey; the other is well explained by Pliny, who tells us, that by the same powers it attains its end with respect to those fish which it wishes to ensnare; for, concealing itself in the mud, and numbing the fish that are carelessly swimming about, it makes a ready prey of them.

M. Reaumur, having no fishes alive to examine what the torpedo would do to them, shut up a drake in water with it, and after some time it was taken out dead. See *Electric Organs of Fish*.

We shall now proceed to give a brief recital of the different theories that have been adopted in order to account for the extraordinary effects of the torpedo. This fish was early known to the Greeks; it is mentioned, as an esculent fish, by Hippocrates, under the name *νερξιν*, which shews that the ancients had some knowledge of its torporific qualities. Plato also was acquainted with them, as appears by the humorous comparison of Socrates to that animal, which he puts into the mouth of Menon. Aristotle likewise treats of the numbing or stupefying qualities of this fish, though he seems to have no idea of their being communicated by the intervention of a stick, rope, or water.

Theophrastus, according to Athenæus, observed that the torpedo conveyed the numbing sensation through sticks and spears into the hands of the fishermen that held them. Diphilus, of Laodicea, takes notice that the torpor was occasioned, not by the whole, but by certain parts of the body of this fish: and Hero of Alexandria mentions it as emitting effluvia through brass and iron, and other solid bodies.

Pliny's account, though partly true, is mingled with the marvellous and false. Plutarch is more full and just; for he represents the torpedo as not only numbing all that touch it, but striking a numbness through the net into the hands of the fishermen, and as even diminishing the feeling of those who poured water upon it, if it happened to be laid on the ground alive. He adds, that whilst the torpedo swims round his prey, he emits certain effluvia like darts, that first affect the water, and then the fishes in it, which are thus disabled from defending themselves or escaping.

Before the days of Galen the torpedo was placed alive to parts affected, and particularly for the cure of an obstinate head-ache, as appears from Scribonius Largus, who lived under Claudian, and from Dioscorides, who flourished soon after. Galen conceived that the torpedo acted by a frigorific principle, for as cold occasions a numbness in an animated body, so does the shock given by that animal. Paulus of Ægina, one of the Galenic school, recommends the oil of the dead fish for tempering the hot humour of the gout, and for other ailments that required cooling applications.

Such are the unsatisfactory accounts of the philosophers and physicians of antiquity.

The Abyssinians, it is said, use torpedos for the cure of fevers,

fevers, by tying down the patient to a table, and applying the fish successively upon all his members, which puts him to cruel torment, but effectually removes his disease. Bellonius assures us, that our own torpedos applied to the soles of the feet, have proved successful against fevers.

Oppian, like Diphilus, distinguishes the parts where the powers of the fish peculiarly reside; these he calls λαγονες, the flanks, from which he imagined the animal had a faculty of darting upon other fishes certain substances, called by a name κερκιδες, the meaning of which is obscure. In the sixteenth century, some members of the Academia del Cimento availed themselves of their vicinity to the sea to make experiments on the torpedo. Redi began, and was afterwards assisted by Borelli, and Steno the Dane; and Lorenzini, his scholar, engaged in the same pursuit, and published a curious treatise upon the subject. Redi, having endeavoured to distinguish between the real properties of the torpedo, and those erroneously ascribed to it, proceeded to the anatomy of it; and was the first who with any accuracy described those crooked substances lying on each side of the spine, near the head, which he considered as muscles (from thence named *musculi falcati*) that projected, according to him, certain effluvia, occasioning the sensation of numbness more or less, as the animal was excited to put these organs into action. This hypothesis of the transmission of effluvia was immediately embraced by Lorenzini, and afterwards by Claude Perrault. Borelli, not admitting the emission of benumbing particles, referred the sensation produced by this fish to a certain brisk undulation of the parts touched, which the animal could excite at will.

In 1714, M. Reaumur, being on the coast of Poitou, took an opportunity of making some experiments on the torpedo, which, with the result, he communicated to the Royal Academy of Sciences at Paris. His hypothesis, which was generally received by the ingenious naturalists over all Europe, is not very different from that of Borelli; for instead of the undefined vibrating parts of the latter, M. Reaumur substituted muscles (the *musculi falcati* of Redi and Lorenzini) which, by the vivacity of their action, impressed upon the hand, that touched these parts, a sensation of numbness, owing to the stoppage of the progression of the nervous fluid, or a repulsion of the same. But he denied that this impression of numbness could be communicated through water, a net, or any other soft and yielding substance; nay, through a stick, except a very short one; whereas, it is certain, that the shocks of the torpedo are not less conducted through such media than those from a charged electrical phial.

We have been lately furnished, by the experiments and observations of John Walsh, esq. with a theory, much more plausible and just than any above recited, which considers the electric fluid as the efficient cause of the amazing qualities of the torpedo. We shall be led to a brief account of the facts on which this theory is founded by the following preliminary remarks.

Soon after the discovery of the Leyden phial, the celebrated professor Allemand applied to M. s'Gravesande, governor of Essequibo, for an account of a fish in Surinam, resembling a conger-eel, and possessing properties similar to those of the torpedo; this account was received in 1754, and published in the second volume of the Transactions of the Society at Haerlem. From this account it appears, that the shocks of the fish, which were so violent, when the fish was strong and lively, as to throw a person who touched it to the ground, were like those of the electrical fire, but unaccompanied with sparks of fire; and that the fish was a

species of the gymnotus of Artedi. In the sixth volume of the same work, we have a more ample relation of the exertions of this animal by M. Vander Lott, dated from Rio Essequibo, in 1761. M. Adanson, about the same time with the discovery of M. s'Gravesande in America, met with the same or a similar fish in the river of Senegal in Africa. The earliest account we have of this kind of eel is by M. Richer, recorded by M. du Hamel, in his History of the Royal Academy of Sciences for 1677. In the island of Cayenne, says M. du Hamel, there is a fish, not unlike a conger-eel, which, touched with the finger, or even with the end of a stick, affects the arm with a numbness, and the head with giddiness, and the eyes with a dimness of sight, which M. Richer had himself felt upon making the experiment. See GYMNOTUS.

We are indebted to Mr. Walsh for not only the first, but for a numerous series of experiments on the torpedo, in order to ascertain its electrical nature; together with some correct and elegant drawings of the entire animal, and of some of its principal organs that appeared upon dissection. These experiments were made in the year 1772, partly at the isle of Rhé, and partly at Rochelle, in the presence of the members of the Royal Academy of Sciences at that place. They were conducted in a scientific manner, and properly diversified, and the result of them satisfactorily established the torpedo in the rank of an electrician, furnished with a power over the electric matter; by means of which he can, without any foreign machinery, and almost in an instantaneous manner, collect, condense, and at his will dispense it to neighbouring bodies, through any of those substances that are known to be conductors of the electric fluid. The sensations occasioned by the torpedo and Leyden phial, in the human frame, are precisely similar: not only the shock, but the numbing sensation sometimes given by the animal, may be exactly imitated with the phial, by means of Lane's electrometer; the regulating rod of which, to produce the latter effect, must be brought almost into contact with the prime conductor which joins the phial. The first experiment of Mr. Walsh discovered the electrical quality of the torpedo, by his conveying its effects through the same conductors with his electricity, such as metals, water, and animal fluids, and by intercepting it by the same non-conductors, as glass and sealing-wax. Besides, one of the most brilliant of his discoveries was, that this animal not only could accumulate in one part a large quantity of electrical matter, but was furnished with a certain organization, disposed in the manner of the Leyden phial: thus, while one surface of the electrical part (e. g. that on the back) was charged with this matter, or in a positive state; the other surface (that on the belly) was deprived of it, or in a negative state: so that the equilibrium could be restored, by making a communication between the two surfaces by water, the fluids of the human body or metals, in the same manner as by forming a circuit between the inside and outside surfaces of the Leyden phial. A living torpedo was laid on a table, upon a wet napkin; round another table stood five persons insulated: and two brass wires, each thirteen feet long, were suspended from the ceiling by silken strings. One of the wires rested by one end upon the wet napkin, the other end was immersed in a basin full of water, placed on a second table, on which stood four other basins full of water. The first person put a finger of one hand into the water in which the wire was immersed, and a finger of the other hand into the second; and so on successively, till all the five persons communicated with one another by the water in the basins. In the

TORPEDO.

the last basin one end of the second wire was dipped, and with the other end Mr. Walsh touched the back of the torpedo, when the five persons felt a shock, differing in nothing from that of the Leyden experiment, except in being weaker. Mr. Walsh, who was not in the circuit, was not affected. This experiment was successfully repeated several times, even with eight persons. From this experiment it is evident, that the action of the torpedo is communicated through metals and water, or, in general, through the same media that transmit the electrical concussion. It follows, likewise, that the upper and under parts of the animal, like the upper and under surfaces of an electrified plate of glass, are in different states; for a person who touches only the upper or the under surface of the electric organs, will not receive the shock of the torpedo. This action evidently depends on the will of the animal, who, however, scarcely exhibits any other sensible motion or effort at the time of exerting it than a depression or winking of his eyes. The same motion is observed likewise to accompany its fruitless attempts to transmit a shock through non-conductors. The shock of electrical matter which the torpedo possesses appears to be very considerable: a torpedo, when insulated, has given to Mr. Walsh, insulated likewise, no less than fifty shocks in the space of a minute and a half.

Such are the operations performed by the torpedo in air. When a large fish, very liberal of his shocks, was held in water, with one hand on his breast and another on his back, he gave the operator shocks of the same kind as before, but about one-fourth of the strength of those given in air. At the very instant of raising him out of the water, he constantly gave a very violent shock, and another nearly as violent, when his lower surface first touched the water on dipping him into it. On briskly and alternately plunging him a foot deeper into water, and raising him an equal height into air, besides one or two shocks which he gave during the short time he was wholly in the water, and those which he gave at the surface, he constantly gave at least two when he was wholly in the air: so that Mr. Walsh estimates that he gave above one hundred shocks during the minute in which the experiment was performed. The conclusions drawn from Mr. Walsh's experiments were farther confirmed by some experiments made on the torpedo at Lehigh, by Dr. Ingenhousz, in 1773.

Mr. Walsh observes, that the electricity of the torpedo resides in those parts that are called his electric organs: the parts bordering on these acting, more or less, as conductors, either through their substance, or by their superficies: and of these, the parts which conduct the best are the two great lateral fins bounding the organs outwardly, and the space lying between the two organs inwardly. All below the double transverse cartilages scarcely conduct at all, unless when the fish is just taken out of water and is still wet, the mucus, with which he is lubricated, shewing itself, as it dries, to be of an insulating nature; and the organs themselves, when uncharged, appeared to be, not interiorly but rather exteriorly, as Mr. Walsh supposes, conductors of a shock. We are indebted to Mr. John Hunter for an accurate anatomical description of the torpedo, accompanied with two excellent drawings, who has thus supplied us with a valuable addition to the anatomical examination of this animal by Redi, Steno, and Lorenzini. For his account, we refer to *Electric Organs of Fish*.

Although Mr. Walsh's experiments leave little room to doubt, that the shock given by the torpedo is produced by the same agent that gives the shock in an electrical explosion, yet there are some circumstances which it is difficult to reconcile to the supposition that it is produced by the

electric fluid. One of these difficulties is, that the fish is able to give a shock when he is in the water, and consequently surrounded by a medium, through which the electric fluid is known to be transmitted with the greatest facility. It has likewise been difficult to conceive why the shock of the torpedo, supposing it to be produced by the electric fluid, should not, like that of an electrified jar, be accompanied with the appearance of light or sparks, or should not exhibit some signs of attraction or repulsion. But from Mr. Walsh's experiments it appears, that no light could possibly accompany the shock of the torpedo, because this shock could never be made to pass through the least sensible space of air, or the smallest interruption made by the circuit; not even through the imperceptible interval between the links of a slender brass chain, apparently in contact with each other, nor over an almost imperceptible interval or slit formed by cutting through a slip of tin-foil pasted on sealing-wax, which constituted part of the circuit; nor are the most delicate pith-balls, or other light bodies, in what manner soever applied, in the least degree affected at the time of the shock. Mr. Walsh observes, that, with respect to the pith-balls, it is not surprising that no motion could be discovered in them, as all his experiments fully shewed that there was no gradual accumulation of the electric fluid, as in the case of charged glass; but that it was collected or condensed in the very instant of the explosion, by a sudden energy of the animal. He also explains this and the other differences between the phenomena of the Leyden phial, and of the torpedo, or the absence of light and sound, in the experiments made with the latter, by the following considerations.

In a large fish, the number of columns above mentioned, contained in one electric organ, was found to be no less than eleven hundred and eighty-two. This immense collection of cylinders Mr. Walsh considers as somewhat analogous to a large number of jars in an electric battery, and as containing a very large area in consequence of the great number and extensive surface of the columns. Now it is known, from experiments made with artificial electricity, that though the electric matter violently condensed, or crowded into a very small phial highly charged, is capable of forcing a passage through an inch of air, and that it will afford, in a very conspicuous manner, the phenomena of light, sound, attraction, and repulsion; yet if the quantity thus condensed be expanded and rarefied, by communicating it to, or dividing it amongst a large number of jars, whose coated surfaces constitute a space, *e. g.* four hundred times larger than that of the phial: this same quantity of electric matter, thus dilated, will now yield only the fainter, or, if they may be so called, the negative phenomena of the torpedo. It will not now be capable of passing over the one hundredth part of that inch of air, which, in its condensed state, it before sprung through with ease; it will not now be able to jump over the little gap made in its track by the intersection of the tin-foil; no spark, sound, or attraction of light bodies, will now be perceived: and yet this portion of electric matter, in this dilated state, and with its elasticity thus diminished, will, like that of the torpedo, to effect its equilibrium, run through a considerable circuit of different conductors, perfectly continuous, and will communicate a sensible shock.

The Hon. Mr. Cavendish has endeavoured to remove the difficulties above stated, first, by some ingenious reasonings *à priori*, and afterwards by others drawn from the phenomena presented by an artificial torpedo which he constructed, and by means of which he has imitated the effects produced by the living animal. With respect to the difficulty

culty of conceiving how the torpedo can give a shock in water, he observes that those electricians are mistaken, who suppose that the electric fluid will only pass along the shortest and best conductors. When different circuits are made (*e. g.* by means of iron wire, and the human body) between the positive and negative sides of a charged jar, some parts of the electric fluid will pass along each of them; though the greater quantity will pass through those in which it meets with the least resistance. Thus, a person may receive a part of the shock given by the torpedo in water, by holding one hand on the lower surface of an electric organ, and the other on the upper, or by applying his hands to other parts of the fish, or by dipping them into the water, so that one hand is nearer to the upper surface of the electric organs than the other; yet the greater part of the shock or charge may pass at the same time in all directions over the surface of the fish, or through the substance of its body, or through the water contiguous to it. With respect to the other difficulties, he solves them by reasonings similar to those urged by Mr. Walth, and by concurring experiments. Mr. Cavendish has confirmed these reasonings by means of his artificial torpedo, which is a piece of wood **A B C F G D E** (*Plate XV. Electricity, fig. 4.*) of which the part **A B C D E** is cut into the shape of the torpedo, and $16\frac{3}{4}$ inches long from **A** to **D**, and $10\frac{3}{4}$ inches broad from **B** to **E**: the part **C F G D** is forty inches long, and serves for a handle. **M N n m** is a glass tube let into a groove cut in the wood: **W w** is a piece of wire passing through the glass tube, and soldered at **W** to a thin piece of pewter, **R r**, lying flat on the wood, and intended to represent the upper surface of the electric organs: on the other side of the wood there is placed such another glass tube, with a wire passing through it, and soldered to another piece of pewter like **R r**, intended to represent the lower surface of those organs. The whole part **A B C D E** is covered with a piece of sheep-skin leather. In making experiments with this apparatus, after thoroughly soaking it in water of the saltness of the sea, made by dissolving one part of common salt in thirty of water, the end of one of the wires is fastened to the negative side of a large battery, and when it is sufficiently charged, the positive side is touched with the end of the other wire; by which means the battery will be discharged through the torpedo. In experiments with this torpedo under water, Mr. Cavendish uses a trough, **A B C D E** (*fig. 5.*), the length **BC** of which is nineteen inches, the depth **AB** fourteen inches, and the breadth thirteen inches. The battery which he used was composed of forty-five jars, of very thin glass, disposed in seven rows, and so contrived, that he could use any number of rows at pleasure. Mr. Cavendish was enabled, by means of this apparatus, when immersed in water, to give shocks much resembling those given by the living animal. He felt similar concussions likewise when he dipped his hands in the water, at the distance of two or three inches from it: and as it is affirmed, that a person accidentally treading on the living fish, when buried in the sand, is sometimes shocked by it, he imitated this experiment with his artificial torpedo, and received shocks from it. The events, indeed, in the greater part of his experiments, too numerous to be recited in this place, with this artificial fish, relative to the shock, seem to agree sufficiently with those made by Mr. Walth with the living animal. The experiments which Mr. Cavendish made with this machine, relative to the circumstance of the shock of the real torpedo not being able to pass through any sensible space of air, appear likewise to correspond with Mr. Walth's trials. A piece of sealing-wax covered with tin-foil freely conducted a shock from the

artificial torpedo; but on making as small a separation as possible through the metal with a penknife, the shock would not pass. See on the subject of this article for Mr. Walth's papers, *Phil. Trans. vol. lxxiii. part ii. p. 461. Id. vol. lxxiv. part ii. p. 464. For Mr. Hunter's paper, Id. vol. lxxiii. part ii. p. 481. For Dr. Ingenhoufz's, Id. vol. lxxv. part i. p. 1. For Mr. Cavendish's, Id. vol. lxxvi. part i. p. 169. See also for John Pringle's Six Discourses, &c. by Dr. Kippis, p. 45, &c.*

TORPEDO, a machine so called, invented by Mr. Fulton of the United States, and destined to blow up the largest ships. It is an apparatus of which the principal piece is a copper-box, inclosing a certain quantity of gunpowder, and prepared with an interior spring which sets fire to the powder, at the same time that the whole is inclosed in a covering of cork, or some other light wood, to make the torpedo float under the surface of the water. It is placed under the keel of the vessel to be destroyed, by means of an harpoon directed against the sides of the ship.

TORPEN, in *Geography*, a town of Transylvania; 4 miles S.S.W. of Bistritz.

TORPERLEY, a town of England, in the county of Chester; 10 miles S.E. of Chester.

TORPETCHIN, a town of Thibet; 100 miles S. of Haratoubé.

TORPHICHEN, a parish in the shire of Linlithgow, Scotland, is situated four miles S. by W. from the shire-town, and extends about nine miles in length, and two and a half in breadth. Its general appearance is hilly, particularly towards the E. end, where the hill called Cairn Naple is situate, which is elevated 1498 feet above the level of the sea. The greater part of the parish is inclosed; and where the land is unfit for cultivation, considerable plantations have been made. Coal is abundant; and here are large quarries of excellent free-stone; several seams of iron-stone, rich in metal; and a strong chalybeate spring. In the year 1811, the population was returned as 1131, occupying 236 houses. The hospital or preceptory of Torphichen, long the principal residence of the knights of St. John of Jerusalem, was founded, in 1120, by king David I. The choir and a square tower still remain, and are fine specimens of the elegance and beauty of the architecture. There are two wings, one on the S. and the other on the N. side; and evident marks of other two on the E. and W. This preceptory had the privilege of sanctuary, which is supposed to have extended a mile in every direction: there is a stone in the church-yard as a centre, and four others at the distance of a mile, E., W., N., and S., with St. John's cross upon them, which stand about two feet above the surface. At the Reformation, the vast estates of that opulent order were converted into a temporal lordship, in favour of sir James Sandilands, lord St. John of Jerusalem; in which noble family the title of lord Torphichen still remains. Near Loch-Coat, in this parish, are the ruins of a castle, which still display baronial gloom and grandeur. About a mile to the E. of the village, is an altar of four great unpolished whin-stones, which is said to have been a druidical place of worship; and about a mile to the N.W., is Boudane Hill, upon which are evident marks of a military station.—*Beauties of Scotland, vol. iii. Linlithgow. Carlisle's Topographical Dictionary of Scotland.*

TORPON, a town of Little Bucharia; 20 miles S.W. of Acfu.

TORQUATA, in *Zoology*, a name given by many authors to the common or water-snake, from the remarkable ring it has about its neck. See **NATRIX**.

TORQUE, in *Heraldry*, a round roll of cloth twisted and

and stuffed: such is the bandage frequently seen in armouries about the heads of Moors, savages, &c.

It is always of the two principal colours of the coat. The torque is the least honourable of all the enrichments worn on the helmet by way of crest.

TORQUEMADA, JOHN DE, in *Biography*, a cardinal, was born at the place in Spain whence he took his name in 1388, and entered at the age of 15 into the Dominican order at Valladolid. He distinguished himself at home, in the university of Paris, and in various other places, and at length was promoted to the cardinalate, under the title of St. Sixtus, in 1439. After having been successively translated from one bishopric to another, he died in 1468, at the age of 80 years. He published a great number of works on theology, and in defence of the papal authority. Among other preferments which he enjoyed, he was confessor to Isabella of Castile from her infancy; and such was the intemperate zeal that actuated him, he extorted from her a promise, that if she ever came to a throne, she would make the chastisement and destruction of heretics her principal object.

Another person of the same name was provincial in New Spain, and published a Spanish work under the title of "Monarquia Indiana;" or, A History of the Wars, Discoveries, Conquests, &c. in the West Indies, in 22 books, 3 vols. fol. 1615. Dupin. Moreri.

TORQUEMADA, in *Geography*, a town of Spain, in the province of Leon, on the Arlanza; 12 miles E. of Palencia.

TORQUILLA, in *Ornithology*, the name of a species of wood-pecker, more commonly known by the name of *juux*, and called in English the *wry-neck*.

TORQUINO, in *Geography*, a river of Cuba, which runs into the Spanish Main, N. lat. 20°. W. long. 76° 57'.

TORR, a town of Arabia, in the province of Yemen; 32 miles E. of Loheia.

TORRALBA, a town of Spain, in New Castile; 7 miles N.E. of Ciudad Real.

TORRALVA, a town of Spain, in Navarre, 15 miles from Estella.

TORRANO, a town of Spain, in Navarre; 15 miles W. of Pamplona.

TORRÈ, FILIPPO DEL, in *Biography*, an eminent antiquary, was born at Ciudad de Friuli in 1657, and having acquired an extensive knowledge of jurisprudence, mathematics, and anatomy at the university of Padua, he sought farther improvement at Rome in 1687, and became an academician of the college of the Propaganda. He was afterwards employed as auditor to cardinal Imperiali, in his legation to Ferrara, and accompanying him on his return to Rome, he devoted his attention to the great work on the antiquities of Antium, which he published in 1700. In 1702 he was nominated by pope Clement XI. to the bishopric of Adria, and there he presided with great reputation until his death, in 1717. Among his writings we may mention as the principal, his "Monumenta Veteris Antii," 4to.; besides which, he published several other dissertations on antiquities, natural history, &c. and left many more in MS. Gen. Biog.

TORRE, JOHN MARIA DE LA, a celebrated Italian philosopher, was born at Rome in 1710, studied at the Clementine college, and was elected professor of mathematics and philosophy in the college of Ciudad, in the Frioul; and afterwards removed to Naples, where he taught the same sciences in the archiepiscopal seminary. In 1754 he was appointed librarian to the king of Naples, superintend-

ant of the royal printing-house, and conservator of the museum. In the construction of microscopes he is said to have made considerable improvements. He was a member of the principal academies in Italy, and a correspondent of those of Paris and Berlin, and of the Royal Society of London. He died in March 1782. His works, besides a Treatise on Arithmetic, are, "The Science of Nature," Naples, 1749, 2 vols. 4to.; Venice, 1750, 4to.; "Elementa Physicæ," Naples, 1767, 8vo.; "History of the Phenomena of Vesuvius," *ibid.* 1755, 4to.; "Microscopic Observations," *ibid.* 1776.

TORRE, in *Geography*, a town of Spain, in Catalonia; 6 miles S. of Lerida.

TORRE del Acri, or *Agri*, a town of Naples, in Basilicata, on the coast of the gulf of Tarento; 25 miles S.S.E. of Matera.

TORRE del Annuntiata, a town of Naples, in Lavora; 9 miles S.E. of Capua.

TORRE Calença, a town of the island of Corfica; 15 miles N.E. of Ajazzo.

TORRE de Candelaro, a town of Naples, in Capitanata; 11 miles W.S.W. of Manfredonia.

TORRE Capigliola, a town of the island of Corfica; 10 miles N. of Ajazzo.

TORRE del Capo di Rosito, a town of Naples, in Calabria Citra; 18 miles N.E. of Cassano.

TORRE Carabese, a town of the island of Corfica; 10 miles W.S.W. of Vico.

TORRE di Cedagna, a town of Spain, in Catalonia; 9 miles N. of Puycerda.

TORRE di Francofisi, a town of Naples, in Lavora; 8 miles N.W. of Capua.

TORRE di Galeria, a town of the island of Corfica; 15 miles S. of Calvi.

TORRE la Gattarella, a town of Naples, in Capitanata; 2 miles S. of Viette.

TORRE Girolata, a town of the island of Corfica; 20 miles S. of Calvi.

TORRE del Greco, a town of Naples, in Lavora. This town was destroyed by an eruption of Vesuvius; yet the inhabitants, after the eruption, returned and rebuilt the town on the same spot; 5 miles S.E. of Capua.

TORRE Maggiore, a town of Naples, in Capitanata; 5 miles S.W. of St. Serviero.

TORRE di Mare, a town of Naples, in Basilicata; 20 miles S.E. of Matera.

TORRE di Mezzo, a town of Italy, in the department of the Mincio; 16 miles E.S.E. of Mantua.

TORRE Molina, a town of Spain, in Grenada; 12 miles from Antequera.

TORRE de Moncorvo, a town of Portugal, in the province of Tras os Montes, surrounded with a wall, and defended by a bastion and a castle. The number of inhabitants is about 1300; 42 miles S.S.W. of Bragança. N. lat. 41°. W. long. 6° 44'.

TORRE di Neopoli, a town of the island of Sardinia; 5 miles N. of Oristagna.

TORRE di Nogaro, a town of Italy, in the department of the Mincio; 11 miles E. of Mantua.

TORRE d'Oglio, a town of Italy, in the department of the Mincio, near its union with the Po; 11 miles S.S.W. of Mantua.

TORRE del Penna, a town of Naples, in Abruzzo Citra, on a promontory, near the Adriatic; 15 miles E. of Lanciano.

TORRE Rosso, a town of Naples, in the province of Otranto; 10 miles N. of Tarento.

TORRE de St. Basilio, a town of Naples, in Basilicata, on the coast of the gulf of Tarento; 8 miles S.E. of Turfi.

TORRE St. Sufanna, a town of Naples, in the province of Otranto; 7 miles S.E. of Orià.

TORRE de las Salinas, a town of Spain, in Valentia, near the coast of the Mediterranean, which carries on a great trade in salt, with which it is furnished by a small lake, formed by saline springs; and though the water be apparently weakened by rain, yet is salt made of it by the exhalations of the sun. The usual quantity thus produced, one year with another, is about 900,000 fanegas, each fanega being 150lbs. weight; but when heavy rains are succeeded by excessive heat, it comes little short of 1,500,000. This is the most considerable salt-work in all Spain; 20 miles S.E. of Origuèla.

TORRE de Sanguinazzo, a town of the island of Candia; 9 miles E. of Retimo.

TORRE della Saffine, a town of Naples, in Capitanata; 3 miles N.E. of Salpe.

TORRE Sicura, a town of the Popedom, in the marquisate of Ancona, on the Tronto, opposite Ascoli.

TORRE Tavignano, a town of the island of Corsica; 28 miles S.E. of Corte.

TORRE di Vacarella, a town of Naples, in Capitanata; 10 miles N.E. of Troja.

TORRE di Varano, a town of Naples, in Capitanata; 20 miles W. of Vieste.

TORRE la Vega, a town of Spain, in the province of Biscay; 11 miles S.W. of Santander.

TORRECILLA, a town of Spain, in Old Castile; 11 miles S.E. of Najera.

TORRECILLAS, a town of Spain, in Estremadura; 6 miles E.N.E. of Truxillo.

TORRECUSO, a town of Naples; 5 miles W. of Benevento.

TORREDAL, a river of Norway, which runs into the sea near Christianfand.

TORREFACTION, formed of *torrefacere*, *to roast*, in *Metallurgy*. See **ROASTING**.

TORREFACTION, in *Pharmacy*, a kind of roasting, or assation, in which a drug is laid to dry on a metalline plate placed over or before coals, till it become friable to the fingers.

Torrefaction is particularly used, when, after reducing some drug, as rhubarb, or myrobalan, into powder, it is laid on an iron or silver plate, and that placed over a moderate fire till the powder begins to assume a darkish hue; which is a mark, that those remedies have lost their purgative virtue, and have acquired a more astringent one.

Formerly they used to torrefy opium, to get out some malignant parts fancied to be in it, before they dared use it in medicine; but the effect was, that its volatile spirits and sulphur, in which its greatest virtue consists, were hereby evaporated.

TORREFIED EARTH, in *Agriculture*, that which has undergone the action of fire, or been burnt. It has been observed by the writer of a paper on peat in the third volume of the "Transactions of the Highland Society of Scotland," that the uncommon fertility of torrefied earth can scarcely have escaped the notice of any one; but that it is difficult to account for the cause. It is suggested that torrefaction, by destroying the cohesive power of clay, may in that way render a soil containing torrefied earth more permeable to the roots of plants. But brick-dust, or burnt clayey matters, even when strewed on the surface of grass-ground, consumes the mosses, or plants of that kind, and produces a deep verdure and lively vegetation of sweet

herbage. It is stated by the author of the "Elements of Agricultural Chemistry," that when clay or tenacious earths are burnt, their power of absorbing moisture is lessened, and they are brought nearer to a state analogous to that of sands. That in the manufacture of bricks, this general principle is well illustrated: as, if a piece of dry brick-earth be applied to the tongue, it will adhere to it very strongly, in consequence of its power to absorb water; but that after it has been burnt, there will be scarcely a sensible adhesion. The process of torrefaction or burning may, therefore, render an earth less compact, less tenacious and retentive of moisture; and, when properly applied, may convert a matter that was stiff, damp, and, in consequence, cold, into one that is powdery, dry, and warm; and much more proper as a bed for vegetable life.

Dr. Darwin, in his "Phytologia," has supposed that clay, during torrefaction, may absorb some nutritive principles from the atmosphere that may afterwards be supplied to plants; but the earths are pure metallic oxyds, saturated with oxygen; and the tendency of torrefaction, or burning, is to expel any other volatile principles that they may contain in combination. If the oxyd of iron in earths be not saturated with oxygen, torrefaction tends to produce its further union with this principle; and hence in burning, the colour of clays changes to red. The oxyd of iron which contains its full proportion of oxygen, has less attraction for acids than the other oxyd, and is consequently less likely to be dissolved by any fluid acids in the earthy parts of land; and it appears in this state to act in the same manner as the earths. And though it has been suggested, that the oxyd of iron, when combined with carbonic acid, is poisonous to plants; and that one use of torrefaction is to expel the carbonic acid from it; yet the carbonate of iron is not soluble in water, and is a very inert substance; besides, a luxuriant crop of cresses has been raised by the writer in a soil composed of one-fifth carbonate of iron, and four-fifths carbonate of lime. Carbonate of iron, too, abounds in some of the most fertile soils of this country, particularly the red hop-soil. And there is no theoretical ground, it is said, for supposing that carbonic acid, which is an essential food of plants, should, in any of its combinations, be poisonous to them; besides, it is known that lime and magnesia are both noxious to vegetation, unless combined with this principle.

The first of the above writers has likewise found, that cohesive earth which has suffered torrefaction, such, for instance, as brick-dust, is one of the most powerful agents in promoting the solubility of peat, and, consequently, not only of assisting in the cultivation of land of that sort, but in expediting the preparation of that earth as a manure. And as it has this very powerful effect in exciting the fertility of peat, kilns might, perhaps, be constructed, in which cohesive earth might be burnt either with the refuse of coal or peat-fuel. After the peat had been somewhat mellowed by the first culture as proposed, into a soil, a quantity of this brick-dust material might be spread out on the surface, after being turned up, to be harrowed in with the seed. But although the torrefaction or burning of clay for this purpose should not be attainable at a moderate expence, if a sufficient quantity of earth be once mixed with the peat, it will not be difficult to reduce that earth to the state of brick-dust. As when the viscidness of peat is destroyed, and its parts separated by the intervention of earthy particles, it is very susceptible of combustion; it might be lightly turned over in the beginning of summer, and fire be communicated to it as soon as it

it became dry. The fire, it is thought, would eat along the surface without penetrating deep, when a body of moist unaltered peat lay below, and not only convert the earth within its reach into brick-dust, but consume many of the incorruptible elastic fibres by which the soil is kept too loose. And by the mixture of incombustible earth checking the rapidity of the combustion, most of the peat would be converted into a sort of charcoal, not ashes. The residue might be mingled with the subsoil, and the field would then be in excellent condition, it is said, for any crop, particularly for turnips; and there is, perhaps, no plant better adapted to such a situation, from its power to resist the autumnal frosts, by which some other cultivated plants are often ruined. See the Paper.

The same writer has, indeed, proved the great disposition of this powdery substance to produce fertility in a variety of experiments, which he has recorded in an elementary work on agriculture, already before the public. See Naismith's Elements of Agriculture.

TORREJON, in *Geography*, a town of Spain, in New Castile; 13 miles S. of Madrid.

TORREJONCILLOS, a town of Spain, in New Castile; 20 miles S. of Huete.

TORRELAGUNA, a town of Spain, in New Castile; 17 miles N. of Guadalaxara.

TORRELLA de Mongri, a town of Spain, in Catalonia, on the north side of the Ter, near its mouth; remarkable for a battle fought here between the French and Spaniards in the year 1694, in which the latter were defeated; 18 miles E. of Gerona.

TORREMOCCHA, a town of Spain, in New Castile; 6 miles W. of Melina.

TORRENT, **TORRENS**, in *Hydrography*, a temporary stream of water, falling suddenly from mountains in which there have been great rains, or an extraordinary thaw of snow; sometimes making great ravages in the plains.

TORRENTE, in *Geography*, a town of Spain, in the province of Valentia; 5 miles S. of Valentia.

TORRENUEVA, a town of Spain, in New Castile; 23 miles S.E. of Ciudad Real.

TORREPARA, a town of Hindoostan, in Lahore; 20 miles W. of Nagorcote.

TORRES, a town of Spain, in the province of Granada, on the coast of the Mediterranean; 9 miles E. of Velez Malaga.

TORRES, a river of Sardinia, which runs into the sea, about 10 miles N. of Sassari.

TORRES, *Cape*, a cape of Spain, on the coast of Asturia. N. lat. $43^{\circ} 37'$. W. long. $5^{\circ} 44'$.

TORRES, *Islands*, a cluster of islands in the Indian sea, near the coast of Siam. N. lat. $11^{\circ} 25'$ to $11^{\circ} 48'$. E. long. $96^{\circ} 50'$ to 97° .

TORRES, *Novas*, a town of Portugal, in Estremadura; 12 miles E. of Santaren.

TORRES, *Vedras*, a town of Portugal, in Estremadura, one of the oldest towns in the kingdom, and containing four churches, an hospital, a castle, four convents, and about 2250 inhabitants; 21 miles N. of Lisbon.

TORRESIA, in *Botany*, a genus so named in the *Flora Peruviana*, p. 114, in honour of Jerome de las Torres, under-gardener of the botanic garden at Madrid. *De Theis*.

TORREXIMENO, in *Geography*, a town of Spain, in the province of Jaen; 8 miles W.N.W. of Jaen.

TORRICELLA, a town of Naples, in Principato Citra; 4 miles S.W. of Amalfi.—Also, a town of Naples, in Abruzzo Citra; 6 miles N. of Lanciano.—Also, a town of Italy, in the department of the Mincio; 10 miles S.S.W.

of Mantua.—Also, a town of Italy, in the department of the Panaro; 8 miles W.S.W. of Modena.

TORRICELLI, **EVANGELISTA**, in *Biography*, a very distinguished mathematician and philosopher, was born at Faenza in 1608, and at the age of eighteen he went to Rome to complete his education, and particularly to extend his acquaintance with mathematics, under the instruction of Benedetto Castelli, who was professor of mathematics in that city. After the perusal of Galileo's "Treatise on Motion," he composed a work of a similar kind, which being shewn to Galileo by Castelli, excited his admiration, and induced him to invite the young author to his house. But as Galileo died three months after his arrival, he proposed to return to Rome; he was diverted, however, from his purpose, by being appointed mathematician and philosopher to the grand duke Ferdinand II., who also advanced him to the mathematical chair at Florence. In this honourable station he assiduously prosecuted his speculations and experiments, till death prematurely deprived the world of the benefit which could not fail to result from them, in the year 1647, at the age of 39 years. His "Treatise on Motion," already mentioned, was published in a "Collection of his Mathematical Works" in 1644. Of his dispute with Roberval concerning the *Cycloid*, we have already given a short account under that article. But Torricelli's fame is sufficiently established by his discovery of the true principle upon which the barometer is constructed. (See **TORRICELLIAN**.) Torricelli was no less celebrated for his mathematical knowledge, evinced by his improvement of the science of indivisibles discovered by Cavalieri, and for his acquaintance with the principles of optics, by which he was led to improve the construction of telescopes and microscopes. His discoveries, by which his name is immortalized among the promoters of useful sciences, are recorded in his "Lezioni Accademiche," published at Florence in 1715, 4to. by Buonaventuri, with the life of Torricelli prefixed. The style with which he wrote in his native language was pure and elegant, and his general character was such as to command the respect and esteem of all who knew him.

TORRICELLIAN, a term very frequent among physical writers, used in the phrases *Toricellian tube*, or *Toricellian experiment*, on account of the inventor, Torricelli, a disciple of the great Galileo.

TORRICELLIAN Tube, is a glass tube, open at one end, and hermetically sealed at the other, about three feet long, and one-tenth of an inch in diameter. See **BAROMETER**.

TORRICELLIAN Experiment, is performed by filling the Torricellian tube with mercury, then stopping the open orifice with the finger, inverting the tube, and plunging that orifice into a vessel of stagnant mercury. This done, the finger is removed, and the tube sustained perpendicular to the surface of the mercury in the vessel.

The consequence is, that part of the mercury falls out of the tube into the vessel, and there remains only enough in the tube to fill from twenty-eight to thirty-one inches of its capacity, above the surface of the stagnant mercury in the vessel.

Those twenty-eight, &c. inches of mercury are sustained in the tube by the pressure of the atmosphere on the surface of the stagnant mercury; and according as the atmosphere is more or less heavy, or as the winds, blowing upwards or downwards, heave up or depress the air, and so increase or diminish its weight and spring, more or less mercury is sustained from twenty-eight inches to thirty-one.

There is a case, however, first taken notice of by Huygens (*Journal de Sçavans*, 1672. p. 111.) in which, if a glass tube of a small bore seventy or eighty inches in length, be well cleaned, and filled with mercury well purged

of air, &c. in the manner described under **BAROMETER**, and then carefully inverted into a vessel of stagnant mercury, the mercury, instead of coming down to the height just mentioned, at which the pressure of the atmosphere is able to sustain it, will continue to fill the tube, and stand at the height of seventy-five inches: but by striking the tube, or gently shaking it, the mercury will descend and settle at its proper height, as in the common barometer. This phenomenon is explained on the principles of the attraction of cohesion, which acts most powerfully in contact: for when the tube is clean, and the mercury well purged of air, many parts of the mercury, which, by the interposition of small air-bubbles, would be kept from touching the tube, are brought into contact with it, and those particles that are in the middle of the column adhere to those that are next to the sides of the tube, and thus form a compact column. Besides, the increase of attracting surface at the arched top of the tube, by means of which a greater number of mercurial particles may come into contact with the glass than those that recede from the contact of one to another, will also give an advantage to the attraction of the glass, and cause the mercury, immediately in contact with it, to adhere to it. That the attraction of cohesion, as already explained, is the cause of this phenomenon is plain, because the experiment will not succeed when the mercury is not well purged of its air, nor even then if the bore of the tube is large.

The Torricellian experiment makes what we now call the *barometer*.

TORRICELLIAN Vacuum, is the vacuum produced by filling a tube with mercury, and allowing it to descend to such a height as is counterbalanced by the pressure of the atmosphere, as in the Torricellian experiment and barometer. For the method of rendering this vacuum luminous by electricity, see **ELECTRICAL**, Exp. 15.

TORRICELLO, in *Geography*, a town of the duchy of Parma, on the Po; 12 miles N.N.W. of Parma.

TORRID ZONE, See **ZONE**.

TORRIGIA, or **TORREGLIA**, in *Geography*, a town of the Ligurian republic; 15 miles N.N.E. of Genoa.

TORRIJOS, a town of Spain, in New Castile; 15 miles N.W. of Toledo.

TORRIMORE HEAD, a cape of Scotland, on the E. coast of the island of Skye. N. lat. $57^{\circ} 22'$. W. long. $6^{\circ} 2'$.

TORRIN-BEG, a rock on the S.W. of the island of Mull. N. lat. $56^{\circ} 19'$. W. long. $6^{\circ} 20'$.

TORRINGTON, or **GREAT TORRINGTON**, as it is generally called, to distinguish it from a village of the same name, is a market-town in the hundred of Fremington, and county of Devon, England; 36 miles N.W. from Exeter, and 197 miles W. by S. from London. The town is situated, partly on the summit, and partly on the declivity of an eminence which forms the eastern bank of the river Torridge. On the south side are some slight vestiges of an ancient castle, the origin of which is unknown; though, according to Risdon, it was the head of a notable barony, which continued from the Conquest to the time of Edward I. Its site is now used as a bowling-green, and commands a fine prospect. The river is here seen to flow in a graceful current along a narrow valley, inclosed by sloping ridges, and having a beautifully wooded back-ground. Torrington was formerly invested with the privilege of having representatives in parliament; but no return has been made since the reign of Henry VI. Its government is vested in a mayor, eight aldermen, and sixteen burgesses, who act under a charter granted by queen Mary. The town consists chiefly of one long street, "indifferently beautified," says Risdon, "with

buildings very populous, and flourishing with merchants and men of trade." The population return of the year 1811, states the number of houses to be 414; the number of inhabitants 2151: the chief employ of the latter arises from the woollen manufacture. A weekly market is held on Saturdays; and here are four annual fairs. The parish contains two churches, the most ancient of which is furnished with a library. In the town are some ancient alms-houses, possessing the right of commonage on an extensive piece of ground given by William Fitz-Robert, baron of Torrington, in the reign of Richard I. Here is likewise a charity-school for thirty-two boys. Margaret, countess of Richmond, mother of Henry VII., resided some time in Torrington, and was a considerable benefactress to it.

At Frithelstoke, a village opposite Torrington, on the W. side of the Torridge, are the ruins of a priory, founded by sir Roger Beauchamp, in the reign of Henry III., for secular Augustine canons. At the dissolution, the annual revenues were valued at 127*l.* 2*s.* 4*d.* The site of the priory is now a farm-yard. The chief remains of the buildings are the walls of two or three apartments, the west window of the conventual church, which still continues perfect, and the great gate.

Near Torrington is Crofs, late the seat of H. Stevens, esq., a handsome mansion, looking down on the romantic scenery which encompasses the bridge and the banks of the Torridge.

A few miles from Crofs, southward, are the ruins of an old mansion called Heanton, formerly a seat of the Rolles, afterwards of lord Orford, and lastly of lord Clinton, who, after its late demolition by fire, cut down the oaks which were in the park, forming woods and groups of the noblest trees in the county.—*Beauties of England and Wales*, vol. iv. Devonshire, by J. Britton and E.W. Brayley, 1803. *Powhele's History, &c. of Devonshire*, folio, 1797.

TORRINGTON, a town of the state of Connecticut; 22 miles W.N.W. of Hartford.

TORRINGTON Bay, or *Bedford's Bay*, a bay on the S. coast of Nova Scotia; 3 miles N. of Halifax.

TORRO, a river of Africa, which runs into the Scherbro.

TORROFF, a town of Bengal; 70 miles N.E. of Dacca. N. lat. $24^{\circ} 20'$. E. long. $85^{\circ} 18'$.

TORRUM, a town of Sweden, in the province of Blekingen; 10 miles S.E. of Carlscrona.

TORRYBURN, a seaport town of Scotland, in Fifeshire, on the Frith of Forth, with a good harbour, to which belong thirteen vessels, amounting to upwards of 1000 tons.

TORSAKER, a town of Sweden, in Angermanland; 27 miles N. of Hernofand.—Also, a town of Sweden, in the province of Gestrica; 15 miles S.W. of Geste.

TORSANG, a town of Sweden, in the province of Dalecarlia; 10 miles S. of Fahlun.

TORSAS, a town of Sweden, in the province of Smaland; 18 miles S.S.W. of Calmar.—Also, a town of Sweden, in the province of Smaland; 16 miles S.W. of Wexio.

TORSEERA, a town of Hindoostan, in the circar of Sumbulpour; 16 miles S. of Sumbulpour.

TORSHELLA, a town of Sweden, in Sudermanland, on a river which runs into the Mælar lake; 46 miles W. of Stockholm.

TORSHOK, a town of Russia, on the route from Petersburg to Moscow, 71 versts distant from Vyshney-Voloshok, remarkable for a spring superstitiously venerated and attracting pilgrims from all parts. This town has no less than 20 churches, some of stone; and is in a thriving condition. See **TORZOK**.

TORSIANO, a town of the Popedom; 10 miles N. of Perugia.

TORSKOG, a town of Sweden, in West Gothland; 53 miles N. of Uddevalla.

TORSO, a small island on the E. side of the gulf of Bothnia. N. lat. $63^{\circ} 37'$. E. long. $22^{\circ} 14'$.

TORSSA, a town of Sweden, in Helsingland, on a river which runs into the gulf of Bothnia; 6 miles W. of Hudwickswall.

TORSUTATAK, a town of East Greenland. N. lat. $59^{\circ} 56'$. E. long. $43^{\circ} 15'$.

TORT, in *Law*, denotes injustice, or injury, as *de son tort même*, in his own wrong, &c.

Hence, also, *tort-feasor*, &c. The word is pure French, where it signifies the fame.

Actions upon torts, or wrongs, are all personal actions for trespasses, nuisances, assaults, defamatory words, and the like.

TORT, *Executor de son*. See EXECUTOR.

TORTICOLLIS, from *torqueo*, to twist, and *collum*, the neck; the *Wryneck*; which see.

TORTO, in *Geography*, a small river of Spain, which runs into the Orbeaga, in the province of Leon.—Also, a river of Sicily, which runs into the sea, 5 miles E. of Termini.

TORTOISE, in *Zoology*. See TESTUDO.

Dr. Parsons has remarked a singularity in the structure of the wind-pipe of the land-tortoise, which for a few inches from the epiglottis is single, but soon divides into two; and as it descends with the œsophagus, forms a folded ring outward on each side, and turns down again to enter the lungs; so that this animal has the advantage of a double aspera arteria, with a volution in each; which shews that this provision is intended to contain a greater portion of air than ordinary, while he is under-ground in winter. It has been observed likewise, that the principal use of the lungs in tortoises is to render them specifically lighter or heavier in the water, by their inflation and compression at pleasure, as fishes do by their swimming bladders; and such a power of long inspiration seems to be as necessary in the land-tortoise as in that of the sea; because, in many countries where they breed, they are known to go into the ground, and lie concealed for several months, and several species of land-tortoises go into ponds or canals in gardens, where they are kept, and remain long under water. Phil. Transf. vol. lvi. p. 213.

TORTOISE-Shell, the shell, or rather scales of the testaceous animal, called a tortoise; used in inlaying, and in various other works, as for snuff-boxes, combs, &c. Mr. Catesby observes, that the hard strong covering, which encloses all sorts of tortoises, is very improperly called a shell; being of a perfect bony contexture; but covered on the outside with scales, or rather plates, of an horny substance: which are what the workmen call tortoise-shell. Phil. Transf. N^o 438, p. 117.

It is the *testudo imbricata* of Linnæus alone, which furnishes that beautiful shell, so much admired in Europe. See TESTUDO *Imbricata*.

The lamellæ or plates of the shell of this tortoise, called the *hawk's-bill turtle*, are much stronger, thicker, and clearer than those of any other kind, and constitute the sole value of the animal. They are semi-transparent, and elegantly variegated with whitish, yellowish, reddish, and dark brown clouds and undulations, so as to constitute, when properly prepared and polished, one of the most elegant articles for ornamental purposes. These lamina form the external coating, and this is raised or separated from the bony part, which it covers, by placing fire beneath the shell; the heat soon

causing the plates to start, so as to be easily detached from the bone. These plates vary in thickness, according to the age and size of the animal, and measure from an eighth to a quarter of an inch in thickness. A large turtle is said to afford about eight pounds of tortoise-shell; or, according to M. Schoepf, from five to fifteen or twenty pounds; and unless the animal itself be about the weight of 150 pounds, the shell is not worth much.

“In order to bring tortoise-shell into the particular form required on the part of the artist,” says Dr. Shaw, “it is steeped in boiling water, till it has acquired a proper degree of softness, and immediately afterwards committed to the pressure of a strong metallic mould of the figure required; and where it is necessary that pieces should be joined so as to compose a surface of considerable extent, the edges of the respective pieces are first scraped or thinned, and being laid over each other during their heated state, are committed to a strong press, by which means they are effectually joined or agglutinated. These are the methods also by which the various ornaments of gold, silver, &c. are occasionally affixed to the tortoise-shell, which is not capable of being melted, as vulgarly supposed. The Greeks and Romans appear to have been peculiarly partial to this elegant ornamental article, with which it was customary to decorate the doors and pillars of their houses, their beds, &c. In the reign of Augustus, this species of luxury seems to have been at its height in Rome.” Shaw's General Zoology, vol. iii. pt. 1.

The Egyptians, says Mr. Bruce in his *Abyssinian Travels*, dealt very largely with the Romans in this elegant article of commerce. According to Pliny, the cutting of them for inlaying or inlaying was first practised by Carvilius Pollio; and this circumstance leads us to presume, that the Romans were not acquainted with the art of separating the lamina by fire placed in the inside of the shell, when the meat is taken out; for these scales, though they appear perfectly distinct and separate, nevertheless adhere, and more frequently break than split, where the mark of separation may be distinctly seen. Martial says, that beds were inlaid with it. Jüvenal and Apuleius mention, that the Indian bed was all-over shining with tortoise-shell on the outside, and swelling with stuffing down within. The immense use made of it at Rome may be inferred from what Velleius Paterculus says, who observes, that when Alexandria was taken by Julius Cæsar, the magazines were so full of this article, that he proposed to have made it the principal ornament of his triumph, as he used ivory afterwards, when triumphing for having happily finished the African war. This substance has been, in more modern times, a great article in the trade to China.

Tortoise-shell colour may be given to horn, by first pressing the horn into proper plates or scales, and tempering two parts of quick-lime and one of litharge to the consistence of a soft paste with soap-ley. Let this paste be laid over all the parts of the horn, except such as are proper to be left transparent, and thus let it remain till it be thoroughly dry; when the paste being brushed off, the horn will be found partly opaque and partly transparent, like tortoise-shell. Semi-transparent parts may be added, by mixing whitening with some of the paste to weaken its effect in particular places, by which means spots of a reddish-brown will be produced, which will increase the beauty of the work as well as its resemblance of real tortoise-shell. Handmaid to the Arts, vol. i. p. 518.

TORTOISE, in the *Military Art*. See TESTUDO.

TORTOISE, *River of*, in *Geography*, a river of North America, in Louisiana and Florida, formed by the Mississippi.

TORTOLA, a town of Spain, in New Castile; 5 miles N.E. of Guadaluza.—Also, a town of Spain, in New Castile; 8 miles S. of Cuenca.—Also, one of the Virgin islands in the West Indies, first settled by a party of Dutch Buccaneers, who built a fort for their protection; but who, in the year 1666, were driven out by another party of the same adventurers, calling themselves English, and pretending to take possession for the crown of England: and the English monarch, if he did not commission the enterprise, made no scruple to take the benefit of it: for Tortola and its dependencies were soon afterwards annexed to the Leeward island government, in a commission granted by king Charles II. to sir William Stapleton. The Dutch had done little towards the cultivation of the island, when they were expelled; but the chief merit of its improvements was reserved for some English settlers from the little island of Anguilla, who, about a century and a quarter ago, embarked with their families and settled in the *VIRGIN ISLANDS*; which see. Tortola is not more than 15 miles long and 6 miles broad. Its chief and almost only staple productions are sugar and cotton. N. lat. 18° 20'. E. long. 64° 20'.

TORTOLI, a town of the island of Sardinia, near the E. coast; 50 miles N.N.E. of Cagliari.

TORTONA, a town of France, in the department of Marengo, on the Scrivia; late the see of a bishop, suffragan of Milan, with a good citadel, situated on an eminence. This place has often been taken and retaken during the different wars in Italy. It gives name to a district called Tortonese; 9 miles E. of Alexandria. N. lat. 44° 53'. E. long. 8° 52'.

TORTORELLA, a town of Naples, in Principato Citra; 5 miles N.E. of Policastro.

TORTORICI, a town of Sicily, in the valley of Demona; 30 miles N.W. of Taormina. N. lat. 38° 9'. E. long. 15°.

TORTOSA, a town of Spain, in the province of Catalonia, situated near the Ebro, about 15 miles from its mouth; the see of a bishop, suffragan of Saragossa. It is said to have been founded 2000 years before the Christian era, but the proofs of this illustrious origin are unfortunately lost. Scipio gave it the name of "Dordosa," and made it a municipal city. Among the numerous and trifling combats between the Spaniards and the Moors, there was one in which the women of Tortosa signalized themselves. They courageously mounted the ramparts of their city, and performed such prodigies of valour, that Raimond Berenger, the last count of Barcelona, instituted for them, in 1170, the military order of the hacha, or flambeau. They merited and obtained the same day several honourable privileges, which exist not at present; they have however preserved the right of precedence in matrimonial ceremonies, let the rank of the men be ever so distinguished. The most remarkable buildings are the cathedral and the castle; the latter of which is a mile square, and in a state of decay; and only serves as a place of residence for a governor; 81 miles S.E. of Saragossa. N. lat. 40° 47'. E. long. 0° 26'.—Also, a sea-port of Syria, in the pachalic of Tripoli, anciently called "Antaradus" and "Orthosia." This town appears to have been built about the fifth or sixth century; it is situated on the sea, and may be about three-quarters of a mile in circumference. The ancient walls are of large hewn stone; without them there are other lower walls, with a fosse round them. At the N.W. corner there are great remains of the castle, and the present town is within the walls of it, which are strong, and built of large hewn stone, rusticated. They are of a surprising height, being at least fifty feet high, and the whole is near half a mile in circuit. Within the castle there is a church. Towards the E. cor-

ner of the city there is also a very beautiful large church; it is built of hewn stone inside and out, and consists of three naves; it does not seem to have been finished, and probably is a building of the sixth century; it is of the Corinthian order; and the arches, which are executed with the plain olive leaf, are built on square pillars, covered on the four sides with semi-circular pilasters. The pulpit was fixed to one of the pillars, and over it there is an inscription in the Syriac language. When Jerusalem was in the hands of the Christians, Tortosa was the see of a bishop, suffragan of Tyre; 35 miles N. of Tripoli. N. lat. 34° 55'. E. long. 35° 58'.—Also, a river of Syria, which runs into the Mediterranean, between Antioch and Tripoli.—Also, a cape of Spain, on the coast of Catalonia. N. lat. 40° 40'. E. long. 0° 47'.

TORTUE, a river of America, which runs into the Wabash, N. lat. 39° 30'. W. long. 87° 55'.

TORTUES, a river of Louisiana, which runs into the Missouri, N. lat. 38° 26'. W. long. 94° 24'.

TORTUGA SALADA, an island in the Caribbean sea, about 36 miles in circumference; the east end is full of rugged and broken rocks, which stretch themselves a little way out to sea. At the south-east part is an indifferent good road for shipping, and much frequented in peaceable times by merchantmen, which come hither to lade salt, from May to August: for at the east end is a large salt-pond, within 200 paces of the sea. Near the west extremity of the island, on the south side, there is a small harbour, and some fresh water. The end of the island is full of shrubby trees; but the east end is rocky, and bare of trees, producing only coarse grass. Upon it are some goats, but not many. The turtles or tortoises come into the sandy bays to lay their eggs, and from hence the island has its name. There is no anchoring any where but in the road where the salt-ponds are, or in the harbour. N. lat. 11° 7'. W. long. 64° 30'.

TORTUGA, an island about six miles from the north coast of the island of Hispaniola, about 40 miles in circumference. N. lat. 20° 5'. W. long. 72° 40'.

TORTUGAS POINT, a cape of South America, on the coast of Chili, near Coquimbo.—Also, the south point of the port of Coquimbo, on the coast of Chili. The road or harbour is well sheltered, but will not contain above 20 or 30 vessels safely. S. lat. 29° 57'.

TORTUGAS Shoals, shoals and rocks in the gulf of Mexico, near the coast of East Florida. N. lat. 24° 36'. W. long. 82° 50'.

TORTUGAS, Dry, shoals in the Florida streams, at the entrance of the gulf of Mexico. N. lat. 24° 40'. W. long. 82° 25'.

TORTUGILLA, a small island in the Spanish Main, near the coast of South America. N. lat. 8° 45'. W. long. 76° 20'.

TORTULA, in *Botany*, Screw-moss, an Hedwigian genus of Mosses, whose essential character, of the spiral fringe, is expressed in the name, derived from *tortus*, twisted. The same appellation was subsequently bestowed on a genus of the *Didymia*, in allusion to its twisted corolla, by the late Dr. Roxburgh, who not being conversant with cryptogamic botany, was not perhaps aware of the preoccupation of the name. (See *STREPTIUM*.)—Hedw. Fund. v. 2. 92. t. 8. f. 38, 39. Sp. Musc. 122. Schreb. Gen. 760. Mart. Mill. Dict. v. 4. Sm. Engl. Bot. 1101. Fl. Brit. 1249. Compend. 171. Prodr. Fl. Græc. Sibth. v. 2. 283. Swartz Musc. Suec. 38. Turn. Musc. Hib. 43. (Barbula; Hedw. Fund. v. 2. 92. v. 1. t. 6. f. 29—32. Sp. Musc. 115.)—Class and order, *Cryptogamia Musci*. Nat. Ord. *Musci*.

TORTULA.

Eff. Ch. Capsule oblong. Fringe simple, of numerous capillary teeth, spirally and repeatedly twisted together.

This is a most natural genus, the character of whose fringe cannot be mistaken. *Barbula* of Hedwig differs only in having round-headed male flowers, on a separate plant from the female, instead of axillary bud-like ones, on the same individual. This is a difficult and obscure distinction, without any natural difference. Of *Barbula* Hedwig defines twelve species, of *Tortula* three. Of the two genera united, nineteen are now enumerated as natives of Britain and Ireland only, exclusive of five of Hedwig's, not as yet discovered among us, so that twenty-four are known in all.

The habit of the genus here described is rather dwarf; the stems erect, sometimes short or nearly wanting; root fibrous, mostly perennial; leaves entire; fruit-stalks terminal or lateral; capsule nearly erect, generally even, rarely furrowed; lid conical or awl-shaped; fringe long, brown, or deep red, elegantly twisted, its points rather loose and spreading.

The species are, in many cases, difficult to ascertain, and probably some of the smaller ones are too much multiplied. All our native ones are figured in *English Botany*. We shall here select some of the principal, in order to exhibit, as in other instances, a compendious view of the genus.

T. rigida. Rigid Screw-moss. Fl. Brit. n. 1. Engl. Bot. t. 180. (*Barbula rigida*; Hedw. Crypt. v. 1. 65. t. 25. *Bryum rigidum*; Hudf. 477. *B. acaulon*, *ericæ tenuifoliæ* Gerardi folio; Dill. Musc. 388. t. 49. f. 55.)—Stem very short. Leaves spreading, rigid, involute, obtuse, ribless. Capsule cylindrical. Lid conical.—Found on rocks, walls, chalky banks and cliffs, bearing capsules in the winter and early spring, not only in England, but in various parts of Europe, from Sweden to Greece. The writer of the present article first discovered and distinguished this humble moss, since the time of Dillenius, on a bank on the right hand of the road from Norwich towards Yarmouth, a little beyond Thorpe. It agrees in size with the most common of mosses, *T. muralis*, hereafter mentioned, but differs in the thickness and dark colour of its almost linear leaves, which have no hair at the point. The fruit-stalk is solitary, red, half an inch to an inch high. Capsule inclining, cylindrical, smooth, dark brown, with a slender veil and lid. Fringe brown, of thirty-two fine teeth. The foliage is incurved when dry.

T. convoluta. Convoluted Screw-moss. Fl. Brit. n. 5. Engl. Bot. t. 2382. (*Barbula convoluta*; Hedw. Crypt. v. 1. 86. t. 32, excluding the *Mntum setaceum* of Linnæus. *Bryum convolutum*; Dickf. Crypt. fasc. 2. 6. H. ficc. fasc. 1. 20. *B. stellare nitidum pallidum*, *capsulis tenuifimis*; Dill. Musc. 381. t. 48. f. 44.)—Branches short. Stem-leaves lanceolate, keeled; those of the sheath obtuse, convoluted and ribless. Lid taper, oblique.—Native of sandy heaths, dry banks and walls, in England, Ireland, Sweden, and Germany, bearing fruit in winter and spring. The perennial roots bear broad, dense patches of very low leafy stems, whose branches are extremely short. Leaves short, imbricated, of a full bright green, spreading, ovato-lanceolate, pointless, single-ribbed. Sheaths at the base of the fruit-stalks very large, solitary between the branches, conspicuous for the pale green hue of their convoluted ribless scales. Fruit-stalks slender, wavy, of a pale lemon-colour, an inch high. Capsule slender, incurved, pale brown, smooth, with a slender oblique lid, half as long as itself.

T. nervosa. Rib-sheathed Screw-moss. Compend. n. 6. Engl. Bot. t. 2383. (*T. convoluta*; Swartz Musc. Succ. Vol. XXXVI.

41. Schrad. Spicil. 66.)—Stem much branched. Leaves all ovate, acute, keeled, with a midrib. Sheaths between the branches, imbricated.—More common than the last, in England, Sweden, and Germany, bearing capsules in March. The tufts of this are much higher, the branches being longer and more numerous. Leaves more ovate and pointed; those of the sheath more numerous, ribbed, imbricated, not rolled together, differing little from the proper foliage. Fruit-stalks tawny, or red. Capsule erect, somewhat ovate, smooth, with a shorter thicker lid than that of *T. convoluta*, with which the present species has usually been confounded.

T. stellata. Starry Furrowed Screw-moss. Fl. Brit. n. 6. Engl. Bot. t. 2384. (*Bryum stellatum*; Dickf. Crypt. fasc. 2. 6, excluding the synonyms.)—Stem none. Leaves ovate, keeled, incurved. Capsule erect, ovate, somewhat cylindrical, furrowed. Lid oblique.—Hitherto gathered only by our great English cryptogamist Mr. Dickson, about Banks, and by the sides of rivers, in Scotland. The synonyms he has applied to it are justly pointed out by Hedwig as erroneous, and belong in fact to three different species. But Hedwig himself errs far more unaccountably, in asserting Mr. Dickson's moss to be merely *T. convoluta*. The want of a stem, smaller size of the whole plant, and, above all, the strongly furrowed capsule, singular perhaps in the whole genus, afford sufficient distinctions. The fringe and lid are as long as the capsule; veil much longer. There appears to be no sheath to the solitary fruit-stalk, whose height is half an inch.

T. ruralis. Great Hairy Screw-moss. Ehrh. Crypt. n. 184. Fl. Brit. n. 7. Engl. Bot. t. 2070. (*Barbula ruralis*; Hedw. Sp. Musc. 121. *Bryum rurale*; Linn. Sp. Pl. 1581. *B. rurale unguiculatum hirsutum*, *elatus et ramosius*; Dill. Musc. 352. t. 45. f. 12.)—Stem branched. Leaves obtuse, recurved, hair-pointed; the uppermost stellated. Capsule cylindrical, somewhat ovate.—Common on walls, roofs, and the trunks of trees, throughout Europe from Sweden to Greece, bearing fruit from January to April. This is much larger than any of the foregoing, the stems, mostly about two inches high, composing broad cushion-like patches, of a dirty hoary aspect in dry weather; dark green in wet; bearing abundance of upright capsules, on long red stalks, in winter and spring. The leaves, recurved in every direction, are very abrupt, with a strong rib, ending in a long, roughish, wavy hair. Capsule slender, the teeth of its fringe united at the bottom into a firm, partly perforated, tube, which last character in this, the *subulata*, and a few other *Tortulae*, has given occasion to Mohr to establish a genus by the name of *Syntrichia*; but it seems to us better avoided.

T. subulata. Awl-shaped Screw-moss. Hedw. Sp. Musc. 122. t. 27. Fl. Brit. n. 8. Engl. Bot. t. 1101. (*Bryum subulatum*; Linn. Sp. Pl. 1581. Curt. Lond. fasc. 3. t. 66. *B. capsulis longis subulatis*; Dill. Musc. 350. t. 45. f. 10.)—Stem nearly simple, short. Leaves ovato-lanceolate, pointed. Capsule cylindrical. Lid awl-shaped, straight.—Common in damp shady places, in the southern and middle countries of Europe; rare in Sweden, and even in Scotland. It forms dense perennial tufts, of a fine deep green, bearing capsules in March and April. The leaves are broad, nearly obovate, tipped with a point, sometimes elongated into a hair, when it becomes the *T. pilosa* of Schrader's *Spicilegium*, 66. The fruit-stalks are terminal, an inch or more in height, rather stout, but seldom straight. Capsule almost erect, long and slender, with a long taper lid and veil. Fringe united into a spiral tube for three quarters of its length.

T. muralis. Wall Screw-mofs. Hedw. Sp. Musc. 123. Fl. Brit. n. 9. Engl. Bot. t. 2033. *Bryum murale*; Linn. Sp. Pl. 1581. *B. tegulare humile, pilosum et incanum*; Dill. Musc. 355. t. 45. f. 14.)—Stem mostly simple, very short. Leaves ovate, acute, hair-pointed. Capsule cylindrical, slightly elliptical. Lid conical.—This is perhaps the most universal of all mosses throughout Europe. Every wall and bank is covered with it, and the abundant capsules, produced in winter and spring, remain in a dry and empty state almost throughout the year. The roots are perennial. Stems very short, though sometimes divided, composing broad dark-green patches, not dense elevated tufts, and rendered hoary by the terminal white hairs of the leaves. These hairs, however, vary in length, and are sometimes scarcely discernible. Fruit-stalk terminal, straight, reddish-brown, near an inch high. Old capsule a little curved when the fringe falls off. The latter is not so much twisted as in most other species, the teeth, all separate and parallel, making hardly more than one turn. Lid red, not half so long as the capsule, slightly oblique. Veil as long as both together, slender, brownish.

T. cuneifolia. Wedge-shaped Screw-mofs. Fl. Brit. n. 10. Engl. Bot. t. 1510. (*Bryum cuneifolium*; Dickf. Crypt. fasc. 3. 7. *B. murale* ♂; Hudf. 477. *B. humile, pilis carens, viride et pellucidum*; Dill. Musc. 356. t. 45. f. 15.)—Stem very short, mostly simple. Leaves obovate, reticulated, pellucid, slightly pointed. Capsule cylindrical. Lid conical.—Found on banks and sandy ground, at Streatham, Surrey, and abundantly about Oxford, according to Dillenius. Mr. D. Turner gathered the specimens figured in Engl. Bot. on some old banks at Hopton, near Yarmouth. This moss is said to be biennial, bearing capsules in the early spring, and composing broad indeterminate patches. When carefully examined, it cannot be confounded with any variety of the last. The leaves are of a brighter green, strongly reticulated, pointless. Capsule more oval, with a longer, more awl-shaped, lid: its fringe bright red, or crimson, repeatedly and closely twisted together, which alone would distinguish this species from the preceding.

T. tortuosa. Frizzled Mountain Screw-mofs. Hedw. Sp. Musc. 124. Fl. Brit. n. 12. Engl. Bot. t. 1708. (*Bryum tortuosum*; Linn. Sp. Pl. 1583. Dickf. Dr. Pl. 48. *B. cirratum, fetis et capsulis longioribus*; Dill. Musc. 377. t. 48. f. 40.)—Stem branched, level-topped. Leaves linear inclining to lanceolate, keeled; twisted and undulated when dry. Capsule cylindrical, slightly ovate. Fringe lax.—Plentiful on the mountains of Wales, Scotland, and the north of England, Derbyshire, &c. as well as in Sweden, Switzerland, Germany, Italy, and, according to Dillenius, in Virginia. It bears capsules in summer, but not very constantly. A large and handsome species, whose stems, from two to four inches high, compose broad and soft tufts, of a most beautiful green, the leaves being long and taper, frizzled when dry, especially at the rough, or minutely crenate, edges. Fruit-stalks an inch and a half or two inches high, bright crimson; pale yellow at the summit. Capsule inclining, slender, smooth, light brown, crimson at the mouth; finally erect. Lid taper, half as long as the capsule. Fringe long, crimson, gradually unrolled, and partly spreading or straight, approaching the character of a *TRICHOSTOMUM*. See that article hereafter.

T. barbata. Bearded Lateral Screw-mofs. Fl. Brit. n. 14. Engl. Bot. t. 2391. (*Bryum barbatum*; Curt. Lond. fasc. 4. t. 65. *B. unguiculatum et barbatum, tenuius et stellatum*; Dill. Musc. 384. t. 48. f. 48.)—Stem

branched from the base. Leaves elliptic-lanceolate, spreading, somewhat revolute. Fruit-stalks lateral. Capsule ovate.—Native of walls and barren heaths, in the winter and spring, said to be not unfrequent about London, particularly at Charlton, where nevertheless we have many a time sought it in vain. Mr. Hudf. is reported to have confounded this species with *T. convoluta*, or perhaps *neruosa*, above described, though certainly none of the genus can be more essentially unlike. The stems are level-topped, branched from the base, clothed with dark-green, single-ribbed, beardless leaves, recurved when dry; the uppermost forming a kind of star at the top of each branch. The fruit-stalks seem to spring from the base of each branch; yet the flower, to which each owes its origin, perhaps terminated the shoot of the preceding season. Capsule small, erect, ovate, polished. Fringe red, not very much twisted, more than half the length of the capsule. The lid is represented by Curtis nearly as long as the capsule, awl-shaped, and oblique. The specific name was meant to contrast this moss with the following, supposed to have no fringe; so that few names can be more exceptionable than either.

T. imberbis. Deciduous Screw-mofs. Fl. Brit. n. 15. Engl. Bot. t. 2392. (*Bryum imberbe*; Linn. Mant. 309. *B. tenue, imberbe et pallidum, foliis crebrioribus*; Dill. Musc. 382. t. 48. f. 46.)—Stem branched. Leaves awl-shaped, spreading; ovate at their base. Stalks about the upper part of the branches. Capsules cylindrical, somewhat elliptical.—Found on dry banks, walls, and amongst grass, perfecting its capsules very early in the spring. This has much the habit of the last, but its leaves are of a paler yellowish-green, more tapering and channelled, turning inward in drying. Fruit-stalks purplish, an inch high. Capsule more cylindrical and longer, while the lid is shorter than in *T. barbata*. Fringe light brown, very soon deciduous, whence Dillenius thought it to be wanting, and his definition led Linnæus to apply the faulty name, which still sticks to this species.

T. aristata. Short-pointed Screw-mofs. Fl. Brit. n. 16. Engl. Bot. t. 2393. (*Bryum aristatum*; Dickf. Crypt. fasc. 4. 12. t. 11. f. 7.)—Stem branched, level-topped. Leaves oblong, obtuse, with a minute point; curved inward and twisted when dry. Capsule cylindrical.—Found on walls at Croydon, Surrey, by Mr. Dickson, who first described this moss, and to whom we are indebted for specimens. The stems are perennial, branched and level-topped, much in the manner of the two foregoing. Leaves rather abrupt, with a very small terminal point: by drying they become twisted, enfolding the branch in a spiral order, and are neither recurved nor inflexed. Fruit-stalks terminal, crimson, scarcely an inch high. Capsule cylindrical, of a light shining brown, thin and semi-pellucid. Lid incurved, tapering, tawny, almost equal in length to the capsule. Fringe soon falling off.

TORTURA, or TANTUR, in Geography, a town of Palestine, on the coast of the Mediterranean, called in the scripture *Dor, Dora, and Nephtali*. Joshua took it from the Canaanites, and it fell to the tribe of Manasseh. Tryphon, tyrant of Syria, after the murder of Antiochus VI. fled to this place for shelter; but he was soon compelled to abandon it, and shortly after lost his life. In the times of Christianity it was erected into a bishopric under the archbishop of Cæsarea. It is at present a village only. The environs abound in grain, cotton, and fruit: wheat in particular is abundant, and of a quality superior to the other parts of Palestine and Syria; 15 miles S. of Acre. N. lat. 32° 35'. E. long. 34° 2'.

TORTURA, a word appropriated by many medical writers, to express only the distortions of the face, and particularly of the mouth, in convulsions.

TORTURE, a grievous pain inflicted on a criminal, or person accused, to make him confess the truth.

The forms of torture are different in different countries. In some they use water, in others iron, in some the wheel or rack, in some the boot, thumbkins, &c. See **RACK**, **BOOT**, &c.

Torture, says archdeacon Paley, (Principles of Mor. and Pol. Philos. vol. ii.) is applied, either to obtain confessions of guilt, or to exasperate or prolong the pains of death. No bodily punishment, however excruciating or long continued, receives the name of torture, unless it be designed to kill the criminal by a more lingering death, or to extort from him the discovery of some secret, which is supposed to lie concealed in his breast. The *question by torture* appears to be equivocal in its effects; for since extremity of pain, and not any consciousness of remorse in the mind, produces those effects, an innocent man may sink under the torture, as soon as the guilty. The latter has as much to fear from yielding as the former. The instant and almost irresistible desire of relief may draw from one sufferer false accusations of himself or others, as it may sometimes extract the truth out of another. This ambiguity renders the use of torture, as a means of procuring information in criminal proceedings, liable to the risk of grievous and irreparable injustice. For which reason, though recommended by ancient and general example, it has been properly exploded from the mild and cautious system of penal jurisprudence established in this country. The enlightened and liberal spirit of modern times has excluded torture from most other countries in Europe; and the revival of it in any nation reflects indelible reproach on the government which countenances it.

The torture, says M. Bruyere, is a sure expedient to destroy an innocent person of a weak complexion, and to save a criminal of a robust one. It was a noble saying of an ancient, "They who can bear the torture will die, and also they who cannot bear it."

The marquis Beccaria (chap. 16.) with exquisite railery proposes this problem: the force of the muscles and the sensibility of the nerves of an innocent person being given, it is required to find the degree of pain necessary to make him confess himself guilty of a given crime.

TORTYRA, in *Ancient Geography*, the name of one of the seven towns which Cyrus gave to his favourite Pythareus, supposed to be in the environs of Asia Minor. Athenæus.

TORUP, in *Geography*, a town of Sweden, in the province of Halland; 12 miles N.N.E. of Halmstad.

TORUS, in *Architecture*. See **TORÉ**.

TORUS, in *Botany and Vegetable Physiology*, a name applied by Mr. Salisbary to what is termed by Linnæus either the receptacle of the flower, or a glandular nectary surrounding the base of the germen. Jussieu and his followers call

discus hypogynus, alluding to its form, as well as situation. The word *torus* is very descriptive, as expressing the frequent resemblance of the part in question to what usually sustains an architectural column, and it is certainly preferable to the compound appellation just mentioned. A very curious lobed and plaited *torus* may be seen in *Cobæa*, but we believe it to be strictly a glandular nectary. Mr. Brown's natural order of *Epacridæ* contains some genera with five separate glands, of a like nature, indubitably (in our opinion) nectariferous; and others with an uninterrupted annular nectariferous disk, or *torus*, under the germen. It does not

follow, because Linnæus has sometimes misapplied the term *nectarium*, that there is no such thing in nature; but his opponents have wished to obscure and invalidate that term, because he has in general, with so much originality and success, employed it for the clear and concise discrimination of genera. This displays a want of candour, unbecoming disinterested students and admirers of Nature.

TORUS, in *Ancient Geography*, a mountain of Sicily, between Heraclea and Agrigentum.

TORUSCULA, a word used by some medical writers to express a drop.

TORY. See **TORIES**.

TORY Island, in *Geography*, an island lying north of Bloody Farland Point, in the county of Donegal, about 61 miles from the main land. It is said to be extremely fertile.

TORYNE, in *Pharmacy*, the name of a kind of spatula intended for stirring up the ingredients of decoctions while boiling.

TORYNETOS, a name given by some to a mixture of bread and water boiled together, whether meant as a kind of a panada, or for a poultice.

TORZA, in *Geography*, a town of Persia, in the province of Irak; 40 miles E. of Hamadan.

TORZOK, a town of Russia, in the government of Tver, on the Tvertza; 40 miles W.N.W. of Tver. N. lat. 57°. E. long. 35° 14'. See **TORSUOK**.

TOSA, a sea-port town of Spain, in the province of Catalonia; 23 miles S.S.E. of Gerona. N. lat. 41° 43'. E. long. 2° 48'.—Also, a river of Italy, which runs into lake Maggiore; 4 miles N.E. of Omegna.—Also, a town of Japan, capital of a province of the island of Xicoco, on the south coast. N. lat. 33° 40'. E. long. 134° 50'.

TOSALE, in *Ancient Geography*, a town of India, on the other side of the Ganges, and near it, which had the title of metropolis. Ptolemy.

TOSANLU, in *Geography*, a river of Natolia, which waters the city of Tocat, and afterwards joins the Jekilermak. It was anciently called *Lycus*.

TOSARCAN, a town of Persia, in the province of Irak; 21 miles S. of Hamadan.

TOSCANELLA, a town of the Popedom, in the Patrimonio, the see of a bishop, suffragan of Viterbo; 9 miles W.S.W. of Viterbo. N. lat. 42° 24'. E. long. 11° 52'.

TOSCANELLI, **PAOLO**, in *Biography*, an eminent astronomer, was born at Florence in 1397. Declining the profession of his father, who was a physician, he devoted himself to the study of geometry and astronomy, and also of the Latin and Greek languages. He was one of the curators of Niccoli's library, and conversant with the solar motions. He corrected the astronomical tables of Alphonso and the Arabians. Of his astronomical tables he left a memorial in the great dial fixed upon the metropolitan church at Florence, erected about the year 1468. He died in 1482, at the age of 85.

TOSCOLANO, in *Geography*, a town of Italy, in the department of the Benaco, on a small river which runs into lake Garda. Here is a manufacture of cloth, with some paper and iron-mills; 6 miles E.N.E. of Salo.

TOSENA, a town of Sweden, in West Gothland; 20 miles W.N.W. of Uddevalla.

TOSI, **GIUSEPPE FELICE**, of Bologna, in *Biography*, maestro di capella at Venice the latter end of the 17th century, and composer of five operas for that city between the years 1684 and 1690. (Gloria della Poesia.) Beside these dramas, he composed others for Bologna. His name,

however, will be longer remembered by the merit of his son, than by his musical productions, which have been long lost and forgotten. See the next article.

TOSI, PIER FRANCESCO, *Accademico Filasfonico di Bologna*, and not only an eminent opera singer, in soprano, during his youth, but a composer of cantatas, in which the recitatives were particularly impassioned, energetic, and impressive, and author of an excellent treatise on singing, well known in England, by the late Mr. Galliard's admirable translation.

The author of this treatise seems to have had no partiality for rapid execution. His own favourite style of singing was the pathetic, which he describes and recommends by excellent precepts. Though this elementary tract has been written more than fourcore years, no work of the same kind has been produced in Europe since its publication, but upon Tosi's model, and in confirmation of his precepts. The excellent composer of the old school, Galliard, a profound and experienced judge of every species of musical merit, not only recommended its perusal to the first musical professors, instrumental as well as vocal, by an admirable translation and notes in 1740, but by his encomiums instantly exalted it into a classical work.

In 1757, Agricola, opera composer to Frederic II., king of Prussia, and the best singing-master in Berlin, published a translation of it with useful and instructive notes, which made the work well-known in Germany; a knowledge which Hiller of Leipzig much increased by frequent extracts from it, in his musical journals.

And in 1774, Mancini, singing-master to the archduchesses at Vienna, published a treatise on singing of great merit, founded on the work, and confirming the principles of Tosi, of whom he speaks with the highest respect in his chapter on "Intonation." "Gioverá non poco si ogni scolare leggera' nel libro tanto stimato di Pier Francesco Tosi. A carte 12, la spiegazione, che esso fa sopra il femituoono maggiore, e minore, appunto per sapere la quantità degl' intervalli, o sia delle comme, che li compone."—"It will be of no small service to students in singing, if they read in the work of P. F. Tosi, (p. 12. of the original,) the explanation which he gives of major and minor semitones, that they may know precisely the quantity of the several intervals, or rather commas, of which they are composed." See **MANCINI**, for the original title and further account of his book.

Of Tosi's life but little is known, except from Galliard's prefatory discourse to his translation; who tells us that he was a singer of great esteem and reputation. He sung on the stage at Venice in 1707, in the opera of "Olibrio," written by Apostolo Zeno, and set by Gasparini, where he is styled Virtuoso di S. A. Elettorale Palatina. He spent the chief part of his time, according to Galliard, in travelling, and by that means heard the most eminent singers in Europe; whence, by the help of his refined taste, he made the observations which are contained in his book. Among many excursions, his curiosity was excited to visit England, where he resided for some time in the reigns of king James II., king William, George I., and beginning of George II. He was very much esteemed by persons of rank wherever he went: among whom, in England, was the late earl of Peterborough, whom he had often met in his travels on the continent, to whom he had dedicated his book, though it was printed at Bologna in 1723, some time after he had quitted England. The emperor Joseph I. gave him an honourable employment in some part of Italy, and the archduchess, a church retirement in Flanders, where he died.

The original title of his book, which is now become scarce, is, "Opinione de' Cantori Antichi e Moderni o Sieno Osservazioni sopra il Canto figurato." 8vo.

The earl of Peterborough, to whom he dedicates his book, was one of the best informed judges of dramatic music and performance in his time. He married the amiable and accomplished Mrs. Anastasia Robinson, after a very long courtship. (See her article.) Tosi used to meet Bononcini, and all the first opera singers of the time, at the earl's villa, at Parson's Green; and we remember hearing Monticelli, Reginelli, and Manzoli, speaking with great respect of the "Trattato di Tosi."

TOSIA, in *Geography*, a neat town of Asiatic Turkey, in Natolia, built on the side of a hill, at the foot of which is a fine fertile country; 70 miles S.S.W. of Sinob.

TOSICCIA, a town of Naples, in Abruzzo Ultra; 7 miles S. of Teramo.

TOSINO, a river which crosses the marquisate of Ancona, and runs into the Adriatic, N. lat. 42° 57'. E. long. 13° 55'.

TOSMUANASSA, in *Ancient Geography*, a town of Asia, in Bactriana. Ptolemy.

TOSNA, in *Geography*, a river of Russia, which runs into the Neva, near Pella, in the government of Peterburg.

TOSNITZPACH, a river of Austria, which runs into the river Erlebach, 2 miles below Scheibs.

TOSOLIC, a town of Thibet; 35 miles S. of Tourfan.

TOSON-HOTOC, a town of Chinese Tartary; 88 miles S.S.W. of Haratoubé.

TOSPITES, in *Ancient Geography*, a country of Asia, in Greater Armenia, S. of the sources of the Euphrates and Tigris. Ptolemy.

TOSQUIATOSSY CREEK, in *Geography*, one of the branches of the Allegany river.

TOSS, a river of Switzerland, which runs into the Rhine, 2 miles S.E. of Eglisau, in the canton of Zurich.

TOSSAQUA, a town of Peru, in the audience of Quito; 110 miles W. of Quito.

TOSSE, a town of France, in the department of the Landes; 12 miles W. of Dax.

TOSSIA'T, a town of France, in the department of the Ain; 7 miles S.E. of Bourg-en-Bresse.

TOSSIGNANO, a town of Italy, in the department of the Amona; 13 miles W. of Ferrara.

TOSSO, a town of Sweden, in West Gothland; 42 miles N.N.E. of Uddevalla.

TOST, or **TOSCHER**, a town of Silesia, in the principality of Oppeln; 26 miles S.E. of Oppeln.

TOSTA, a river of Mexico, which runs into the Pacific ocean, N. lat. 12° 30'.

TOSTAR, or **SUSTER**. See **SHUS**, **SHUSTER**, and **SUSA**.

TOSTERYD, a town of Sweden, in Smaland; 22 miles S. of Jonkioping.

TOSTES, a town of France, in the department of the Lower Seine; 12 miles S.W. of Arques.

TOSTO, CAPE, a cape on the N. coast of Spain. N. lat. 43° 13'. W. long. 9° 10'.

TOSUN HOTUN, a town of Thibet; 508 miles W.S.W. of Tourfan. N. lat. 41° 55'. E. long. 99° 10'.

TOT VARADIN, a town of Hungary; 24 miles S.E. of Boros Jenó.

TOTA ISLAND, or *Island of Plantains*, an island of the Atlantic, near the coast of Africa, at the mouth of the Scherbro.

TOTANA, a town of Spain, in the province of Murcia; 11 miles N.E. of Lorca.

TOTANO,

TOTANO, or **TOTANUS**, in *Ornithology*, the name of a bird common in the Italian markets, and more usually known by the name of *Vetola*; which see.

The totanus of Linnæus is a species of *Scolopax*, (which see,) and the *orex* of other authors. See **RAIL**.

TOTANUS is also used by some for the *Limosa*; which see.

TOTAQUESTAC, in *Ornithology*, the name of a beautiful American bird, described by Nieremberg from Antonius Herrera. It is said to be something smaller than a pigeon, and all over of a most beautiful green; its tail-feathers are of a very great length, and are greatly esteemed. The Indians value the bird highly, that it is death by their laws to kill it, so that when it is caught they only strip it and let it go again. **Ray**.

TOTEN, in *Geography*, a town of Norway, in the province of Aggerhuus; 47 miles N. of Chrilliania.

TOTES, a town of France, in the department of the Lower Seine; 14 miles N. of Rouen.

TOTEZVA, a town of Hungary, on the river Bodrog; 5 miles S.W. of Patak.

TOTFALU, a town of Hungary; 1 mile N. of Siclos.—Also, a town of Hungary; 8 miles W. of Podolicz.

TOTILA, in *Biography*, king of the Ostrogoths in Italy, was a commander of the Gothic garrison at Treviso, and upon the deposition and murder of his uncle Eraric, was chosen to succeed him A.D. 541. After several successful conflicts with the Romans, and the capture of their chief cities, he advanced to Tibur, within eighteen miles of the capital. In every step of his progress his conduct was conciliatory; he restrained his soldiers, in the career of victory, from all acts of licentiousness; and by the exercise of humanity and liberality, he attached to his service and cause his vanquished enemies. Upon his approach to the capital, the emperor Justinian was alarmed, and recalling Belisarius from the Persian war, sent him, already renowned for his character and exploits, to his relief. Failing in his attempts to throw succours into the city, he withdrew, and abandoned it to the distress of famine; so that those inhabitants who could make their escape deserted it, and those that remained importunately solicited the governor to capitulate. At length the Roman garrison retired, and one of the gates was opened to the Gothic troops, by which Totila entered the city December 17, A.D. 546. Although the conqueror spared the lives of the inhabitants, he allowed his soldiers to pillage the city, and by so doing reduced the wealthy senators and their families to absolute beggary. Having convened those few of this rank that remained, he reprehended and threatened them; but pacified by the intercession of Pelagius, he sent a respectful message to Justinian, offering to live with him upon amicable terms; and yet intimating, that on the rejection of his proposal he would utterly destroy Rome, and remove the seat of war to Illyricum. The emperor referred him for an answer to Belisarius, upon which slight he began to demolish the city. As he was proceeding in the work of destruction, Belisarius remonstrated with him on the barbarity of his conduct, and so far succeeded as to induce Totila to desist, and to march off, with his troops and the senators, to Lucania. The remaining inhabitants were dispersed in exile, and Rome was for forty days in a state of total depopulation. Belisarius seized the opportunity of taking possession of the city, repairing the fortifications to the utmost of his power, and recalling the inhabitants. Upon receiving this intelligence, the Gothic sovereign returned, and having made many unsuccessful attempts for regaining possession of the city, and sacrificed, in repeated assaults, the choicest of his troops, he was under a necessity of decamping, and of marching, with degraded

reputation, and a discontented army, to the siege of Perugia. He contrived, however, to regain the confidence of his troops, and after obtaining a reinforcement, marched again for Rome, and by the treachery of some Italian centinels, became master of the city. Experience had now taught him wisdom; and he adopted every measure which found policy dictated for conciliating his enemies. He not only repaired the walls and edifices which he had demolished, but recalled the senators, and restored them to their rank, and at the same time invited the citizens to take possession of their property, supplying them in the mean while with provisions. He also exhibited the Circensian games, and presided at them with the dignity of a Roman emperor. Totila renewed his embassy to Justinian, making an offer of peace and alliance; but the emperor would not admit the Gothic ambassadors to an audience. The Gothic sovereign was incensed by this treatment; and fitting out a powerful fleet, took Rhegium and Tarentum, and passed over to Sicily, which he speedily reduced and pillaged; and having made himself master of Sardinia and Corsica, and ravaged the whole sea-coast of Greece, whilst his troops were besieging Ancona, his fleet was defeated, so that he was obliged to raise the siege, and soon after he lost Sicily. Justinian, encouraged by these fortunate events, determined to preserve Italy from the power of Totila; and having recalled Belisarius, devolved the command of his army on Narfes, who marched directly to Rome, and meeting Totila in his progress, presented to him the emperor's message, which was merely an offer of pardon. Totila seemed to regard it as an insult, and replied, that he would conquer or die. In the furious combat between the hostile armies that ensued, the Goths were driven from the field of battle, and Totila fled with no more than five attendants. In his flight he was overtaken by Asbad, a leader of the Gepidæ, who pierced him through the body with a lance. His faithful companions hurried him away seven miles beyond the scene of action, and had his wound dressed; but he soon after expired. A private burial terminated the glory of this conqueror of Rome, whom his eulogists have celebrated for valour tempered by humanity and moderation, and for a government conducted with a regard to justice and equity. With this battle, fought in July 552, the 11th year of Totila's reign, the triumph and dominion of the Goths in Italy also terminated. *Anc. Un. Hist.* Gibbon's *Rom. Emp.*

TOTMA, in *Geography*, a town of Russia, in the government of Vologda. In the environs are several salt-pits; 92 miles N.E. of Vologda. N. lat. 60° 10'. E. long. 42° 34'.

TOTNESS, an ancient borough and market-town in the hundred of Coleridge, and county of Devon, England; is situated on the banks of the river Dart, 22 miles S.S.W. from Exeter, and 195 miles W.S.W. from London. It ranks among the most ancient towns in the kingdom; and if credit could be given to Geoffrey of Monmouth, would assume an origin coeval with the first; for here, according to this author, Brute first landed; and the inhabitants, to corroborate the tale, still point out a stone near the spot where the east gate stood, as the very one on which he first set his foot. It is certainly, however, of remote antiquity; for Leland mentions that the Roman foss-way, extending through Devonshire and Somersetshire, began here: and Risdon quotes a passage from Bede, which notices the arrival of Ambrosius and Uther-Pendragon at Totness, when they returned from Bretagne to oppose the tyranny of Vortigern. The site of the town is peculiarly fine: from the margin of the Dart it climbs the steep acclivity of a hill, and stretches itself along its brow; commanding a view of the winding stream and the country in its vicinity; but sheltered

by higher grounds on every side. The piazzas in front of the houses in some parts of the town, and the higher stories projecting over the lower, are manifest proofs of its antiquity; a claim which is strengthened by the keep of its castle, a large circular building, turreted, rising from an immense artificial mound. This castle, according to Brown Willis, was erected by Judhael de Totnais (to whom the manor was given by the Conqueror), and made the head of his barony. During his residence here, he founded a priory for Benedictines, which continued till the dissolution, when its annual revenues were estimated at 124*l.* 10*s.* 2*d.* The manor was granted in the reign of Henry VII. to Richard Edgcombe, whose son, or grandson, in the second year of Elizabeth, conveyed it to the corporation, reserving the right of a burghership to his heirs for ever. Totness was incorporated by charter of king John; and has had its privileges confirmed by several succeeding sovereigns. The corporation is vested in a mayor, recorder, thirteen burgo-masters, and twenty common-councilmen. The borough first sent representatives to parliament in the 23*d.* of Edward I.: the right of election is in the corporation. At the period of the Norman survey, Totness had immunity from taxation, excepting at those times when Exeter was rated. The parish-church is a handsome edifice, having a well proportioned tower at the west end. The date of its foundation was unknown till the year 1799, when the south-east pinnacle was struck by lightning, and in its fall beat in the roof of a small room over the porch. In this room were two chests of old records, which becoming exposed by this accident, among them was found a grant of indulgence from bishop Lacey, "to those people who had or might contribute to the rebuilding of the church at Totness." This was dated at Chudleigh, where the bishops of Exeter had a residence in 1432. The chancel is separated from the body of the church by an elegant screen of ornamental tracery in stone-work; but the altar-piece, instead of corresponding with the rest of the building, is of Grecian design, having a semi-dome supported by Corinthian pillars. Totness consists principally of one street, about three-quarters of a mile in length, terminated on the E. by a bridge over the Dart: the town was formerly surrounded by a wall, and had four gates: the east and north gate-houses are now standing. By the population return of the year 1811, the houses were estimated at 327, the number of inhabitants at 2725. Many of the labouring class derive employment from the woollen trade, which is rapidly increasing. Five fairs are held annually, and a market weekly, on Saturday.

Edward Lye, the learned author of the Anglo-Saxon and Gothic Dictionary, published in 1772, was a native of Totness; as was also Dr. Benjamin Kennicott, well known for his collection of Hebrew MSS. The former died in 1769, the latter in 1783.

About two miles below Totness, on the brow of a thickly wooded declivity which rises from the margin of the Dart, is Sharpham, the seat of Edmund Bastard, esq. The mansion, an elegant building of freestone, was erected by captain Pownall, who lost his life at the moment of victory in a naval engagement during the American war. The daughter of that gentleman married Mr. Bastard.

On the eastern shore is Greenaway, a seat for many generations possessed by, and a residence of the family of Gilbert. Of this family, and born here, was sir Humphrey Gilbert, a celebrated voyager in the reign of Elizabeth: to him this kingdom is indebted for the discovery and settlement of Newfoundland.—Warner's Walk through the Western Counties, 8vo. 1800. Beauties of England and Wales, vol. iv. Devonshire: by J. Britton and E. W. Brayley, 1803. Polwhele's History, &c. of Devonshire, folio, 1797.

TOTOMINA, a bay on the south coast of the island of Nippon. N. lat. 35° 10'.

TOTOO, a town of Bengal; 7 miles N.N.E. of Torea.

TOTAL, a town of South America, in the province of Cordova; 54 miles N. of Cordova.—Also, a small island in the Pacific ocean, near the coast of Chili. S. lat. 29° 20'.

TOWA, a town of New Jersey, on the Passaic; 15 miles N. of Newark.

TOTSKAIA, a fortress of Russia, in the government of Upha; 20 miles S.E. of Buzulatfk.

TOTTAIUM, in *Ancient Geography*, a place of Asia, in Bithynia, on the route from Constantinople to Antioch, between Oriens-Medio and Dahlis. Anton. Itin.

TOTTAVILLA, in *Ornithology*, a name by which some authors have called the *alauda arborca*, or common wood-lark. See ALAUDA.

TOTTED. A good debt to the king is, by the foreign apposer, or other officer, in the exchequer, noted for such by writing the word *tot*, q. d. *100 pœunie regi debentur*; whence it is said to be *totted*. Also that which is paid is to be totted.

TOTTENHAM, or TOTTENHAM HIGH-CROSS, in *Geography*, in ancient records called *Tottham*, is a village and parish in the hundred of Edmonton, and county of Middlesex, England. The village is situated about five miles to the N. of London: the parish is about fifteen miles in circumference, and is bounded on the E. by the river Lea; on the N. by Edmonton; on the W. by Hornsey and Friars Barnet; and on the S. by Hackney and Stoke-Newington. It contains about 4000 acres of land, of which nearly one-eighth part is arable, the remainder grass. It is divided into four districts, named the Middle, Lower, High-Cross, and Wood-Green wards. There are an overseer and a constable for each ward, and two churchwardens for the whole parish. The New River passes with a very circuitous course through the western part of the parish. On the east side of the high road, nearly in the centre of the village, stood an ancient wooden cross, whence the place is said to have obtained the appellation of Tottenham High-Cross. About the year 1580, Bedwell described it as "a column of wood, covered with a square sheet of lead." This, being decayed, was taken down, and an octangular brick column raised in its place. The manor of Tottenham, in the reign of Edward the Confessor, was the property of earl Waltheof, son to the famous Siward, earl of Northumberland, who defeated Macbeth, the usurper of the crown of Scotland. Waltheof's widow, Judith, niece of William the Conqueror, was in possession of this manor at the time of the Domesday survey. From her it passed through a succession of royal and noble possessors till the year 1254, when, having been the property of John, earl of Chester, it was divided between Robert de Brus, John de Baliol, and Henry de Hastings, as coheirs, by marriage, of the said earl. The manor, being thus divided into three portions, formed as many distinct manors, some of which were subdivided, and acquired also the name of manors. Through various descents, they all devolved to, and centered in, John Gedeney, alderman of London, who died possessed of the whole in 1449. In 1792 it was sold to Thomas Smith, esq. of Gray's Inn, who is now the lord. Bruce castle, which may be considered as the manor-house of Tottenham, is a large brick mansion: it was probably rebuilt by sir William Compton, at the beginning of the sixteenth century, as we read that in the year 1516, king Henry VIII. met his sister Margaret, queen of Scots, at "Maister Compton's house besides Tottnam." Bruce castle was repaired and altered by Henry, lord Colerane, in the latter part

part of the last century. The parish-church is built of hewn stone, flints, and pebbles, and consists of a chancel, nave, two aisles, and a square embattled tower. On the fourth side of the church is a large brick porch, built, as appears by the architecture, about the beginning of the sixteenth century. At the east end of the north aisle is the vestry, erected in 1696, by Henry, lord Colerane, and repaired, pursuant to his will, in 1790. The building is semicircular at the east end; its roof is in the shape of a dome. The font is octagonal, richly ornamented with tracery, and the devices of a mermaid, pelican, &c. Monuments and other sepulchral memorials abound in every part of the church. David, king of Scotland, gave this church, in the twelfth century, to the canons of the Holy Trinity in London; after the dissolution of that monastery, the rectorial manor and the advowson of the vicarage were granted, in 1544, to the dean and chapter of St. Paul's, in whom they are still vested. There is a considerable Quakers' meeting in this parish, and a chapel belonging to the Methodists. An alms-house for four men and four women was founded and endowed, in 1600, by Balthazar Sanchez, a Spaniard. A similar establishment for six men and six women was built in 1736, pursuant to the will of Nicholas Reynardson, esq.; who also made provision for a school, for twenty poor children. By the bequests of Sarah, duchess dowager of Somerset, the school-house was enlarged, and the benefits extended to all the children of such inhabitants of this parish as were not possessed of an estate of 20*l. per annum*. A charity-school for girls was established in the year 1735: also a Sunday-school for boys, and a school of industry for girls, in the year 1790. According to the return made to the population act in 1811, the number of houses in this parish was 873; of inhabitants 4571.—Lysons's *Environs of London*, vol. iii. quarto, 1792, 1811. Dyson's *History of Tottenham High-Cross*, octavo, 1792.

TOTTIUM, a town of Hindoostan, in the Carnatic; 24 miles W.N.W. of Trichinopoly.

TOTTWEIL, a town of Switzerland, in the county of Baden; 4 miles S.W. of Baden.

TOVALEY, a town of Hindoostan; 16 miles S.E. of Travancore.

TOUCAN, otherwise called *anser Americanus*, in *Astronomy*, a modern constellation of the southern hemisphere, consisting of nine small stars. See **CONSTELLATION**.

TOUCAN, in *Ornithology*. See **RAMPHASTOS**.

TOUCH, or **TOUQUE**, in *Coinage*, the manner of expressing the fineness of gold and silver in China, by dividing it into 100 parts, so called: thus, if it be 93 touch, it contains seven parts of alloy in 100. The Chinese in general take French silver coin at 95 touch (the better informed taking it only at 93), and English silver at 94 ditto; Spanish dollars at about 92; Siam ticals, and Madras rupees, at 98; and Rajamole rupees at 99 ditto.—Also, a method of trying the fineness of gold and silver in many places, by means of a stone called touch-stone.

TOUCH, in *Musical*. An organ is said to have a good touch, or stop, when the keys close, and lie down well, being neither too loose, nor too stiff.

TOUCH, in *Ship-Building*, the broadest part of plank worked top and butt, which place is six feet from the butt-end; or, the middle of a plank worked anchor-stock fashion. Also, the angles of the stern-timbers at the counters, &c.

TOUCH the Wind, in *Sea Language*, is when the steerman at the helm is bid to keep the ship as near the wind as may be. See **TOUCHING**.

TOUCH-Me-Not, in *Botany*. See **IMPATIENS** and **MORMORDICA**.

TOUCH-Hole, or **Vent**, in *Gunnery*, is the small hole at the end of the cylinder of a gun or musket, by which the fire is conveyed to the powder in the chamber.

In a fire-lock, carabine, or pistol, it is called the touch-hole; but in a piece of cannon, it is more properly called the vent.

TOUCH-Needles, small masses of gold, silver, and copper, each pure and simple, and in all the different combinations, proportions, and degrees of mixture, prepared for the trying of gold and silver by the touch-stone; by comparison with the mark they leave on it.

The metals usually tried by the touch-stone, are gold, silver, and copper, either pure, or mixed with one another in different degrees and proportions by fusion. In order to find out the purity or quantity of baser metal in these various admixtures, when they are to be examined, they are compared with these needles, which are mixed in a known proportion, and prepared for this use. The metals of these needles, both pure and mixed, are all made into laminæ or plates one-twelfth of an inch broad, and of a fourth part of their breadth in thickness, and an inch and half long; these being thus prepared, you are to engrave on each a mark indicating its purity, or the nature and quantity of the mixture in it.

The manner of making the touch-needles is by the proportions of the mark, a weight of half a pound, or eight ounces, being divided into sixteen half-ounces, the half-ounces each into four drachms, the drachm into four pennyweights, and this into two half-pennyweights.

TOUCH-Needles, Silver: these must be only tempered with copper, and the proportion determined by the mark divided into half-ounces and grains.

You must use therefore for this purpose one mark of such a weight, that it may constitute a sufficient mass of metal for the making of one needle; let it weigh, for instance, one drachm, then weigh such a mark of the purest silver, wrap it up in a small paper, and upon this write sixteen half-ounces, which will signify that the whole mark of this metal is the purest silver, and make the first needles of this mass.

Next weigh fifteen half-ounces of pure silver, and one half-ounce of pure copper; wrap these both in a paper, and write on it fifteen half-ounces, which will signify that there are in that small mass fifteen parts of pure silver, and one part of pure copper; make of this the second needle. In the same manner go on with the rest, add two half-ounces of copper to fourteen half-ounces of silver, mark it fourteen half-ounces, make the third needle of this; and in the same manner proportion the small masses of silver and copper for making the other needles, and put inscriptions upon every one in the following manner.

For the needle	}	half oz. of silver.	1 — 16	0	} half oz. copper.
			2 — 15	1	
			3 — 14	2	
			4 — 13	3	
			5 — 12	4	
			6 — 11	5	
			7 — 10	6	
			8 — 9	7	
			9 — 8	8	
			10 — 7	9	
			11 — 6	10	
			12 — 5	11	
			13 — 4	12	
			14 — 3	13	
			15 — 2	14	
			16 — 1	15	

When you have the metals in each of their due proportions, each being wrapped up in its separate paper; put each separately into a new crucible never used for any operation, and, adding a little borax, melt them together in a very quick fire, which must be well kindled before with bellows; or, what is yet better, throw them suddenly into a hot crucible, and as soon as they melt, stir them with a dry wooden peg, burnt at the end, and pour them immediately into an ingot. When this is done, wrap up each mass, when cold, in its own paper again, and weigh them singly, in a nice balance; if they still weigh a whole mark, they are good; but if there is any considerable deficiency in their weight, it is a sign that your fire, having been too weak, or of too long duration, has consumed as much copper as is wanting in the weight; therefore this mass must be esteemed useless, and another made in its place in the same proportion.

When this is all finished, make with the hammer out of each of these small masses, a needle, making them a little hot; then engrave on each of these needles the number of half-ounces it contains, as before marked on its paper; that is, upon the first sixteen, upon the second fifteen, and so on; and then pierce them at one end, and running a silver wire through their eyes, collect them in order according to their different numbers. These are the silver touch-needles, made of the different alloys of silver and copper.

In Holland they make use of the mint mark, divided into grains, for the making of their needles. The first needle made of pure silver is said to be of twelve pennyweights. The second is made of eleven pennyweights, and eighteen grains, by the addition of six grains of copper. The third is made of eleven pennyweights and twelve grains, by the addition of twelve grains of copper; and so on, the proportion of silver decreasing always six grains, that is, one quarter of a pennyweight at a time, and that of the copper being always increased in the same proportion, till at last the weight of the silver is reduced to one pennyweight, and that of the copper increased to eleven pennyweights, which proportion constitutes the last needle.

It is needless, however, to go through the whole series of the needles, by so small progressions to the very last, for very delicate proportions cannot be very accurately distinguished in the operation.

Touch-Needles, Gold. These must be mixed either with silver alone, or with silver and copper variously intermixed. This mixture is called allowing or carating, and is determined with a mark divided into twenty-four carats, or weights of two-sixth parts of an ounce. There is nothing to be observed about the making of these needles, beside what has been already said in regard to the silver needles; except that the proportions of the weights are determined in another manner. These needles are made according to the following division and order; and they all weigh one mark.

The first is entirely of pure gold, or of 24 carats.

2. 23 car. 6 gr.	} pure gold.	} pure silver.
3. 23 car.		
4. 22 car. 6 gr.		
5. 22 car.		
6. 21 car. 6 gr.		
7. 21 car.		
8. 20 car. 6 gr.		
9. 20 car.		
10. 19 car.		
11. 18 car.		

The decrease goes on thus, by whole carats, till the weight of the gold is arrived at one carat, and that of the silver at

twenty-three; for after the ninth needle, you cannot make so exact a distinction of the half-carats.

N. B. The carat is divided into twelve grains.

This mixture of the gold and silver is called the white alloy; but when copper together with silver enters into the mixture of the gold, then it is called a mixt alloy. The needles for trial of pieces thus debased, are made of mixtures analogous to the former, except only that those portions, which in the first case were pure silver, here consist of copper and silver mixt. Therefore you have a double series: for the mixture is either of two parts of silver and one of copper, or of two parts of copper and one of silver. For instance,

The first is of pure gold.

2 } of pure gold.	{ 23 car. 6 gr.	} of pure silver.	{ 4 gr.	} of pure copper.	{ 2 gr.
3 }	{ 23 car.		{ 8 gr.		{ 4 gr.
4 }	{ 22 car. 6 gr.		{ 1 car.		{ 6 gr.
5 }	{ 22 car.		{ 1 car. 4 gr.		{ 8 gr.
6 }	{ 21 car. 6 gr.		{ 1 car. 8 gr.		{ 10 gr.
7 }	{ 21 car.		{ 2 car.		{ 1 car.
8 }	{ 20 car. 6 gr.		{ 2 car. 4 gr.		{ 1 car. 2 gr.

and so on as in the foregoing.

If in this table you take pure copper instead of pure silver, and silver instead of copper, this gives you a third series of golden needles. And you may have a fourth by mixing with gold equal quantities of silver and copper in the same proportion. These alloys of gold are much in use, but workmen may easily employ a number of other variations, which, compared with those already mentioned, will be distinguished into a thousand different ways by an experienced person, so that it is neither possible, nor necessary to imitate them all.

But that these golden needles may not be too expensive, they may be made much shorter than those of silver, and afterwards foldered to plates of copper, that may be sufficiently long for use.

The use of these needles is by means of the touch-stone; and arises hence, that every metal when pure must have its specific colour, that distinguishes it from the rest: but metals being the most opaque of all known bodies, the specific colour of every one appears most distinctly when you rub it against a very black hard stone; and if the colours of two or more metals are expressed by large lively spots, made near each other on the same plane, by rubbing them against the surface of the stone, you will by that means easily discern their difference, or their likeness.

The stone adapted to this use, and called from its office the touch-stone, must have the following qualities. It must be of the deepest black, lest the tincture of the metal should be altered by spurious rays of light shining among it: it must be capable of being pretty well polished, for when too rough, the colours of the metals rubbed against it cannot be nearly or regularly distinguished; and if it is too smooth, the metals are but faintly, and too slowly abraded or scraped by it, especially when gold is tried. It must also be neither too hard nor too soft. Tripoli, coal-dust, and tin-ashes, are used in rubbing off the thin metalline crusts, and in a short time the stone when very hard is apt to acquire too smooth a surface; and when it is too soft it easily wears, throws off a dust, and contracts furrows.

The stone is made in the form of a quadrangular prism, about an inch thick, and two or three inches long.

If the proper stone cannot be procured, moderately smooth pieces of flint are the best substitutes; and the more they approach in colour to the other the better.

The method of using your needles and the stone is this: the piece of gold to be examined, being well cleaned in some convenient part of its surface, a stroke is to be made with it on the stone; and another, close by it, with such of the touch-needles as appear to come the nearest to it in colour. If the colour of both, upon the stone, is exactly the same, it is judged that the given mass is of the same fineness with the needle: if different, another and another needle must be tried, till such a one is found as exactly corresponds to it. To do this readily, practice only can teach.

In making the strokes, both the given piece, and the needle of comparison, are to be rubbed several times backwards and forwards upon the stone, that the marks may be strong and full, not less than a quarter of an inch long, and about a tenth or an eighth of an inch broad: both marks are to be wetted before the examination of them, their colours being thus rendered more distinct. A stroke, which has been drawn some days, is never to be compared with a fresh one, as the colour may have suffered an alteration from the air; the fine atoms, left upon the touch-stone, being much more susceptible of such alterations than the metal in the mass. If the piece is supposed to be superficially heightened by art in its colour, that part of it, which the stroke is designed to be made with, should be previously rubbed on another part of the stone, or rather on a rougher kind of stone than the common touch-stones, that a fresh surface of the metal may be exposed. If it is suspected to be gilt with a thick coat of metal finer than the internal part, it should be raised with a graver, to some depth, that the exterior coat may be broken through: cutting the piece in two is a less certain way of discovering this abuse; the outer coat being frequently drawn along by the sheers or chisel, so as to cover the divided parts.

The metallic compositions, made to resemble gold in colour, are readily known by means of a drop or two of aqua fortis, which has no effect upon gold, but dissolves or discharges the marks made by all its known imitations.

If gold is debased by an admixture of any considerable quantity of these compositions, aqua fortis will, in this case, also discharge so much of the mark as was made by the base metal, and leave only that of the gold, which will now appear discontinued or in specks. Silver and copper are in like manner eaten out from gold on the touch-stone, and hence some judgment may thus be formed of the fineness of the metal from the proportion of the remaining gold to the vacancies.

Ercker observes, that hard gold appears on the touch-stone less fine than it really is. It may be presumed that this difference does not proceed from the simple hardness; but from the hardness being occasioned by an admixture of such metallic bodies, as debase the colour in a greater degree than an equal quantity of the common alloy. Silver and copper are the only metals usually found mixed with gold, whether in bullion or in coins; and the only ones, whose quantity is attempted to be judged of by this method of trial.

The Chinese are said to be extremely expert in the use of the touch-stone, so as to distinguish by it so small a difference in the fineness as half a touch, or a two hundredth part of the mixt. The touch-stone, says Dr. Lewis, is the only test by which they regulate the sale of their gold to the European merchants; and in those countries it is subject to fewer difficulties than among us, on account of the uniformity of the alloy, where there is almost always silver; the least appearance of copper being used in the alloy gives a suspicion of fraud. As an assay of the gold is rarely permitted in that commerce, it behoves the European trader to be well prac-

tised in this way of examination: by carefully attending to the above directions, and by accustoming himself to compare the colours of a good set of touch-needles, it is presumed he will be able to avoid being imposed on, either in the touch itself, or by the abuses said to be sometimes committed, of covering the bar or ingot with a thick coat of finer metal than the interior part, or of including masses of base metal within it. A set of needles may be prepared, for this use, with silver alloy, in the series of the Chinese touches; or the needles of the European account may be easily accommodated to the Chinese, by means of a table formed for that purpose on the principles already explained. It may be observed, that the gold shoes of China have a depression in the middle, from the shrinking of the metal in its cooling, with a number of circular rings, like those on the balls of the fingers, but larger: Dr. Lewis says, that when any other metallic mass is included within, the fraud is discoverable at sight, by the middle being elevated instead of depressed, and the sides being uneven and knobby; but that the same kind of fraud is sometimes practised in the gold bars, where it is not discoverable by any external mark. See Cramer's Art of Assaying, p. 116, &c. Lewis's Com. of Arts, p. 122, &c. See also ASSAYING.

TOUCH-STONE, a black, smooth, glossy stone, used to try metals upon.

The ancients called it *lapis Lydius*, the Lydian stone, from Lydia, a country of Asia Minor, whence it was brought. See **TOUCH-NEEDLES**.

TOUCH-STONE, Irish, called *basanus Hibernicus* by Molyneux and some others, is a black stone, found in the county of Antrim, in that kingdom, in angular columns, forming that amazing pile called by the vulgar the Giant's Causeway. See **BASALTES** and **MARMARO-PROSERA**.

The basaltes being an excellent touch-stone, authors have confounded it with the touch-stone of the ancient Greeks, called by them *basanos*, *basanites*, *lapis Lydius* or *Heraclius*, &c. which were, probably, only black jaspers; and they have derived *basanos* and *basaltes* from the same Greek word, *βασανίζω*, to try or prove: but the basaltes was not known to the Greeks, and Pliny expressly tells us, that it is an Ethiopic or Egyptian name: whence it is probable that basaltes is a corruption of the Hebrew word *ברזל*, *barzel*, which signifies iron, a very proper name for a stone, which they describe to be of the colour and hardness of iron. Many authors affirm, that the touch-stone is a kind of black marble, or that most black marbles may serve for touch-stones: black marbles, it is true, take the colours of metals, and may be used as touch-stones in the ancient manner mentioned by Theophrastus and Pliny; *i. e.* by touching them with needles of different alloys; which manner is still practised in Germany and other countries: but in the manner of trying them with aqua fortis, it is absurd to use any calcareous substances, as the acid will immediately destroy the substance of the stone, and consequently affect and somewhat deface the strokes of the metals. For a good touch-stone, choice should be made of a black stone of the genus of *marmaro-prospera*, or of the jasper genus, on which the aqua fortis will only dissolve the copper, silver, &c. without touching the gold, or affecting the stone. The first genus should be preferred, as a nice touch-stone should only have a certain degree of polish, and should be of a compact fine texture, and neither too hard nor too soft; whereas the jaspers are too hard, and do not shew with sufficient exactness the different degrees of alloy; for the touches of the metal give them a higher lustre than their natural polish, and that lustre injures the distinctness of the strokes made upon it. Costa's Hist. Foss. p. 264. See **TOUCH-NEEDLES**.

TOUCH-Wood, in *Botany*, a name given to spunk or agaric of the oak, on account of its readily taking fire.

TOU-CHAN, in *Geography*, a city of China, of the second rank, in Koei-tcheou; 987 miles S.S.W. of Peking. N. lat. $25^{\circ} 46'$. E. long. $107^{\circ} 3'$.—Also, a lake of China, in Chan-tong, 52 miles in circumference; 15 miles S. of Tci-ngan.

TOU-CHANG-TAO, a small island near the coast of China. N. lat. $36^{\circ} 55'$. E. long. 121° .

TOUCHE, CLAUDE GUYMOND DE LA, in *Biography*. a French poet, was born in 1719, and entered among the Jesuits; but a comedy, acted in 1748, occasioned his alienation from their fraternity. The slight of this body was repented by him in a poetical epistle published in 1766, and entitled "Les Soupçons du Cloître, ou le Triomphe du Fanatisme," in which he has exhibited the Jesuits in the blackest colours. Upon abandoning their society, he attached himself to the theatre; and in 1757 introduced on the stage his tragedy "Iphigénie en Tauride," the subject of which he borrowed from Euripides. This play, though chargeable with many defects, was well received, and has retained its reputation. Whilst he was preparing another tragedy on the story of Regulus, he fell a sacrifice to a pulmonary disorder in 1760. Among his MSS. was found his "Épître à l'Amitié," which has been read with pleasure. *Nouv. Dict. Hist.*

TOUCHE, in *Geography*, a town of France, in the department of the Saône and Loire; 7 miles N.W. of Châlons sur Saône.

TOUCHING is sometimes used for the sense of feeling. This sense may be injured by any thing that obstructs the nervous influence, or prevents its being regularly conveyed to the organs of touching, as pressure, extreme cold, &c. also by too great a degree of sensibility, when the nerve is not sufficiently covered with the scarf-skin, or where there is too great tension, or it is too delicate. Whatever disorders the functions of the brain and nerves, hurts the sense of touching; and as it proceeds from the same general causes, as palsy and apoplexy, it requires nearly the same method of treatment. In a defect of touching, which arises from an obstruction of the cutaneous nerves, the patient must be first purged, and then such medicines as excite the action of the nerves or stimulate the system may be used; for which purpose spirit of hartshorn, sal volatile oleosum, horse-radish, &c. may be taken inwardly; and the disordered parts often rubbed with fresh nettles or spirit of sal ammoniac.

Blistering plasters and sinapisms applied to the parts will likewise be of use, as also warm bathing, especially in the natural hot baths.

TOUCHING, in *Geometry*. See TANGENT.

TOUCHING, in *Sea Language*, denotes the state of a ship's sails when they first begin to shiver, with their edges in the direction of the wind. It is either occasioned by a sudden alteration of the ship's course, or by a change of the wind, in which it blows more obliquely along the surface of the sails, instead of falling into their cavities from behind, according to its usual direction. *Falconer*. See FULL-AND-BY.

TOUCHING-At, denotes the circumstance of stopping, or anchoring occasionally, at some intermediate port, in the course of a voyage.

TOUCHIROA, in *Botany*, formed by Aublet, out of the Caribbean appellation *Moutouchiraou*, which belongs to an aromatic tree of Guiana. See CRUDIA.

TOUCQUES, in *Geography*, a sea-port town of France,

in the department of the Calvados, taken by the English in 1427; 6 miles S.W. of Honfleur.

TOUCQUES, *La*, a river of France, which runs into the sea, about 8 miles N. from the town of Tocques.

TOUCY, a town of France, in the department of the Yonne; 12 miles W.S.W. of Auxerre.

TOUDARGA, a town of Asiatic Turkey, in Natolia; 26 miles W.S.W. of Boli.

TOUDSONG, a town of Thibet; 92 miles S.S.W. of Lassa. N. lat. $29^{\circ} 6'$. E. long. $90^{\circ} 42'$.

TOUERY, a town of Hindoostan, in the circar of Nagore; 40 miles S.W. of Nagore.

TOVET, in *Rural Economy*, a term used provincially in some districts to signify a measure of half a bushel. It is sometimes written *tofet* in books on agriculture and rural economy.

TOU-FANS, in *Geography*. See SI-FANS.

TOUGITO-HOTOC, a town of Chinese Tartary. N. lat. $44^{\circ} 48'$. E. long. $116^{\circ} 54'$.

TOUING, a town of Croatia; 24 miles S.S.W. of Carlsbad.

TOUINTCHOSE, a Tartarian standard of Chinese Tartary. N. lat. $41^{\circ} 40'$. E. long. $111^{\circ} 14'$.

TOUJOO, a small island near the W. coast of Sumatra. S. lat. $0^{\circ} 38'$. E. long. $99^{\circ} 25'$.

TOU-YUEN, a town of Corea; 50 miles N.E. of King-ki-tao.

TOU-KIE, a city of China, of the second rank, in Quang-si; 1137 miles S.S.W. of Peking. N. lat. $23^{\circ} 10'$. E. long. $106^{\circ} 49'$.

TOUL, a town of France, and principal place of a district, in the department of the Meurthe, on the Moselle, over which is a stone bridge, and regularly fortified. Before the revolution it was the principal town of a government, and the see of a bishop. It was formerly imperial, and the bishop a prince of the empire, and suffragan of Treves. The Toulais, with the city of Toul, and the two bishoprics of Metz and Verdun, in the year 1552, put themselves under the protection of France; and, in 1648, became a part of that country; 12 miles W. of Nancy. N. lat. $48^{\circ} 41'$. E. long. $5^{\circ} 59'$.

TOULA, a river of Tartary, in that part inhabited by the Kalkas, and called *Kalka-pira*, which takes its course from E. to W., and is often broader, deeper, and more rapid than the Kerlon, another river of the same country, which runs from W. to E., and discharges itself into the lake Koulon-nor, the waters of which again flow into the river Saghalien by that of Ergone; and the banks of which afford the best pastures in Tartary. The banks of the Toula are covered with woods and beautiful meadows. The mountains which hang over it on the northern side are covered with forests of aged firs, and present to the view a kind of amphitheatre. This river, after having received the waters of the Selingué, loses itself in the lake of Pai-cal, which is the largest lake in Tartary, and lies in the territories of the Muscovites. The Russians are also masters of the lower part of the Selingué, where they have built a small city called the Selingekoi.

TOULICIA, in *Botany*, from the Caribbean name of the same plant *Toulici*. See PONEA.

TOULOMBA, in *Geography*, a town and fortress of Hindoostan, in the subah of Moultan, on the Rauvee. This town was taken and plundered by Timur Bec; 50 miles N.E. of Moultan. N. lat. $30^{\circ} 59'$. E. long. $72^{\circ} 25'$.

TOULON, a city and seaport of France, and capital of the département of the Var, strongly fortified. Before the revolution, it was the see of a bishop, and, besides the cathedral

cathedral and other parish-churches, contained nine convents, a seminary, and a college. The old and new harbour lie contiguous, and, by means of a canal, communicate with one another, both having an outlet into the spacious outer harbour, which is naturally almost of a circular figure, and very large, being surrounded with hills. The entrance on both sides is defended by a fort, with strong batteries. The new harbour, which is a work of Louis XIV., is well defended by batteries, and round it stands the arsenal, where every man-of-war has its own particular storehouse, but the guns and cordage are laid up separate. In it are spacious working houses for blacksmiths, joiners, carpenters, locksmiths, carvers, &c. The rope-house is built wholly of freestone, being 320 toises in length, with three arched walks, in which as many parties of rope-makers may work at the same time. The general magazine here, which supplies whatever may be wanting in the particular storehouses for single ships, contains an immense quantity of all kinds of stores, disposed in the greatest order and convenience. In the month of August, 1793, the people of Toulon, and the French vice-admiral Trugoff, entered into a negociation with the English admiral lord Hood, who was then cruising in the Mediterranean, and he took possession both of the town and of the shipping, in the name of Louis XVII., and under the express and positive stipulation, that he was to assist in restoring the constitution of 1789. Great expectations were formed on this occasion; and general O'Hara was sent with troops from Gibraltar, being appointed, under the king of England's commission, governor and commander-in-chief: the republicans were not negligent in attempting to recover a place of so much consequence, and soon succeeded. General O'Hara was wounded, and taken prisoner, and the city and port abandoned. On the 19th of December, the town was bombarded from noon till ten o'clock in the evening; when the allies, and part of the inhabitants, having set fire to the town and shipping, precipitated their flight. Two chaloupes, filled with fugitives, were sunk to the bottom by the batteries. The precipitation with which the evacuation was effected, caused a great part of the ships and property to fall into the hands of the French, and was attended with the most melancholy consequences to the wretched inhabitants. Of thirty-one ships of the line, which the English found at Toulon, thirteen were left behind, nine were burned at Toulon, and one at Leghorn, and four lord Hood had previously sent away to the French ports, Brest and Rochefort, with 5000 republican seamen, whom he was afraid to trust; $7\frac{1}{2}$ posts E. of Marfeilles. N. lat. $43^{\circ} 7'$. E. long. 6° .

TOULON, a township of New York, near lake Ontario.

TOULON *en Charollois*, a town of France, in the department of the Saône and Loire, near the Arroux river; 16 miles N.W. of Charolles. N. lat. $46^{\circ} 41'$. E. long. $4^{\circ} 13'$.

TOULOUSE, a town of France, and capital of the department of the Upper Garonne, on the Garonne. In the sixth century, it was the capital of the kingdom of the Goths. Before the revolution, it was the capital of Languedoc, see of an archbishop, and second parliament of France: it is recognized for size next to Paris; the streets are mostly broad, and the houses are built of brick. The number of inhabitants, by a late numeration, is said to be 50,171. Though so finely situated, its trade is inconsiderable, the principal article being Spanish wool. The university here was founded in 1228. The town-house is a spacious building, and called the capitulum, whence the aldermen are termed capitouls; and amongst other curiosities preserved here, are fifteen large parchment folios, delicately written and illuminated,

being annals of the city, commencing from the year 1288, and annually continued by the eldest capitoul. These were drawn up originally in Latin, but under Francis I. were altered to French. The three first volumes are principally filled with the portraits and names of the capitouls, and the following contain all the memorable events and transactions throughout the whole kingdom. Here is also an academy of the sciences and liberal arts. At half an hour's distance below the city, the celebrated canal of Languedoc joins the Garonne, which here becomes navigable. In this city are made carpets, but of little value; together with some slight silk and woollen stuffs; 34 posts S.E. of Bourdeaux. N. lat. $43^{\circ} 35'$. E. long. $1^{\circ} 32'$.

TOUM, a town of Syria; 6 miles N.E. of Damascus.

TOUMANDI, a town of Asiatic Turkey, in Natolia; 32 miles W. of Kiutaja.

TOUMANDI *Daghi*, a mountain of Natolia, part of the ancient Olympus; 20 miles S.E. of Burfa.

TOUMANUGGREE, a town of Hindooftan, in the circar of Kitchwaja; 12 miles S. of Budawar.

TOUMEN, a town of Chinese Tartary; 608 miles E.N.E. of Peking. N. lat. $42^{\circ} 27'$. E. long. $128^{\circ} 51'$.—Also, a river of Corea, which rises lat. $42^{\circ} 8'$, long. $127^{\circ} 34'$, and runs into the sea of Japan, N. lat. $42^{\circ} 30'$. E. long. $130^{\circ} 34'$.

TOUMET, a Tartarian standard of Chinese Tartary. N. lat. $41^{\circ} 7'$. E. long. $110^{\circ} 49'$.

TOUN, a town of Persia, in the province of Khorassan; 90 miles N.W. of Herat.

TOUNA, or *Sheik Abdallah*, a small island of Egypt, in lake Menzaleh, on which are the ruins of an ancient town; 3 miles W. of Tennis.

TOUNATEA, in *Botany*, somewhat arbitrarily constructed by Aublet, out of the Guiana name *Tounou*. See SWARTZIA.

TOUNSE, in *Geography*, a river of Hindooftan, which rises about 20 miles S.W. of Mahur, in the circar of Gurrach, and runs into the Ganges, about 20 miles below Allahabad.

TOVOMITA, in *Botany*, an untenable name, altered by Aublet, from the Caribbean *Votomite*. Jussieu has, we presume, according to his declared intention, afforded it merely a temporary adoption, till the genus is fully understood. With the same view we here admit this name, for the present only.—Juss. Gen. 256. Aubl. Guian. 956. Poiret in Lamarck's Dict. v. 7. 717.—Class and order, *Polyandria Monogynia*. Nat. Ord. *Guttifera*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of two roundish, concave leaves. *Cor.* Petals four, rather longer, ovate, acute, concave, equal, inserted into the receptacle of the flower. *Stam.* Filaments numerous, twenty to twenty-five, inserted into the same receptacle, erect, linear, shorter than the corolla; anthers of two distinct ovate cells. *Pist.* Germen superior, sessile, ovate, with four furrows; style none; stigma cruciform, in four depressed, rounded lobes. *Fruit* unknown.

Eff. Ch. Petals four. Calyx of two leaves. Stigma sessile, four-lobed.

1. *T. guianensis*. Aubl. t. 364.—The only species, found in the inland forests of Guiana, flowering in September. This is a tree, whose trunk rises to the height of ten feet, and is a foot in diameter, with a branching head. The wood is compact and hard. *Bark* reddish, exuding drops of a yellow transparent resin. *Leaves* on the young branches only, opposite, stalked, smooth, three inches long, elliptical, pointed, entire; green above; whitish, with red parallel veins, beneath. *Flowers* in little terminal three-forked panicles,

nicles, with a pair of small scales, or *bractes*, at the base of each partial stalk. They are small, with a green *corolla*, as well as *calyx*. Nothing having been observed by Aublet respecting the *fruit*, the character of the genus remains incomplete. Of its natural order there can be no doubt, from its near affinity to *Clusia*, *Garcinia*, &c.

TOUP, JONATHAN, in *Biography*, a learned critic, was born at St. Ives, in Cornwall, in the year 1713, and entered at Exeter college, Oxford, where he took a bachelor's degree. After being presented to the rectory of St. Martin, Cornwall, he took the degree of M.A. at Cambridge, in 1756. His "Emendationes in Suidam" introduced him to the learned world: it was published successively in three parts, the first in 1760, the second in 1764, and the third in 1766. The learning of this writer recommended him to the notice and patronage of bishop Warburton, whose positive and contemptuous manner he too much resembles; and for which he received merited castigation. In 1769 he published "Epistola Critica ad Virum celeberrimum Gul. Episc. Glocestr." which contains remarks on Greek writers. Warton's edition of Theocritus, which appeared in 1770, was accompanied with valuable corrections and annotations by Toup; and in 1772 he published, in a separate work, "Curæ posteriores, five Appendicula Notarum atque Emendationum in Theocritum, Oxonii nuperime publicatum," 4to. His treatment of Reiske, on account of his edition of Theocritus, drew upon him the very severe animadversion of that learned writer. By the recommendation of Warburton to Keppel, bishop of Exeter, Mr. Toup obtained a prebend in the church of Exeter, and the vicarage of St. Martin. In 1775, he printed "Appendicula Notarum in Suidam;" and in 1778, his "Longini omnia quæ extant; Gr. et Lat., &c." This latter work was well received, and a second edition was printed in Svo.

Notwithstanding the asperity which Mr. Toup manifested as a critic, and which is too common among learned men of this description, he is said in private life to have been kind and affectionate, and singularly humane towards the brutal creation. As a theologian, he drew his sentiments from the Scriptures; and he was respected as a liberal and tolerant divine. He was never married, but left considerable property among the three daughters of a half-sister, who lived with him. He died in January 1785, in his 72d year. Nicholl's Anecd. Gen. Biog.

TOUPOUR, in *Geography*, a lake of Thibet, 27 miles in circumference; 10 miles N. of Souc.

TOUR, TURN, a French term, often used among English writers for a journey. Thus we say the tour of Paris, or Rome, &c.

TOUR of Hair, a tress or border of hair, going round the head, which, mingled dexterously with the natural hair, lengthens and thickens it.

These tours are for men. The women likewise use tours, and false hair, either to hide their age, or to supply the thinness of their natural hair on the forehead and temples.

The form is different according to the mode, sometimes raised and curled, sometimes straight, and laid flat along the forehead.

TOUR, in *Geography*, a town of France, in the department of the Calvados; 3 miles W.N.W. of Bayeux.

TOUR, La, a town of France, in the department of the Puy-de-Dôme; 12 miles W. of Besse.

TOUR la Blanch, a town of France, in the department of the Dordogne; 9 miles N. of Riberc.

TOUR de Cordovan, a fort on the coast of France, in the department of the Gironde, at the mouth of the Garonne,

whose summit is 300 feet above the level of the sea. N. lat. 44° 35'. W. long. 1° 4'.

TOUR de France, La, a town of France, in the department of the Eastern Pyrenees; 12 miles W.N.W. of Perpignan.

TOUR d'Aigues, La, a town of France, in the department of the Mouths of the Rhône; 12 miles N.N.E. of Apt.

TOUR Landry, La, a town of France, in the department of the Mayne and Loire; 6 miles W. of Vihiers.

TOUR de Peil, La, a town of Switzerland, in the Pays de Vaud, on the lake of Geneva; 1 mile S. of Vevay.

TOUR du Pin, La, a town of France, and principal place of a district, in the department of the Isère, situated on a small river of the same name, which runs into the Rhône; 27 miles S.E. of Lyons. N. lat. 45° 34'. E. long. 5° 32'.

TOUR de Rojel, a cape of the island of Jersey; 5 miles N.N.E. of St. Helier.

TOUR de Rouffillon, La, a town of France, in the department of the Eastern Pyrenees, on the Tet; situated on a spot where once stood a city called Ruscino, which was destroyed in the ninth century; 3 miles E. of Perpignan.

TOUR de Treme, a town of Switzerland, in the canton of Friburg; 2 miles N. of Gruyeres.

TOUR la Ville, a town of France, in the department of the Channel, celebrated for its manufacture of glass: almost joining to Cherbourg.

TOURAINÉ, before the revolution a province of France, bounded on the E. by Orleannois, on the S. by Berry and Poitou, on the W. by Anjou, and on the N. by Maine; about 60 miles in length, and 54 in breadth: the river Loire runs through it, and divides it into Higher and Lower Touraine. Tours is the capital. This province had formerly counts of its own. In the year 1044, it was taken by the counts of Anjou; in 1202, united with the crown; and in 1356, raised to a dukedom and peerage. It has frequently been granted to the royal children; and after the death of Francis, duke of Alençon, brother to Henry III., was again united to the crown, since which it has never been alienated. It was governed by laws of its own, but with a right of appeal to the parliament of Paris.

TOURAK, a river of Turkish Armenia, which runs into the Batoun; 20 miles E.N.E. of Ispira.

TOURAN, Kingdoms of, an appellation given to the vast regions of Grand Tartary, extending from Russia to China, and from Siberia to the Caspian sea.

TOURACO, in *Ornithology*. See CUCULUS.

TOURANCOURCHY, in *Geography*, a town of Hindoostan, in the Carnatic; 35 miles S.S.W. of Trichinopoly.

TOURCALL, a town of Hindoostan, in Bahar; 9 miles S. of Arrah.

TOURCHENGADA, a town of Hindoostan, in Baramaul; 18 miles N.N.W. of Namecul.

TOURETTE, a town of France, in the department of the Var; 3 miles N.W. of St. Paul.

TOURFAN HORTU, a town of Little Bucharra, and capital of a province; 180 miles W.N.W. of Hami. N. lat. 43° 33'. E. long. 107° 17'.

TOURINA, CAPE, a cape of Spain, on the W. coast of Galicia. N. lat. 43° 5'. W. long. 9° 20'.

TOURMALINE, in *Mineralogy*, a stone sometimes used as a gem by jewellers, and particularly remarkable for exhibiting electricity by heat or friction. It almost always occurs in long prisms which are deeply striated. The common form of the crystal is a six-sided prism, terminated by three principal planes, which on one extremity are set on the sides of the prism, and on the other on the edges.

TOURMALINE.

The edges of the prism are frequently truncated, and thus form prisms with nine or twelve sides. The primitive form of the crystal, according to Häuy, is an obtuse rhomb. The fracture of tourmaline is perfectly conchoidal; the internal lustre is vitreous. It is harder than hornblende, but less hard than quartz: it scratches glass, and is brittle. The principal colours are dark green and brown, but it occurs also red and blue, of various shades and degrees of intensity. It is sometimes nearly opaque, but more frequently translucent or transparent. The crystals of tourmaline possess the peculiar property of being transparent when the light passes perpendicular to the axis of the prism, and opaque when it passes in the direction of the axis. It is always opaque when the height of the prism is less than its breadth. The principal form of the crystal has been before stated; but the most common of the fourteen or fifteen different varieties, is the prism with nine sides terminated by six planes at one end, and by three at the other; or by seven planes at one end, and three at the other. The end which has the smallest number of planes exhibits negative electricity, and that which has the greatest number, positive. This difference in the form of the electric poles is a general law of all crystallized minerals that are electric by heat. Before the blowpipe, the tourmaline melts into a greyish-white porous enamel, but the red Siberian tourmaline is infusible. The constituent parts of tourmaline are given by Vauquelin and Klaproth as under.

According to Vauquelin:

	Green Tourmaline from Brazil.	Violet Tourmaline from Siberia.
Silex - -	40	42
Alumine - -	39	40
Soda - - -	-	10
Lime - - -	3.84	-
Oxyd of iron -	12.5	-
Oxyd of manganese	2	7

According to Klaproth:

	Red Tourmaline from Rosene.	Black Tourmaline.
Silex - - -	43.5	35
Alumine - -	42.25	40
Soda - - -	9	-
Oxyd of manganese	1.5	-
Oxyd of iron -	-	22
Lime - - -	0.1	-
Water - - -	1.25	-

The tourmaline is a name given, as Dr. Watson has evinced, to the *lyncurium* of the ancients. See *LYNCURIUS Lapis*.

This stone is very common in several parts of the East Indies, particularly in the island of Ceylon, where it is called *tourmal*. Pliny mentions a red or purple stone which attracted light bodies. This is supposed to be the tourmaline. The first account of this stone, that occurs of late years, is in the History of the Royal Academy of Sciences at Paris for 1717, where we are told that M. Lemery exhibited an uncommon stone brought from Ceylon, which attracted and repelled small light bodies. Linnæus, in his *Flora Zeylanica*, calls this stone *lapis electricus*, and takes notice of Lemery's experiments. M. Æpinus, having been informed of the attractive power of the tourmaline by Mr. Lechman, and furnished by him with two stones, made many experiments, the result of which was published in the History of the Academy of Sciences and Belles Lettres at Berlin, for 1756. The substance of his memoir is as follows: the tourmaline has always, at the same time, a positive

and a negative electricity; the one of its sides being in one state, and the other in the opposite; and this does not depend on the external form of the stone. These electricities he could excite in the strongest degree by plunging the stone in boiling water.

The proper degree of heat for manifesting the electricity of the tourmaline, is from 100° Fahrenheit to 212°. If we raise the temperature above 212°, it loses its electricity, but regains it in cooling; but if we continue to raise the temperature, we arrive at a point in which the mineral again becomes electric, but has its poles reversed to what they were before. Häuy observed, that we may also change the position of the poles, by heating it unequally in the focus of a lens or mirror. If an electrified tourmaline be broken, the fragments immediately present electric poles, situated in the same direction as that of the large crystal.

If one side of the tourmaline be heated more than the other (as if it had lain upon a hot cake of metal), each of the sides acquires an electricity opposite to that which is natural to it; but if left to itself, it will return to its natural state.

If one of the sides of the tourmaline be rubbed, while the other is in contact with some conductor communicating with the ground; the rubbed side is always positive, and the other negative. If neither side be in contact with a conductor, both become positive. If, in the former of these cases, the tourmaline be rubbed so as to acquire a sensible heat, and the side which is naturally positive be made negative, it will, upon standing to cool, return to its natural state; but if it have acquired no sensible heat, it will not return to its natural state while any kind of electricity remains. If it be heated, even when it is rubbed and insulated (in which case both sides become positive), it will still return to its natural state upon cooling.

The Duc de Noya, who, in 1758, procured two of these stones in Holland, and made a number of experiments with them, an account of which he published, mentions the experiments of M. Æpinus, but does not admit of a *plus* and *minus* electricity belonging to the tourmaline when heated. On the contrary, he says that both the sides are electrified *plus*, but one of them more than the other. The tourmaline was introduced to the notice of the English philosophers by Dr. Heberden, who procured one (and, indeed, the only one known in England at that time) for Mr. Wilson; whose experiments confirmed the opinion of its positive and negative power, advanced by M. Æpinus. Dr. Franklin, likewise, in a letter to Dr. Heberden, in 1759, informs him of experiments on one of these stones, sufficient for establishing the same theory. About this time Dr. Heberden procured some of these stones from Holland, and put them into the hands of Mr. Wilson and Mr. Canton, gentlemen particularly conversant with the subject of electricity, and capable of using them with the greatest advantage to this branch of science. Mr. Wilson's experiments and observations are very numerous; the result of which was, in the main, the same with that of M. Æpinus, establishing the opinion of the two different powers of this stone; but he differs from him in asserting, that when the sides of the tourmaline are unequally heated, it exhibits that species of electricity which is natural to the hotter side; *i. e.* the tourmaline is *plus* on both sides, when the *plus* side is the hottest; and *minus* on both sides, when the *minus* side is the hottest. Both these gentlemen repeated their experiments, and each retained his own opinion; but Mr. Wilson's apparatus was better calculated for the purpose of accurate experiments than that of M. Æpinus, and he used a greater variety of methods

methods for communicating heat to his tourmaline. Mr. Wilfon imagined that this stone, as well as glass, was permeable to the electric fluid, and that the resistance to its entering the substance of it was less on what he calls the negative than on the positive side; for rubbing the positive side of the stone strongly, he found both sides electrified *plus*; by rubbing the negative side in the same manner, both sides were electrified *plus*, more strongly than before. Several experiments led Mr. Wilfon to conclude, that the tourmaline resisted the exit and entrance of the electric fluid considerably less than glass, or even than amber; and he infers, upon the whole, that this stone differs in nothing from other electric bodies but in acquiring electricity by heat. Mr. Wilfon also conceived, that the tourmaline suffered the electric fluid to pass through it only in one direction, bearing in this respect some analogy to the load-stone, and having as it were two electric poles, which are not easily destroyed or altered. He also apprehended, that the electric fluid, flowing through all the stones and gems which resemble the tourmaline in their electrical properties, moves in that direction in which the grain happens to lie; the resistance, as he supposes, which the fluid meets with, being less in that direction than in any other.

Notwithstanding the attention given to this subject by M. *Æpinus* and Mr. Wilfon, the most important discovery relating to the electricity of the tourmaline was reserved for Mr. Canton, who, in a paper read before the Royal Society in December 1759, observes, that the tourmaline emits and absorbs the electric fluid only by the increase or diminution of its heat; for if the tourmaline, he says, be placed on a plain piece of heated glass or metal, so that each side of it, by being perpendicular to the surface of the heated body, may be equally heated; it will while heating have the electricity of one of its sides positive, and that of the other negative. This will likewise be the case, when it is taken out of boiling water, and suffered to cool; but the side which was positive while it was heating, will be negative while it is cooling; and the side which was negative will be positive. In the *Gentleman's Magazine* for September 1759, (vol. xxix. p. 424.) he published the result of some experiments which he had made on a tourmaline procured from Holland, in a series of propositions, comprising the principal part of what is known on this subject. They are as follow: 1. When the tourmaline is not electrical or attractive, heating it, without friction, will make it so; and the electricity of one side of it (distinguished by A) will be positive, and that of the other side (B) will be negative. 2. The tourmaline not being electrical, will become so by cooling; but with this difference, that the side A will be negative, and the side B positive. 3. If the tourmaline, in a non-electrical state, be heated, and suffered to cool again, without either of its sides being touched; A will be positive and B negative, during the whole time of the increase and decrease of its heat. 4. Either side of the tourmaline will be positive by friction, and both may be so made at the same time. He suggests that, if air be endued with similar properties, or be capable of becoming electrical by the increase or diminution of its heat (as is probable by attending to its state before and after a thunder-storm), thunder-clouds, both positive and negative, as well as thunder-gusts, may be easily accounted for. Mr. Canton, with the tourmaline which he received from Dr. Heberden, made other new and curious experiments, first published by Dr. Priestley. He put one of them, which was of the common colour, into the flame from a blowpipe, and burnt it white; when he found that its electrical property was entirely destroyed. The electricity of another was only in part destroyed by fire.

He joined two others, made soft by fire, without destroying their electrical property. The virtue of another was improved by being melted at one end; and he found (contrary to what Mr. Wilfon had observed of another tourmaline, heated in the same manner) that one tourmaline retained its electrical property, after it had been frequently made red-hot, and in that state put into cold water. But the most curious experiment was made on a large irregular tourmaline, about half an inch long, which he cut into three pieces; taking one part from the positive and another from the negative end. Trying these pieces separately, he found the outer side of the piece cut from the end that was negative when cooling, was likewise negative when cooling; and that the outer side of that piece which was cut from the end that was positive when cooling, was likewise positive when cooling; the opposite sides of both pieces being, according to the general law of the electricity of the tourmaline, in a contrary state. The middle part of the same stone was affected as it had been when it was entire; the positive end remaining positive, and the negative end negative.

Dr. Priestley, about the close of the year 1766, directed his attention to the tourmaline: being in possession of Dr. Heberden's large polished one, which weighed one hundred and twenty grains, of an oval form, plane on one side and convex on the other, and which had passed through the hands of Mr. Wilfon and Mr. Canton, he pursued his investigation of the properties of this stone in a variety of experiments. Several of them were undertaken with a view of determining, whether the tourmaline collected its electricity from the neighbouring air: he was led to this conjecture from the consideration of Mr. Wilcke's experiments on the production of spontaneous electricity, by melting one substance within another; and his experiments seem to prove that his conjecture was just. He also discovered a method of reversing all the experiments made upon the tourmaline, making that side which is positive in heating or cooling to be negative; and that which is negative to be positive: so that the kind of electricity shall be just what the operator shall direct, by the application of proper substances to the stone. Dr. Priestley not only tried how the tourmaline would be affected by being heated or cooled in contact with various substances, to which only one of its sides was exposed at once, but he also made other experiments, in which the stone was entirely surrounded by them. Having covered the stone to the thickness of about a crown-piece with sealing-wax, he found it to act nearly, if not quite as well, through this coating of wax, as if it had been exposed to the air: hence, if a tourmaline be concealed in a stick of sealing-wax, the wax will seem to have acquired the properties of the tourmaline. See on this article *Phil. Trans.* vol. li. p. 308, &c. p. 394, &c. vol. liii. p. 436, &c. *Franklin's Letters*, &c. p. 376. *Priestley's Electricity*, vol. i. p. 347, &c. vol. ii. p. 308, &c. 8vo. ed.

The tourmaline, according to Mr. Kirwan, is a siliceous earth, imperfectly united with from 1.05 to 1.47 of its weight of argil, from 0.3 to 0.4 of its weight of mild calcareous earth, and from 0.15 to 0.243 of its weight of iron. This stone has been found in Ceylon, Brazil, and the Tyrol: a specimen of each has been examined by Mr. Bergman; that of Ceylon is of a dark-brown or yellowish colour; its specific gravity 3.065 or 3.295: that of Brazil is green, blue, red, or yellow, and its specific gravity 3.07 or 3.18: that of the Tyrol, by reflected light, is of a blackish-brown, but by refracted light, yellowish, or in thin pieces, green; its specific gravity 3.05. In fire, none of them decrepitate: but those of Ceylon

and the vitriol melt *per se* into a black frothy slag. That of Brazil forms only a brittle scoria. Bergman's Ess. by Cullen, vol. ii. p. 120, &c. 1784. Kirwan's Elem. Mineral, p. 131.

The red-coloured tourmaline from Siberia is regarded by some mineralogists as a distinct species; it differs from other tourmalines in being infusible: it has been denominated *rubellite*, (which see.) The indigo-blue variety of tourmaline has been called by Karsten and Dendrada an *indicolite*.

The tourmaline occurs imbedded in gneiss, mica-slate, talcous slate, and talc. It is sometimes found in granite. It is found in rolled pieces in alluvial ground: it was first discovered in the island of Ceylon in the 16th century. It has since been found in various alpine districts of Europe and Asia, in the island of Madagascar, and in North and South America.

The tourmaline may be distinguished from common schorl by its colour; the latter is always black. The fracture in common schorl is small-grained and uneven, that of tourmaline conchoidal. The opacity of common schorl is always greater than that of tourmaline. It differs from common and basaltic hornblende in its structure, that of the latter being distinctly foliated. The following names have been given to different varieties of tourmaline.

Green tourmaline	named	Brazilian emerald
Berlin blue	-	Brazilian sapphires.
Indigo-blue	-	Indicolite.
Honey-yellow	-	Peridot of Ceylon.
Red	-	{ Rubellite, fiberite, and tourmaline apyre.

In the Memoirs of the Royal Academy of Sciences at Berlin for 1780, we have the following directions by Mr. Margraaf, for forming a composition similar to the tourmaline. Take magnesia, or that earth which is the basis of the sal catharticus amarus; mix it with chalk, which has been dissolved in spirit of nitre, and precipitated from thence by a solution of salt of tartar, and then welledulcorated; add to this mixture equal quantities of flint and clay (taking a scruple of each of the four ingredients), and four grains of the precipitate of sublimate of fusible spar, or what is here called the fluor crust, *i. e.* the earth, which is not only sublimed from the fluor or Derbyshire spar, on heating it with oil of vitriol, but may also be precipitated from thence, and from the acid liquor in the receiver, by the addition of a solution of salt of tartar.

To two drachms of the above mixture add five grains of crocus martis, calcined according to the method of Kunckel, during four months, in a glass-house furnace, and the result will be the formation of a vitreous stone, similar to the tourmaline.

TOURMENTINE, in *Geography*, a town of France, in the department of the Maine and Loire; 6 miles N.N.E. of Chollet.

TOURN, in *Lazv*. See TURN.

TOURNAMENT. See TURNAMENT.

TOURNAN, in *Geography*, a town of France, in the department of the Seine and Marne; 13 miles N. of Melun.

TOURNAY, a city of France, in the department of Jemappe, on the Scheld, considered as the most ancient town of Belgic Gaul, being founded 600 years B.C., and anciently the capital of the Nervii. It was lately the capital of a district to which it gave name, and the see of a bishop, erected in the fifth century. This city has often been taken and laid waste in the different wars between the

French, English, and Flemings. By the peace of Aix-la-Chapelle it was ceded to France, and made one of the best fortified towns in Flanders. In 1709, prince Eugene and the duke of Marlborough invested Tournay, and besieged it in form. The town capitulated, being in want of provisions. The citadel held out till the 3d of September, when the garrison surrendered prisoners of war. By the peace of Utrecht, in the year 1713, the States-General remained masters of the military, and the emperor of the civil government. In 1745, after the battle of Fontenoy, it was taken by the French, but ceded to the Austrians, by the peace of Aix-la-Chapelle, in 1748. The late emperor Joseph ordered the fortifications to be destroyed. In 1792 an action took place between the Austrians and the French near Tournay, in which M. Dillon commanded the latter; and being suspected of treachery, was murdered at Lille by the soldiers. On the 10th of May, 1794, the duke of York was assailed near Tournay by the republican forces, in different columns, to the amount of 30,000 men; but they were compelled to retreat. In 1794, on the general evacuation of Flanders by the allies, the French entered Tournay, where they found 20 guns spiked, 10,000 musketballs, a large quantity of gunpowder, several magazines, and 14 barges laden with ammunition; 3 posts E. of Lille. N. lat. 50° 35'. E. long. 3° 25'.

TOURNAY, a town of France, in the department of the Pyrenées; 9 miles S.E. of Tarbes.

TOURNE-COUPÉ-EN-BIGORRE, a town of France, in the department of the Gers; 9 miles S.E. of Lectoure.

TOURNEFORT, JOSEPH PITTON DE, in *Biography*, the great leader of the French school of botany, of whom we have spoken (see RIVINUS) as one of the three most distinguished systematic writers of the age preceding Linnæus, was born of a gentleman's family at Aix, in Provence, June 5th, 1656. His mother, Ademara Fagouç, was of a Parisian family, likewise, in the French sense, noble. Being destined by his parents for the church, he was educated at the Jesuits' college of his native town; but he soon imbibed a taste for natural knowledge, which led him at the age of 21, on the death of his father, to change his original destination, for the profession of physic. This latter indeed was but subservient to a most ardent devotion for botanic science, which ever after made the object and the happiness of his life. Not that his education, in other respects, was neglected; for he proved a good scholar, well grounded in the studies necessary to his medical profession, particularly anatomy and chemistry, and no less versed in historical and critical knowledge; inasmuch that he became an elegant writer and lecturer, as happy in his powers of communicating, as of acquiring, information. His personal character, manners, and address were also such as to prove a general recommendation in his favour through life.

Having soon exhausted the botanical riches of a physic-garden at Aix, and of the circumjacent fields, he extended his researches to the neighbouring Alps, and afterwards to the Pyrenées, where his hardy frame of body, and his observing enterprising mind, rendered easy to him the acquisition of the principal vegetable stores of those romantic and fertile regions. Even the thievish and lawless hordes, which so often infest the borders of kingdoms, and which then abounded in the Pyrenean fastnesses, were scarcely formidable to a traveller, whose only riches were dried plants, and whose ostensible provision for his journey consisted of a little black bread, in which he concealed his money. The intermediate winters between his several visits to Dauphiny, Savoy, Catalonia, the Pyrenées, &c.

were spent in the university of Montpellier, where he first entered in 1679; but he is said to have taken his doctor's degree at Orange. At Montpellier he enjoyed the intimacy of the excellent MAGNOL, of whom we have given an account in his proper place, and to whom the long-established botanical fame of that university is chiefly owing. Yet this able man narrowly escaped being hunted from his seat; as his no less eminent successor, professor Decandolle, has lately, in 1816, been, because he was a Protestant; nor could the appointment of his king protect the latter from that king's worst enemies. Tournefort was in no danger of this kind. He was nevertheless a liberal Catholic, whose subsequent animadversions on the depraved superstitions that occurred in his travels, prove him to have been by no means the slave of any church or priesthood.

The merits of Tournefort, as a botanist, soon became conspicuous at Paris, and, aided by a fortunate introduction, procured him the especial favour of professor Fagon, then chief physician to the queen, (see FAGONIA,) who resigned in his favour the superintendance of the royal garden. In this school he was soon attended by a numerous throng of students, eager to follow him in his herborizations round Paris, and to profit by his practical remarks. We have already, in our account of WILLIAM SHERARD, mentioned that illustrious botanist as among his assiduous pupils. The subject of our memoir now became desirous of further examining the productions of other countries than his own, in their native situations. For this purpose he travelled in 1688 to Spain and Portugal, afterwards into Holland and England; enriching by these means his own collection of dried plants, as well as the living collections of the Parisian garden, and procuring the acquaintance and correspondence of all the most eminent cultivators of the science in which he excelled. Hence the great herbarium of Sherard became supplied with all Tournefort's acquisitions, not only at that time, but after his subsequent voyage to the East, the fruits of which were transmitted to England with more particular care and exactness, than perhaps to any other country, as appears by what are still preserved at Oxford. The studies and labours of Tournefort were facilitated and encouraged by a royal pension, which could certainly not come under the opprobrious denomination of a sinecure. In 1692 he became a member of the Academy of Sciences, and in 1694 published in French his *Elements de Botanique*, making three octavo volumes, dedicated to Louis XIV.—This was but a prelude to his immortal work, the *Institutiones Rei Herbariæ*, of which the first edition, in three quarto volumes, with 476 plates, appeared in 1700. The second, which, with a reference to the "*Elements*," is called the third, was published by Anthony de Jussieu, at Lyons, in 1719, with the *Corollarium*, composed of the author's Oriental discoveries. In 1698, when he was admitted a member of the Medical Faculty at Paris, he published a little duodecimo volume, *Histoire des Plantes qui naissent aux Environs de Paris*, afterwards translated by professor Martyn into English. The reputed virtues of the plants are subjoined to their synonyms and descriptions. The arrangement is alphabetical, the style desultory, nor is this one of the best books of its kind.

We know not at what period Tournefort received the order of St. Michael, but that he was decorated therewith appears by his portrait, published by Dr. Thornton, from an original picture; and the circumstance is alluded to by Haller, *Bibl. Bot.* v. 2, 3.

At the earnest recommendation of his friend Fagon, Tournefort was dispatched, under royal patronage, on a voyage to the Levant, the avowed object of which was to

investigate the plants of ancient writers, as well as to make new discoveries. He was accompanied by a German physician, named Andrew Gundelscheimer, (see GUNDELIA,) and by Claude Aubriet, one of the most exquisite botanical painters that the world ever saw. These travellers left Paris on the 9th of March, 1700, and embarking at Marseilles the 23d of April, anchored nine days afterwards in Crete. The investigation of the Archipelago, Greece, the shores of the Euxine, the countries of Bithynia, Cappadocia, Iberia, Armenia, Georgia, Galatia, Lydia, &c. occupied two years, and our adventurers returned in safety to Marseilles, on the 3d of June, 1702. Tournefort's account of this expedition, written in French, and published soon after his decease, is one of the most agreeable, intelligent, and valuable books of travels extant. De Theis justly resents the censure of the Abbate Sestini, that it is written with the *furia francese*, or rage for every thing French. To the mode of its composition indeed something may be objected. The work is addressed, in the form of letters, to the comte de Pontchartrain, secretary of state, &c. &c.; and as the etiquette of the French court required that so illustrious a personage should of course be endued with all human erudition and knowledge, the writer is obliged to treat him accordingly. We are therefore told nothing without the impertinence of "vous sçavez Monseigneur;" except perhaps the harmless description of a new plant, in writing which the author's love of science made him slip, for a moment, the collar of patronage. The reader indeed soon forgets every thing but the delightful company of the narrator, who takes us along with him to every spot; details with equal intelligence the manners, dresses, and information of the people he visits; or carries us into the profoundest researches of ancient history and geography; tracing the fate of empires, countries, and cities, with the same grace and facility with which he makes us enamoured with a new plant, or exposes the impositions or the ignorance of empirics of the soul or body. This work is illustrated with a very large number of plates, of which the botanical ones are peculiarly excellent. We have a good English edition, and Haller mentions one in Dutch. The curious grotto of Antiparos afforded the author an opportunity of detailing his favourite theory of the vegetation of stones, which is now refuted by more accurate chemical enquiries. (See STONES.) His travels were to have extended into Africa, but the plague raging in Egypt, he returned home directly from Smyrna. On arriving at Paris, it was his design to have turned to advantage the connections and reputation he had acquired, by devoting himself to the practice of physic. But whatever prospect he might formerly have had of success in this line, was defeated by his long absence; nor did the duties of his botanical appointments leave him sufficient leisure to court or to pursue his more lucrative profession. His time however was incessantly occupied; and the preparation of his *Voyage du Levant* for publication, which, considering the books necessary to be consulted, was no light or speedy task, led him too often to encroach on the night, after the superabundant labours of the day. His health became impaired, but this could not relax his ardour. His fate however was precipitated by the accident of a carriage in the street, which crushed his breast, and even threatened him with instant death, from which he was rescued by the exertions of a friend near at hand. He languished for a few months only after this event, and died December 28, 1708, in the fifty-third year of his age. We find no mention of his place of burial, nor of any monument erected to his memory. He was never married. He left his collection of plants to the king, who bestowed a pension of a thousand

thousand livres on his nephew, as an avowed return for this legacy, and a testimony of royal esteem for the deceased. The first volume only of his *Voyage* was printed at the time of its author's death. A second edition appeared at Amsterdam in 1718, to which are prefixed the *elogé* of Tournefort, delivered by Fontenelle to the Academy of Sciences, April 10, 1709; and a more ample composition of the same kind by Lauthier, in a letter to M. Begon, the patron of Plumier, and the friend of Tournefort. This last account, in particular, is written with the affection and respect of a person intimately acquainted with the private character, as well as public merits, of the subject of his narrative. Tournefort is described by him as of the most simple though engaging manners, devoid alike of ostentation and of jealousy, as amiable and exemplary in private life, as he was zealous and exact to fulfil his public duties. Besides his knowledge of Latin and Greek, he was versed in the Italian and Spanish languages. The abundant riches of his mind were readily communicated, with clearness and facility, but without parade, in his conversation as well as in his lectures.

Of the principal works of this eminent man, we have already spoken, and it chiefly remains for us to offer some remarks upon his merits as a systematic botanist. He is said to have left several works in manuscript. One of these was entitled *Topographie Botanique*, containing the precise places of growth of the plants collected by himself in the south of France, as well as in Spain and Portugal, between the years 1676 and 1690. He also composed an universal critical history of plants, in alphabetical order, under the title of *Plantarum Adversaria*, in which the remarks of preceding writers were collected and compared, and his own opinions subjoined. The *Schola Botanica* a catalogue of the Paris garden, we have already mentioned in the biographical article of WILLIAM SHERARD. M. Lauthier removes all doubt respecting the real author of that little volume, by informing us he had seen a copy, with manuscript additions and corrections in Tournefort's own hand, where Sherard was named as the writer of the book.

Tournefort was led, by the philosophy of his time, to search for the medical qualities of plants by a chemical analysis. On this subject he is recorded to have left a volume of manuscripts. That it has never been published is no loss to the world; the work of Geoffroy, undertaken, and laboriously accomplished, with the same view, having proved that no real knowledge is to be acquired by this means, and having therefore set the question for ever at rest. Our readers will find the principles of Tournefort's system of botanical arrangement, under the article CLASSIFICATION. According to this, his *Institutiones Rei Herbariæ* are disposed; and the same system was adopted by several compilers of local *Floras*, or of garden Catalogues, in the early part of the eighteenth century. Even Linnæus's earliest work, entitled *Spolia Botanica, sive Plantæ Rariores per Smolandiam, Scaniam et Roslagiam observatæ et enumeratæ*, the unpublished manuscript of which, dated Upsal, 1729, and illustrated with drawings, is now before us, is classed after Tournefort's method. Nor did any great difficulties attend the application of that method to any tribes of plants with which its author had been conversant. But when the productions of new continents came to be examined, it necessarily fell short; as we have remarked in the biographical article of Dr. ALEXANDER GARDEN. No system of botanical classification, except the artificial sexual one of Linnæus, has ever proved universally applicable to the vegetables of all countries, because no other depends on parts essential to the very being of every plant.

Tournefort's method, however, by its apparent facility,

the elegance of the parts on which it chiefly rested, and its great conformity, in many respects, to the evident order of nature, though in others it as remarkably infringes on that order; became, by all these attractions, very popular. If the more abstruse and philosophical principles of Cæsalpinus, Ray, Hermann, &c. educated sounder theoretical botanists; the method of Tournefort made a great number of practical ones. Yet it is not upon his system of classification that the fame of this great naturalist depends. His discrimination of the genera of plants must alone immortalize his memory. His labours in this department of the science are the principal foundation of all that has been done since his time, and of all that can ever be attempted in future. If he did not, like Linnæus, invent a clear mode of defining each genus by words, no one can deny that he had a most comprehensive, and, for the chief part, distinct idea of the whole subject. He has caused each genus to be figured in so able a manner, that his exquisite plates supply, as much as possible, all verbal deficiencies. Haller indeed complains, not unjustly, that Tournefort's figures are more instructive than his definitions, as exhibiting characters respecting the stem, styles, and other parts of flowers, which, though affording the best generic distinctions, are not taken into his descriptions. Such defects seem to have arisen from his disapprobation, bordering on contempt, of the doctrine of the sexes of plants. He thought the anthers served merely to discharge an excrementitious matter, or to separate impurities from the embryo; though it could not escape him that these two parts were often very distant from each other; and he was therefore not much satisfied with his own hypothesis. Such dissatisfaction would naturally lead him further from dwelling with pleasure on the parts in question, for any purposes of arrangement. He rather delighted to persist in the disgraceful blunder of the old authors, who spoke of the male and female plants of Nettle, Mercury, Hemp, &c. as distinct species, and called the female the male, because of the form of the seed-vessel. It is indeed one of the most remarkable facts in the philosophy of botany, if it may here deserve so honourable an appellation, that when the most ancient writers, as well as their early followers among the moderns, distinguished plants by the names of male and female, they meant to designate them, in general, as different species. Tournefort, from inadvertency surely, followed them in this error, as well as in every other, relating to the species of plants. To that subject he never gave any philosophical attention. The plan of his work was to dispose all the known plants, under genera, whose leading principles of distinction were, with some exceptions, taken from the fructification. This great undertaking he accomplished in a masterly manner, as well as the arrangement of those genera, according to a philosophical system. But he was content to collect under each genus all the reputed species of Caspar Bauhin and others, judging of their generic character only, and not taking into the least consideration their specific differences. Hence double flowers, varieties of colour, flavour, &c. stand as species in Tournefort's *Institutiones*. It is unfair to blame him for imperfections in what he never undertook to amend; but if genuine specific distinctions be, as Linnæus declared, the perfection of botanical science, as they are, in fact, the only permanent and indisputable ground of the whole; we cannot claim for Tournefort the highest rank as a practical botanical philosopher. That he was deeply and learnedly versed in the theory of the science, appears from all parts of his writings, and from none more than his masterly *Isagoge in Rem Herbariam*, where the subject is treated historically as well as systematically. Whatever this illustrious botanist has done, or whatever he has

left undone, he is the father of the French school of botany, and the traces of his principles, either confirmed, improved, or superseeded by the labours of other teachers, are conspicuous in the works of his distinguished followers Vaillant, Lamarck, and the Jussieus. With the feelings of the first of these, as Vaillant could not but be sensible that, in some important points, he had the advantage of his great predecessor, somewhat of conscious superiority, not inconsistent with jealousy, was often intermixed, and too often betrayed. But the others, living at too remote a period from their idol to consider him otherwise than as the glory of their country, have made him ample amends in identifying his fame with that of France itself. The most valuable improvements, not only in classification, but in nomenclature, were, for a long time, not permitted to encroach even on the negligences or errors of Tournefort. The national spirit of the French still renders this illiberal principle sacred. The homage long given to Tournefort is now transferred to Jussieu. The term of *léze-nature* is applied to the Linnæan system, as if his own were entirely a natural one, and as if what the great Swedish botanist modestly called fragments of a natural scheme of arrangement, were not, in fact, the basis of the best part of Jussieu's. The mischief of these exclusive partialities is, that the really valuable improvements in science, which originate in other schools, are too much neglected by the pupils of the Parisian one. In clear discrimination, and concise definition, in lucid order, elegant and classical terminology and nomenclature, in judicious combination, as opposed to fastidious and indiscriminate distinction, they generally, and sometimes very remarkably, fail. If any of them should deign to peruse this criticism, may they disdain it by correcting the imperfections to which it alludes! Rivalship in science or philosophy ought only to lead to mutual improvement; for he who will learn nothing from an adversary, does but render apparent one discreditable cause of his own imperfections. Tournefort's Works. Hall. Bibl. Bot. S.

TOURNEFORTIA, in *Botany*, bears that name in commemoration of the great French botanist, of whom we have given an account in the preceding article. This genus, founded by Plumier, was called by him *Pittonia*, after the family name of the person commemorated. Linnæus altered it, according to his own rule, of retaining the appellation by which that person was most known. So he preferred *Hippocratea* to the *Coa* of Plumier, and *Theophrasta* to his *Eresia*. French writers have subsequently acceded to this decision.—Linn. Gen. 78. Schreb. 104. Willd. Sp. Pl. v. 1. 791. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 1. 303. Brown Prodr. Nov. Holl. v. 1. 496. Juss. 129. Lamarck Illustr. t. 95. Poir. in Lam. Dict. v. 5. 355. Gærtn. t. 76. (*Pittonia*; Plum. Gen. 5. t. 3.)—Class and order, *Pentandria Monogynia*. Nat. Ord. *Asperifolia*, Linn. *Borraginea*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, small, in five deep, awl-shaped, permanent segments. *Cor.* of one petal, funnel-shaped; tube cylindrical, globose at the bottom; limb spreading, divided half way down into five pointed, horizontal segments. *Stam.* Filaments five, awl-shaped, in the throat of the corolla; anthers simple, within the orifice of the tube, converging, pointed. *Pist.* Germen superior, globose; style simple, the length of the stamens, club-shaped; stigma bare, umbonate. *Peric.* Berry globose, of two cells, perforated by two pores at the summit. *Seeds* four, nearly ovate, separated by pulp.

Eff. Ch. Corolla funnel-shaped, with a naked throat. Stamens in the tube. Stigma umbonate. Berry superior, of two cells. Seeds two in each cell.

A tropical genus of erect or twining shrubs, with simple, undivided, alternate, rough, hairy, or silky, rarely smooth, leaves. The flowers are numerous, mostly white or blueish, in dense, recurved, unilateral, often cymose, spikes, without bractæas. Berries white, blueish or black. In habit, this genus comes nearest to *HELIOTROPIMUM*; *MESSERSCHMIDIA* is united to it by Mr. Brown. (See those articles.) In the true *Tournefortia*, according to that learned botanist, the berry has only two seeds, or nuts, each with two cells. To these belong the *Messerschmidia*, and *Heliotropium gnaphalodes* of Linnæus. In *T. hirsutissima*, the berry has four simple, or single-kernelled, seeds, and a straight embryo. In *T. volubilis* of Linnæus, and *scandens* of Solander, to which we may add *sericea* of Vahl, the segments of the corolla are awl-shaped, the berry with four simple seeds, of which two or three are often abortive, and a curved embryo. Mr. Brown would separate all these from *Tournefortia*, but whether the *hirsutissima* should form a distinct genus from the species with awl-shaped segments of the corolla, he is doubtful. A consideration of the genera *Onosma* and *Cerinth*, to say nothing of others of this same order, makes us doubtful whether the number of parts, or cells, in the fruit, or rather the greater or less union of those parts, can here make a generic distinction. We submit it to the re-consideration of our learned friend; and in the meanwhile we shall attempt a display of all the species of *Tournefortia*, of which Linnæus and Willdenow have given but a very incomplete list. Poir. in Lamarck's Dict. has added several to the number, but we possess some, even from Commerçon's collection, which are not to be referred to any of his. Some of the described ones have not come under our inspection, and the history of others is much confused, but we hope to leave the subject, if not fully elucidated, at least in a clearer state than we find it.—*T. humilis*, Linn. Sp. Pl. 202, belongs, according to Mr. Brown, to *HELIOTROPIMUM*. See that article.

1. *T. serrata*. Greater Serrated *Tournefortia*. Linn. Sp. Pl. 201. Willd. n. 1. (*Pittonia arborefcens*, *chamædrifolia major*; Plum. Ic. 224. t. 228. f. 1. *Varronia mirabiloides*; Poir. in Lam. Dict. v. 4. 262.)—Leaves ovate, serrated, on spinecent footstalks. Spikes recurved, on axillary stalks, longer than the leaves.—Native of the West Indies, where it was found by Plumier, from whose figure alone it is known to us. The stem is said to be arborescent, with round zigzag branches. Leaves about two inches long, strongly serrated, on stalks nearly an inch in length, each with a joint about the middle, where the stalk seems finally to separate, the lower part hardening into a spine. Flower-stalks axillary, solitary, each bearing three recurved spikes, of numerous, large sessile flowers, the limb of whose corolla is undulated, an inch in diameter. Berry the size of a pea, globose, undivided. Poir. says it is red. If his plant from Hispaniola be the same, this species must be removed to *Varronia*, which is rendered probable by the aspect of its corolla.

2. *T. chamædrifolia*. Lesser Serrated *Tournefortia*—(*T. serrata* ß; Linn. Sp. Pl. 201. Willd. n. 1. *Pittonia arborefcens*, *chamædrifolia minor*; Plum. Ic. 224. t. 228. f. 2.)—Leaves oblong, serrated, on recurved spinecent footstalks. Spikes capital, terminal.—For this also our only authority is Plumier, who gathered it in some part of the West Indies. It appears to differ essentially from the former, in the characters above given, as well as its much smaller size. The flowers however are nearly as large, but much fewer, with partial stalks, which become very conspicuous as the fruit ripens. Their corolla is represented very regularly crenate, rather than undulated, but indicates a *Varronia*, as well as that of the foregoing.

TOURNEFORTIA.

3. *T. hirsutissima*. Hairy Tournefortia. Linn. Sp. Pl. 201. Willd. n. 2. Poiret n. 1. Swartz Obf. 56. (*Pittonia hirsutissima et ramifoliosa, baccis albis*; Plum. Ic. 226. t. 228. *Heliotropii flore, frutex baccifer racemosus, folio rugoso fetido maximo subrotundo hirsuto, fructu albo*; Sloane Jam. v. 2. 108. t. 212. f. 1.)—Native of bushy places in Jamaica, and other West Indian islands, as well as of Mexico, from whence it was sent by Mutis to Linnæus. This is a *shrub*, three or four feet high, somewhat twining, its branches, stalks, foliage, and *calyx* clothed with rusty down. The *corolla* is still more densely covered externally with silky hairs. *Leaves* fetid, stalked, elliptical, entire, pointed at each end, transversely ribbed, three inches long, and an inch and half broad; most hairy, and rather silky, at the back. *Spikes* aggregate, on long, hairy, axillary and terminal stalks, about the ends of the branches. *Flowers*, as well as *berries*, white; the latter rough and hairy, Swartz says of two cells, with two seeds in each, which does not agree with Mr. Brown's account, given above.

4. *T. fetidissima*. Tobacco-leaved Tournefortia. Linn. Sp. Pl. 201. Willd. n. 5. Ait. n. 2. Swartz Obf. 58. (*Pittonia racemosa, nicotianæ foliis, fetidissima*; Plum. Ic. 226. t. 230.)—Leaves ovato-lanceolate, rough; downy and paler beneath. Flower-stalks branched. Spikes pendulous. Calyx shorter than the style.—Native of Jamaica. Dr. Wright. The leaves vary in size; but are not unlike those of *T. hirsutissima* in shape. Their upper surface is more minutely rough than in that species, and their under one more softly and densely downy. The spikes are very remarkable for their extremely long linear form, and pendulous position. They measure frequently eight or ten inches, and are from six to eight on each axillary forked stalk. The flowers are small, sessile, in a simple unilateral line. Calyx hairy, with lanceolate upright segments. Tube of the corolla hairy upwards, about thrice as long as the calyx; its limb in five ovate, obtuse, keeled, reflexed segments. Style projecting beyond the permanent calyx, after the corolla is fallen, with a very large pulley-shaped pointed stigma. This is united, by Lamarck and Poiret, to the following, under the name of *macrophylla*; Poiret n. 2.

5. *T. cymosa*. Drooping Cymose Tournefortia. Linn. Sp. Pl. 202. Willd. n. 8. Ait. n. 4. Jacq. Coll. v. 1. 96. Ic. Rar. t. 31. (*Heliotropii flore, frutex, folio maximo oblongo acuminato glabro*; Sloane Jam. v. 2. 109. t. 212. f. 2.)—Leaves elliptic-lanceolate, pointed, smooth. Flower-stalks much branched. Spikes drooping. Calyx as long as the style.—Native of the West Indies. This is certainly, as Linnæus observes, nearly related to the foregoing, but differs in the smoothness, and more elongated points, of the leaves, as well as in its more numerous, shorter, and less directly pendulous, spikes. The flowers are similar, but the style in our specimens does not project beyond the calyx. The corolla, at first white, turns tawny, and dark red, before it falls. Berry the size of a small pea, white, with black dots.

6. *T. siringifolia*. Lilac-leaved Tournefortia. Vahl Symb. v. 3. 23. Willd. n. 4. Poiret n. 17.—Leaves ovate, somewhat heart-shaped, pointed, smooth. Spikes terminal, divaricated, hairy, as well as the stalks.—Native of Cayenne, and, if we mistake not, of Jamaica, where our specimen, precisely answering to Vahl's description, was gathered by Dr. Wright. The young branches, as well as the footstalks, the main rib of the leaves on both sides, and the transverse ribs underneath, are all more or less hairy, like the flower-stalks, spikes, calyx, and outside of the corolla. Leaves two inches long, destitute of fine intermediate veins,

quite smooth, except the ribs. Flower-stalk terminal, erect, forked, with spreading spikes above an inch long. Flowers alternate. Segments of the corolla with long taper points.

7. *T. bicolor*. Pale-backed Tournefortia. Swartz Ind. Occ. v. 1. 344. Willd. n. 7. (*T. lævigata*; Poiret n. 3?)—Leaves elliptical, pointed, smooth; slightly rugged on the upper side. Spikes terminal, cymose, crowded, erect, recurved, somewhat hairy.—Native of bushy places in Jamaica. A shrub six feet high, with smooth branches. Leaves three or four inches long, elliptical rather than ovate, acute at each end, finely reticulated with veins between the ribs, occasionally minutely hairy, as well as the branches and footstalks; paler beneath. Flower-stalks several, terminal, alternate, rather hairy, erect, each bearing six or eight subdivided, cymose, dense spikes. Segments of the calyx ovate, scarcely hairy, except when the leaves are so. Corolla greenish-white, externally covered with silky hairs. *T. glabra*, Linn. Sp. Pl. ed. 1. 141, is perhaps a variety of this.

8. *T. maculata*. Four-dotted Tournefortia. Jacq. Amer. 47. Poiret n. 4.—Leaves ovate, pointed, smooth on both sides. Spikes much branched, pendulous, lax, recurved. Stalks slightly hairy.—Native of thickets in South America. Jacquin found it near Carthage. He describes it as a shrub, with weak branches. Leaves stalked, entire, scentless. Berry yellow, with four round black dots at the base. Poiret says the leaves are at least four inches long, and two broad. Corolla yellow, with a long narrow tube, and five acute segments.

9. *T. orientalis*. Twining Oriental Tournefortia. Br. n. 1.—Stem twining. Leaves broadly ovate, somewhat pointed, smooth. Cymes forked. Limb of the corolla five-cleft, with plaited sinuses. Nuts cellular.—Gathered by Sir Joseph Banks, in the tropical part of New Holland.

10. *T. farmentosa*. Trailing Tournefortia. Poiret n. 5.—Leaves ovate-oblong, acute. Spikes branched, very short, two-ranked. Stem twining.—Native of the Mauritius. Sonnerat. A specimen gathered by Commerçon in the Philippine islands, answers very nearly to the following description of Poiret. The stems are climbing, with long, distant, trailing shoots, striated, nearly cylindrical, clothed with short whitish hairs. Leaves alternate; downy, and whitish beneath, especially when young; rounded and dilated at the base; almost smooth on the upper surface; three or four inches long, and an inch and half wide. Footstalks short, very downy. Flowers terminal, in short, close, branched, downy spikes, and disposed in two rows, sessile. Calyx short, with blunt segments.

11. *T. brasiliensis*. Brasil Tournefortia. Poiret n. 6.—Leaves ovato-lanceolate, harsh, somewhat sinuated; whitish beneath. Stem round, acutely striated.—Sent to Lamarck from Brasil. Allied to the last, but the leaves are of a different shape, and the whole plant nearly destitute of pubescence. Leaves two or three inches long, an inch or more in breadth, contracted at their base, harsh on both sides, whitish and downy beneath when young. Flowers in short, reflexed, downy, hoary, branched spikes, composing a terminal cyme. Segments of the calyx downy, very acute, slightly recurved. Poiret.

12. *T. arborefcens*. Arborefcens Tournefortia. Poiret n. 7.—Leaves ovato-lanceolate; somewhat downy when young. Spikes branched, very short. Stem arborefcens.—Gathered by Sonnerat, in the East Indies. Branches woody, angular, rough and rugged, particularly the young shoots. Leaves oval-lanceolate, contracted at each end, veiny, ribbed, harsh, four or five inches long, an inch and half broad; white and downy beneath when young. We have nothing

TOURNEFORTIA.

answering to this description, nor is the specific character such as to afford much assistance in determining the plant.

13. *T. velutina*. Velvet-leaved Tournefortia. — Leaves elliptic-lanceolate, acute, silky on both sides. Spikes dense, aggregate, cymose, from the forks of the branches, silky. Stigma slightly two-lobed. — Gathered by Commerfon in mountainous woods of the isle of Bourbon. The *branches*, *stalks*, *leaves*, *calyx* and *corolla* are entirely clothed with fine silky filvery pubescence, the globose base, and obtuse limb of the latter, on its upper side, being the only smooth parts, except the *berries*, which are snow-white. The *leaves* are four or five inches long, somewhat undulated, various in breadth. We have from the Mauritius what may possibly be a variety, with very narrow, and nearly smooth, *leaves*. Its *inflorescence* betrays no difference.

14. *T. argentea*. Blunt-leaved Silvery Tournefortia. Linn. Suppl. 133. Willd. n. 9. Poir. n. 8. Brown n. 2. (*Buglossum lanuginosum*; Rumph. Amboin. v. 4. 119. t. 55.) — Leaves obovate, bluntish, silky on both sides. Spikes in repeatedly compound cymes. Tube of the corolla very short. — Native of the sea-coast, in Ceylon, Amboyna, Banda, and other parts of the East Indies. This *shrub* is hardly so tall as a man; its main *stem* very short, the *bark* full of deep fissures; the *branches* widely spreading, hairy. *Leaves* crowded about the ends of the branches, alternate, stalked, about three inches long, entire; tapering at the base; rather fleshy, beautifully clothed all over with the finest silky pubescence, which appears to vary in degree, and in one of our specimens, from the isle of Bourbon, excels in splendour every plant of our acquaintance. The *flower-stalks*, longer than the leaves, are at first terminal, but the branch is soon protruded at each side beyond them. They are subdivided into tufts of dense recurved *spikes*, above an inch in length. All the *stalks*, like the broad obtuse *calyx*, are silky. *Corolla* white, with a short tube, and a recurved limb, altogether not extending beyond the calyx. Mr. Brown describes the *stigma* as sessile and two-lobed. Rumphius says the *leaves* are eatable, and much esteemed in Amboyna for their saltish flavour.

15. *T. gnaphaloides*. Cud-weed Tournefortia. See Brown 496. (*Heliotropium gnaphaloides*; Linn. Sp. Pl. 188. Willd. Sp. Pl. v. 1. 745. *H. gnaphaloides litoreum frutescens americanum*; Pluk. Phyt. t. 193. f. 5.) — Leaves linear, obtuse, densely downy on both sides. Spikes dense, downy, recurved, on cymose stalks. — Native of the sea-coast in the West Indies. We follow Mr. Brown in removing to the present genus this elegant *shrub*, whose snow-white downy covering is rather more cottony than silky, and yet partakes of the silvery beauty of the last described. The *leaves* are crowded, thick, about two or three inches long, and hardly a quarter of an inch wide. *Flowers* small, white, in short, thick, woolly, solitary or twin, recurved spikes. *Berries* smooth, the size of a currant.

16. *T. suffruticosa*. Hoary-leaved Tournefortia. Linn. Sp. Pl. 202. Willd. n. 11. Ait. n. 5. (*T. suffruticosa*, foliis subincanis oblongis, fronde comosâ; Browne Jam. 170, excluding the synonym of Sloane, which belongs to *Suriana maritima*. *T. incana*; Poir. n. 9? Lamarck Illustr. n. 1880. t. 95. f. 3?) — “Leaves nearly lanceolate, hoary. Stem somewhat shrubby.” — Native of Jamaica, by the sea-side, near the borough of St. James’s. Seldom rises above three or four feet from the ground. *Browne*. This is a very uncertain species, for which Dr. Browne seems the only authority, nor is there any specimen to represent it in the Linnæan herbarium. The *Thymelæa facie frutex*, Sloane Jam. v. 2. 29. t. 162. f. 4, is certainly *Suriana maritima*, for which it was subsequently quoted by Linnæus. Confe-

quently Willdenow cites it under both. It is sufficient to read Sloane, to see that his plant can be no *Tournefortia*. Possibly it may, nevertheless, have been what Browne intended. If so, the plant of Lamarck and Poir. has nothing to do with it, and may perhaps be the *sericea* of Vahl, hereafter described. Miller is recorded as having cultivated the *T. suffruticosa*, whence it has found a place in Mr. Aiton’s work, but apparently without being known at the present day.

17. *T. volubilis*. Climbing Rough Tournefortia. Linn. Sp. Pl. 201. Willd. n. 3. Ait. n. 1. Poir. n. 10. Lamarck Illustr. n. 1884. t. 95. f. 2. Gærtn. t. 75. *Byronia nigra fruticosa*, racemi ramulis variè implicitis, atque caudæ scorpionis instar in se contortis, baccis albis unâ vel alterâ nigrâ maculâ notatis; Sloane Jam. v. 1. 234. t. 143. f. 2. *Virga aurea americana frutescens glabra*, foliis subtus cæsiis, &c.; Pluk. Phyt. t. 235. f. 6.) — Leaves deflexed, ovate, acute, rough with minute points on both sides. Stem twining. Segments of the corolla awl-shaped. — Native of South America and the West Indies. It flowered with Linnæus in the Upsal garden, and is preserved occasionally in our English stoves. Sloane says the *trunk* near the ground is as thick as one’s arm, twining round any thing it comes near, rising to the height of seven or eight feet. The *branches* are slender, round, somewhat zigzag, repeatedly subdivided, minutely downy, or rather silky, with close-pressed hairs. *Leaves* scattered, an inch or inch and half long, on slender, downy, deflexed *stalks*, about half an inch in length, single-ribbed, entire, flat and even, clothed on both sides with very minute, white, callous prickles, but no hairiness. *Flowers* numerous, small, greenish, in lateral, or somewhat terminal, slender, divaricated, downy, cymose panicles, of lax spikes, or rather clusters. *Calyx* in five deep, hairy, narrow segments. Tube of the *corolla* silky, hardly thrice the length of the calyx; limb in five narrow, awl-shaped, spreading segments, above half the length of the tube. *Style* slender, with a large long-beaked *stigma*. *Berry* half the size of a pea, globose, often two-lobed, white, with black dots.

18. *T. levigata*. Climbing Smooth Tournefortia. — Leaves spreading, ovate, acute; smooth above; rough with minute points beneath. Stem twining. Segments of the corolla awl-shaped. — Native of Jamaica. *Dr. Wright*. This has altogether the habit of the last, of which it may possibly be a variety. The chief difference discoverable in the dried specimens is the upper surface of the *leaves* being perfectly destitute of the innumerable callous points which cover their backs, and which are found on both sides of the foliage of the foregoing. The *leaves* of the present are also perhaps less deflexed. The *inflorescence* and *flowers* afford no marks of distinction. The *berries* are most frequently of three globular lobes.

19. *T. sericea*. Climbing Hoary Tournefortia. Vahl Eclog. fasc. 1. 17. Willd. n. 10. Poir. n. 11. (*T. incana*; Poir. n. 9. Lamarck Illustr. n. 1880. t. 95. f. 3. *Frutex*; Macgr. Brasil. 78, excellent as to the leaves, but though cited by Vahl, without any exception, the description shews it to be a syngeneis plant.) — Leaves spreading, ovate, acute; rough with minute points above; downy and hoary beneath. Stem twining. Segments of the corolla awl-shaped. — Native of Hispaniola, and other parts of the West Indies. Like the two last in size and general habit; but the *footstalks* are rather shorter; *leaves* more rounded, and often somewhat heart-shaped, at the base; their upper surface covered with much more numerous and minute, hair-pointed, white, callous tubercles, which produce somewhat of a hoary appearance; while the under

TOURNEFORTIA.

is white with fine close down, and furnished with very prominent ribs. *Inflorescence, flowers, and fruit*, much like the two foregoing. The *stigma* in all has a long conical point.

20. *T. tomentosa*. Climbing Downy Tournefortia. Mill. Dict. ed. 8. n. 5. Poiret n. 12.—Leaves heart-shaped; downy beneath. Stem twining. Segments of the corolla awl-shaped?—Discovered by Mr. Robert Millar, near Carthage, in South America. The twining *stems* reach to the height of ten or twelve feet. *Leaves* two inches long, and one and a quarter broad near their base, very downy beneath, on very short *footstalks*. *Inflorescence* apparently like the last. *Flowers* small, dirty-white. *Berries* juicy, with two, three, or four seeds. We gather from Miller's account, our only authority, that this plant comes very near our last, of which it may possibly be a variety; yet the *leaves* seem to be of a broader figure, and their *footstalks* shorter.

21. *T. ferruginea*. Climbing Rusty Tournefortia. Lamarck Illustr. n. 1882. Poiret n. 13.—“Leaves somewhat heart-shaped, acute; villous beneath. Stem somewhat climbing. Young branches very hairy.”—Native of Hispaniola, where it is known by the name of *Kallaba*. Allied to *T. volubilis*, but its *branches* are less elongated and trailing; its *leaves* and young shoots very much more hairy, or shaggy, with stiff, straight, rusty-coloured hairs, equally remarkable on the *footstalks*, and ribs at the backs of the *leaves*. The latter are pointed, thick, harsh above, downy beneath, a little fringed at the margin, dark green, two or three inches long and one broad. Their *footstalks* straight, very short. *Flower-stalks* much branched, hairy, divided into short *spikes*. *Flowers* small, unilateral, with a rough hairy *calyx*, and a short tubular *corolla*. Poiret.

22. *T. scabra*. Rough Small-leaved Tournefortia. Lamarck Illustr. n. 1883. Poiret n. 14.—“Leaves reflexed, oblong, obtuse; very rough above; wrinkled and downy beneath. Flower-stalks branched, terminal. Berries conical.”—Gathered in Hispaniola, by Joseph Martin. *Branches* slender and flexible, striated, somewhat downy. *Leaves* stalked, slightly toothed, an inch long and four lines broad, rounded at the base, blunt at the extremity. *Calyx* hairy, rough, widely spreading, acute. *Berry* reddish, oval, almost conical. Poiret, whose description is our only guide, mentions a supposed variety, with *leaves* twice as long, but narrower, of which, however, he had seen neither *flowers* nor *fruit*.

23. *T. scandens*. Climbing Brown-flowered Tournefortia. Mill. Dict. ed. 8. n. 4. Poiret n. 18.—“Leaves heart-shaped, hairy. Spikes branched, reflexed. Stem twining. Segments of the corolla awl-shaped.”—Found in Jamaica by Houttoun, who sent seeds to Miller. We presume it to be the same with what Mr. Brown mentions as *T. scandens* of Solander's manuscripts, and therefore we adopt from him the character of the *corolla*; though our *Lavigata* was marked by Dr. Wright, with doubt indeed, as the plant of Solander; but it does not at all answer to the description. The present has shrubby branching *stems*, ten or twelve feet high. *Leaves* near three inches long, one and a half broad near the base, acutely pointed, on short *footstalks*. *Flowers* in very slender, branching, terminal *spikes*, small, unilateral, of a dirty brown. *Berries* pulpy, with four seeds. Miller.

24. *T. sessilifolia*. Sessile-leaved Tournefortia. Poiret n. 19.—“Leaves sessile, linear-lanceolate, villous. Flowers in roundish dense terminal spikes. Stem lispid.”—Gathered by Commerçon at Buenos Ayres. *Branches* shrubby, round, clothed with stiff hairs. *Leaves* obtuse at each end,

though a little contracted at the base, half clasping the stem, an inch and a half long, three lines broad, downy on both sides. *Flowers* at the ends of the branches, on a common stalk, which divides into two parts, each bearing several very dense crowded *spikes*. Limb of the *corolla* dilated, with five short blunt segments. *Stalks* and *calyx* clothed with numerous, stiff, glandular hairs. Poiret.

25. *T. carnosa*. Fleshy-leaved Tournefortia. Mill. Dict. ed. 8. n. 6. Poiret n. 20. (*Pittonia frutescens*, folio carnosò, hirsuto et obtuso; Plum. Gen. 5.)—“Leaves stalked, ovate; rugose and very rough above; paler and smoother beneath. Spikes branched, axillary. Stem shrubby.”—Gathered by Robert Millar, near Carthage in South America. *Stem* woody, near 20 feet high, with strong rough branches. *Leaves* thick, oval, four inches long and three broad, on pretty long *footstalks*. *Flowers* small, white. *Berries* small, with two or three oblong seeds. Miller.

Besides all the above species, Poiret has a *T. bifida*, n. 16. Of this we find a specimen, gathered by Commerçon in the island of Mauritius; but it appears to us totally foreign to this genus. The *stem* is shrubby, with opposite, bluntly quadrangular, rugged branches. *Leaves* likewise opposite, though Poiret says alternate, on downy channelled *footstalks*, ovate, about two inches long, entire, even, smooth, pale green, with a yellow mid-rib, slender lateral ribs hairy at their origin, and innumerable, excessively minute, reticulated veins. *Stipulas* opposite, between the *footstalks*, and half as long, broad at the base, pointed, silky, deciduous. *Flower-stalks* axillary, solitary, opposite, round, downy, longer than the *footstalks*, each bearing two, horizontally divaricated, simple, unilateral *spikes*, of numerous, small, sessile *flowers*, in two rows. *Germen* inferior, oblong, silky, crowned with a *calyx* of five deep, round, silky segments. *Corolla* funnel-shaped, white or yellowish, twice as long as the *calyx* and *germen* together, a little silky externally. *Stamens* within the tube; their *anthers* large, oblong, obtuse. Of the *style, stigma, or fruit*, we can give no account. This shrub appears to belong to the natural order of *Rubiaceæ*, but we have not sufficient materials to determine its genus.

TOURNEFORTIA, in *Gardening*, contains plants of the shrubby exotic kind, among which the species cultivated are, the hairy Tournefortia (*T. hirsutissima*); the climbing Tournefortia (*T. volubilis*); the fetid Tournefortia (*T. fœtidissima*); the dwarf Tournefortia (*T. humilis*); the broad-leaved Tournefortia (*T. cymosa*); the silvery Tournefortia (*T. argentea*); and the hoary-leaved Tournefortia (*T. suffruticosa*).

Method of Culture.—These plants may all be increased by seeds, which should be procured from the countries where they grow naturally, and be sown in small pots filled with light earth, and plunged into a hot-bed of tanners'-bark. They sometimes grow the first year, but often remain in the ground a whole year: therefore, when the plants do not come up the same season, the pots should be plunged in autumn into a tan-bed in the stove, where they should remain all the winter, and in the spring be removed and plunged into a fresh tan-bed, which will soon bring up the plants, if the seeds were good. When these are fit to remove, they should be each planted in a small pot, and plunged into a tan-bed, where they must be shaded from the sun till they have taken new root, and then be treated in the same way as other tender plants from the same countries, which require to be kept constantly in the bark-stove. They may also sometimes be increased by cuttings, which should be planted in pots, and plunged into the bark-bed.

These

These are all plants of the tender kind, which constantly stand in need of the heat of the stove in this climate.

They afford variety in stove collections, among others in pots, mostly retaining their leaves the year round.

TOURNEHEM, in *Geography*, a town of France, in the department of the Straits of Calais; 9 miles N.W. of St. Omer.

TOURNEMINE, RENÉ-JOSEPH DE, in *Biography*, a learned Jesuit, was born at Rennes in 1661, entered among the Jesuits in 1680, and took all the vows of their order in 1695. In 1701 he resided in the Jesuits college at Paris, for the convenience of conducting and superintending the journal of Trevoux, or "Memoires pour servir à l'Histoire des Sciences et des beaux Arts," printed at Trevoux, and periodically published from 1701 to 1767, when it fell with the society. In 1718, Tournemine was made librarian of the Jesuits library, in the professed house of the society, where he died in 1739, at the age of seventy-eight years. Tournemine published some other works of less note. Moreri.

TOURNEUR, PETER LE, born at Valogne, in Normandy, in 1736, gained prizes at Montauban and Besançon for his literary pieces, which were reprinted at Paris, and admired on account of their philoſophic ſpirit and eloquence. But he was brought more into notice by his free translation of Young's "Night Thoughts," which being favourably received, was followed with translations of "Hervey's Meditations;" "The Life of Savage;" "Oſſian and other Gaelic Poems;" a great part of the "Univerſal Hiſtory;" "Shakſpeare;" "Clariffa;" and other works. Theſe tranſlations are introduced by prefaces, abounding with bold and intereſting ideas. His praifes of Shakſpeare provoked various attacks, and particularly from Voltaire. Le Tourneur, who died in 1798, is repreſented as one of the mildeſt and moſt amiable of men. *Nouv. Diſt. Hiſt.*

TOURNIQUET, Fr. from *tourner*, to turn, a machine, or inſtrument, employed in the practice of *Surgery*, in order to ſtop bleeding. It is only applicable, however, to the limbs, and its uſe is merely intended to be temporary, that is to ſay, until ſome more permanent method of checking the hemorrhage can be praſticed. Thus, in the operation of amputation, the tourniquet is applied with a view of preventing the loſs of blood, which would otherwiſe happen before the ſurgeon had done with the knife and the ſaw, and before he could poſſibly devote his attention to the ligature of the arteries. But it is never put on tightly with the deſign of being left any conſiderable time in this way, as the conſtriction produced would inevitably bring on mortification. Sometimes, after amputations, operations for aneurifms, and in caſes of wounds, it is left looſely upon the limb, ſo that, in the event of a ſudden hemorrhage, it may be tightened in an inſtant. Here, however, the ſurgeon does not regard it as the principal means by which the bleeding is to be ſtopped; but ſimply as a temporary aſſiſtance, until an opportunity has been afforded of ſecuring the bleeding veſſels in another way.

When hemorrhage takes place from a large artery in one of the limbs, where the veſſel can be conveniently compressed above the wound in it, a tourniquet, judiciously applied, never fails in putting an immediate ſtop to the bleeding.

Before the invention of this inſtrument, which did not take place till the latter part of the ſeventeenth century, ſurgery was really a very defective art. No important operation could be undertaken on the extremities without placing the patient in the moſt imminent peril; and the want of the aid afforded by the tourniquet made many wounds mortal which

otherwiſe would not have been attended with the leaſt danger.

Perhaps we are not juſtified in ſtating that the tourniquet was not invented till the late period above ſpecified; and it might be more correct to ſay, that it has been uſed in a rude and imperfect manner ever ſince ſurgeons have known that the flow of blood through a limb may be commanded by preſſure. For when a ſimple band was tightly applied round a limb, in order to ſtop bleeding, it was, in fact, a kind of tourniquet. The records of ſurgery, indeed, inform us, that the old ſurgeons uſed to ſurround the limb with a band, with which they made ſuch a degree of conſtriction, that the circulation was quite ſtopped. Theſe practitioners alſo believed, that the preſſure of the band was advantageous in benumbing the limb, and moderating the pain of operations.

The violent pain and conuſion, however, which this ſort of tourniquet occaſioned, were frequently followed by ſloughing and abſceſſes, and therefore ſurgeons endeavoured to deviſe ſome other method of checking hemorrhage. The application of the circular band was firſt improved, ſo that it cauſed leſs pain and leſs miſchief to the ſkin. The limb was ſurrounded with a very thick compreſs, over which the band was placed. Two ſmall ſticks were next put under the band, one on the inſide, the other on the outſide of the limb; and they were twiſted till the band was rendered ſufficiently tight. It is in this manner, ſays Dionis, in his *Treatiſe on the Operations of Surgery*, that carriers tighten the cords which faſten the bales of goods in their carts. A French ſurgeon named Morel is ſaid to have made this firſt improvement in the application of tourniquets.

Although in the *Armamentarium Chirurgicum* of Scultetus, there is an engraving of a machine invented by this author for compreſſing the radial artery by means of a ſcrew, M. Petit is univerſally allowed to be the firſt who brought the tourniquet to perfection, by combining the circular band with a ſcrew, in ſuch a manner, that the greateſt preſſure operates on the principal artery. It was in 1718 that he preſented his improved inſtrument to the Academy of Sciences. It conſiſts of two pieces of wood, one of which is ſuperior, the other inferior. The inferior piece is about four inches and a half long, and nearly two broad. Its under ſurface is ſomewhat concave, while its upper one is a little convex; and the ends are hollowed out. From its middle part riſes a round eminence, about ſeven lines high, and eight and a half broad. The ſuperior piece is almoſt the ſame as the inferior, but rather ſhorter. The eminence which aſcends from its middle part is ſix lines high, and an inch and a half in diameter. This eminence is hollow within, and calculated to receive a wooden ſcrew, the top of which is a ſort of button for turning the ſcrew. The grooves of Petit's ſcrew were about four or five, and each of them four lines in diameter, in order that a half-turn might produce the neceſſary effect. Laſtly, all the pieces of the inſtrument were faſtened together with an iron pin, which went through the middle of the two pieces of wood, and through the whole length of the ſcrew. This iron pin was rivetted under the inferior piece, and at the top of the button; in ſuch a manner, however, that the ſcrew was capable of turning on it as on a pivot.

In order to apply this tourniquet, the limb is to be ſurrounded with a double ſtrip, about four finger-breadths wide, and made of chamois leather, which is the ſoſteſt material that can be uſed. To one end of the ſtrip a ſmall double cuſhion is faſtened, of the ſame length and breadth as the lower piece of the tourniquet. A narrow compreſs, or cylindrical pad, is alſo requiſite, for the purpoſe of compreſſing

pressing the track of the vessels. This compress consists of a very firm roll of linen, covered with chamois leather. The ends of a piece of tape are sewed to the outer part of the pad, and thus the tape leaves a passage for the leather strap. By this artifice, the pad can be moved to any situation on the strap which may be most convenient, according to the bulk of the limb. The middle of the tape is to be fastened to the outside of the leather strap. The cylindrical compress, or pad, is to be put over the course of the vessels. The double cushion is to be placed on the opposite side of the member, while the leather strap is to surround the limb in a circular manner. All the different pieces of the apparatus are next to be retained by the tape, which is to be tied at the side of the cushion.

The tourniquet is now to be put over the cushion, on that side of the limb which is furthest from the track of the large vessels, and is to be fastened in this situation by a double band, with a hole in it for the reception of the upper part of the screw.

In order to make proper compression, the screw is to be half turned round from the right to the left. The upper piece of the tourniquet becoming now further from the lower one, the double band draws the pad, and presses it against the vessels, so as to make the due degree of compression for stopping the flow of blood through the main arteries.

The following are the advantages attending the use of Petit's tourniquet. 1. It compresses the lateral parts of the limb less than the tourniquet previously in use. 2. It requires the aid of no assistant either to hold, tighten, or loosen it. 3. The operator is able of himself to stop the flow of blood through the artery by means of the screw. 4. When there is any danger of hemorrhage after an operation, this kind of tourniquet may be left on the limb; and in case of bleeding coming on, the patient, if no one be at hand, can tighten the instrument himself as much as necessary. 5. The constriction which this tourniquet produces may be continued longer than that of the old method, without hazard of sloughing, because it does not altogether stop the flow of blood through the collateral arteries.

The tourniquet just described is certainly very complex, when compared with what is now used by the best modern practitioners; but still it is the original of the latter, and both are constructed on the same principles. The several pieces of a modern tourniquet are always kept connected together, and, instead of two pieces of wood, used by Petit, there is contrived a brass bridge, which is capable of being elevated or depressed by means of a screw of the same metal. Over this bridge a very strong band proceeds, and by passing under two little rollers at the ends of the bridge, it always remains connected with the instrument. A convex firm pad is sewed to the band, and put immediately over the artery when the instrument is applied. There are no cushions for the opposite side of the limb under the screw; but a thick piece of leather, through which the band proceeds in two places, is sometimes put under the lower surface of the brass, and serves to prevent any bad effects of its pressure on the skin. It is usual, also, for the surgeon to fold some rag, and put it in this situation at the time of applying the instrument. Cooper's Dict. of Pract. Surgery.

In the army, surgeons are provided with what are named *field* tourniquets, in addition to such as are always found in cases of amputating instruments. A field tourniquet is most simple in its construction, and is particularly intended for use on the field of battle, where numerous soldiers frequently stand in need of temporary compression of their bleeding limbs, until the surgeon has time to pay their accidents further attention. It consists merely of a strong band, a pad

fixed to this band, and a buckle. It admits of being applied in an instant. Every military surgeon is commonly furnished with two or three dozen field tourniquets, and the plan is undoubtedly good, as the preservation of many lives by it has confirmed.

The reader will have a better idea of the nature of a tourniquet, by referring to engravings of the instrument; but a sight of the thing itself will be still more useful.

Some tourniquets of different constructions are represented in *Plate I.* of the *Surgical Instruments*, where *fig. 1.* shews a tourniquet of the most simple kind, which is tightened by twisting the band D with the piece of wood B. C is the pad which is to be placed upon the main artery, and A is a sort of metallic or wooden guard, for preventing the twisted part of the band from hurting the skin. *Fig. 2.* a tourniquet of a more modern and improved make. D the screw. C, C, the two pieces of the frame or bridge of the tourniquet, which tighten the band B, when the upper piece is raised by turning the screw. A is the pad. *Fig. 3.* represents another kind of tourniquet, which is tightened by a contrivance resembling a windlass in principle; C the handle by which it is turned; E a steel branch, which serves to prevent the handle from turning back again; B a short bit of chain, which fixes itself in the notches of the circle, and by carrying the band with it when moved round, tightens the band D; A the basis of the tourniquet. *Fig. 4.* another kind of screw-tourniquet.

TOURNOIS, in *Coinage*, the name applied to French money in the old system, as sterling is to English money.

TOURNON, in *Geography*, a town of France, in the department of the Lot and Garonne; 12 miles E. of Villeneuve d'Agen.—Also, a town of France, situated on the river Creuse, one part in the department of the Indre, and the other in the department of the Indre and Loire; 7 miles S. of Preuilly.—Also, a town of France, in the department of the Ardèche, on the Rhône; 22 miles N.N.E. of Privas. N. lat. 45° 4'. E. long. 4° 54'.—Also, a town of France, in the department of Mont Blanc; 15 miles E. of Chambéry.

TOURNUS, a town of France, in the department of the Saône and Loire, on the Saône; 3 posts S. of Châlons sur Saône. N. lat. 46° 34'. E. long. 5° 0'.

TOURO, a town of Portugal, in the province of Beira; 13 miles W.S.W. of Alfayates.

TOURONE, a town of Persia, in the province of Cohestan; 80 miles S.W. of Neifabur.

TOUROULIA, in *Botany*, a Caribbean name, used by Aublet, but absolutely inadmissible into any classical work.—Aubl. Guian. v. 1. 492. Juss. 434. Lamarck Illustr. t. 424. Poir. in Lam. Dict. v. 7. 718.—Schreber and Willdenow, after Scopoli, have called this genus *ROBINSONIA*, which may be found in its proper place.

TOUROUMANG, in *Geography*, a town on the west coast of Sumatra. N. lat. 2° 50'. E. long. 97° 6'.

TOUROUVRE, a town of France, in the department of the Orne; 6 miles N.E. of Mortagne.

TOURRETTE, MARK-ANTHONY-LEWIS-CLARET DE LA, in *Biography*, was born at Lyons in 1729, and having studied at the college de Harcourt, at Paris, settled in his native place, where for twenty years he occupied an important post in the magistracy. Strongly attached to the study of natural history, he formed, in 1763, a large collection of insects, and a series of specimens in mineralogy. In 1766 he introduced into a large park near the town of Arbresle all the foreign trees and shrubs that could bear that climate, and in his own garden at Lyons, he cultivated more than 3000 species of rare plants. He was a companion of J. J. Rousseau,

cross-bow men. A moveable tower was constructed by the royalists so late as the troubles under king Charles I., which was surprised and taken by the parliamentary forces. It was named a *bow*; which see.

Towers are also built to enable people, by their elevation, to view to a great distance. These are of all figures, as square, round, pentagonal, &c. (See PHAROS.) In China is a famous tower of porcelain, of which the Dutch relate wonders.

Towers are also built for fortresses, prisons, &c. as the Tower of London, the towers of the late Baniak, &c.

The Tower of London is not only a citadel to defend and command the city, river, &c. but also a royal palace, where our kings with their courts have sometimes lodged.

It contains a royal arsenal, in which are arms and ammunition for 80,000 soldiers: the offices of ordnance: a treasury for the jewels and ornaments of the crown: formerly a mint for coining of money: the great archive, in which are preserved all the ancient records of the courts of Westminster, &c. and is the chief prison for state criminals.

In the midst of it is the great square white tower, built by William the Conqueror, about the year 1079. Within the Tower is a parochial church, founded by king Edward III. and dedicated in the name of St. Peter in Chains, exempt from all jurisdiction of the archbishop, and a royal chapel, now dissolved.

The chief officer of the Tower is a constable, or chief governor, under whom is the lieutenant-governor, who acts by his direction, and in his absence. He had, by grant of several of our kings, *under his own*, two gallons and a pint of wine before, and as much behind the mast of all wine ships that come to London: and a certain quantity out of every boat laden with lobsters, oysters, and other shell-fish, and double the quantity out of every alien's boat passing by the Tower. Under the constable, besides the lieutenant, are a deputy-lieutenant, a tower-major, a chaplain, a physician, gentleman-porter, gentleman-gaoler, surgeon, and forty warders. The gentleman-porter has charge of the gates to lock and unlock them, and deliver the keys every night to the constable or lieutenant, and receive them of him the next morning: he commands the warders in waiting, and at the entrance of a prisoner has for his fee *vestimenta superiora*, or else a composition for the same.

For the women warders of the Tower, see WARDER.

In the Tower is likewise kept a court of record by prescription for the liberty of the Tower, of debt, trespass, and other actions of any kind.

The Tower liberty, subject to no jurisdiction but that of the Tower itself, includes both the Tower-hills, part of East Smithfield, Rosemary-lane, Wellclose-square, Little Minories, Artillery-street, French-alley, Duke-street, Steward-street, Gun-street, Fore-street, and the other courts and alleys within their compass, in Spitalfields.

TOWER, in *Glass-making*. See LENS.

TOWER-BATTLES, in *Fortification*, are small towers, made in the form of bastions by M. Vauban in his second and third method: with rooms or cellars underneath, for accommodating men and guns. See FORTIFICATION.

TOWER, HOLLOW. See HOLLOW TOWER.

TOWERS, *Italian*, are those whose tops hang so far over, as to appear in danger to people walking below. Such is that of Pisa, 138 feet high, whose top overhangs the base 15 feet: and that of Bologna, 130 feet high, whose top overhangs the base 9 feet: and the reason why they do not fall is, that their centres of gravity are supported, or the lines of direction in them fall within their base. But if towers of this kind, that incline, were to be elevated in height by any additional weight on their tops; in that case

the centres of gravity would be raised, and their lines of direction fall without the base, so that the towers themselves must fall.

TOWER MUSTARD, and *Bastard Tower Mustard*, in *Botany*. See MUSTARD.

TOWER POUND, an old English weight for coins. This tower or monevers' pound, with which gold and silver were weighed in England before the reign of Henry VIII. and which is still occasionally referred to on the subject of coins, was lighter than the pound troy by fifteen penny-weights troy.

TOWER-HILL, in *Geography*, a town of the state of Rhode island, with a post-office; 17 miles S. of Providence.—Also, a town of North Carolina, on the Neuse; 30 miles W. of Newbern.

TOWER ISLAND, a small island in the East Indian sea, near the S. coast of the island of Flores. S. lat. 9° 21'. E. long. 124° 44'.

TOWIACHES, called *Passi* by the French, a tribe of Indians in Louisiana, who live on the S. bank of the Red river, by the course of the river upward of 800 miles above Natchitoches, and by the nearest land distance about 340 miles. They have two towns near one another: the lower town, where the chief lives, is called Nitchera, and the other is called Towashach. Their present chief is denominated the Great Bear. They are at war with the Spaniards, but friendly to those French and American hunters who have lately been among them, according to the statement of Mr. Jefferson in the year 1806. They are likewise at war with the Osages, as is every other nation. For many hundreds of miles round them, the country is a rich prairie, covered with luxuriant grass, which is green summer and winter, with skirts of wood on the river bank, by the springs and creeks. They have many horses and mules. They raise more corn, pumpkins, beans and tobacco than they want for their own consumption, so that some of these commodities furnish articles of trade. They have but few guns, and very little ammunition, which they keep for war, and hunt with the bow. Their meat is principally buffalo, and they seldom kill a deer, though plentiful. They have also elk, bears, wolves, antelopes, and wild hogs in abundance, and white rabbits and hares, as well as the common rabbits. The men are generally altogether naked, and the women nearly so, with the exception of a small flap of a piece of skin. They have many Spaniards among them, taken from the settlement of Santa Fé, when they were children. Their language differs from that of every other nation, the Towachones excepted. Mr. Jefferson states the number of men at about 200; a great number of them having been swept away, about four years before, by the small-pox.

TOWING-PATH, the road or path which is formed along on the borders of navigable rivers and canals, for the purpose of drawing different sorts of materials for farm and other uses, in some kind of small vessels, on them, either by men or horses. (See E. C. fig. 16. *Plan I. Canal*, and fig. 20. *Plan V.*) These paths constitute one of the great improvements in this sort of navigation, by removing the inconvenience and disgust afforded by the mode of hauling the barges by means of men instead of horses, where they are formed with that intention.

In speaking of the inland navigation of the river Severn, and the county, in the Shropshire agricultural report, Mr. Telford observes, that with regard to adopting the mode of hauling barges by means of horses, instead of the present barbarous and expensive custom of performing this slave-like office by men, it is only necessary that a good towing-path for horses should be formed along the banks of the river, and which will no doubt take place, if any scheme of general

ral improvements should ever be adopted. That in the mean time, a laudable example has been shewn by Mr. W. Reynolds, of Ketley, who has formed a towing-path for horses near to the new manufactories at Coalport, and has carried it on through his father's property to the iron bridge, a distance of about two miles: this being along some rugged banks, and over some of the worst fords which are on the river, proves, beyond contradiction, it is thought, that this sort of towing-path is practicable at no very extravagant expence, and besides, that it completely destroys the common objection of horse towing-paths where many rapids or fords intervene.

In constructing all sorts of towing-paths, they should be formed as much on the level as possible, and be well and firmly laid with some convenient sort of hard materials.

Where they are for men or small animals, they need not be of such breadths or depths of hard substances, as where large and many horses are in use. In carrying them over fords or runs of water, an experienced workman will mostly be necessary.

TOWING-Path Wall, is a wall under the bridges, A B C D, (*Plate V. Canals, fig. 40.*) for keeping up the towing-path.

TOWLGAW, in *Geography*, a town of Hindoostan, in Dowlatabad; 6 miles W. of Tooliappour.

TOWN, a place inhabited by a considerable number of people, of an intermediate magnitude and degree between a city and a village, &c.

It is hard to give a tolerable definition of a town, because the idea is a little arbitrary and unfixed. A town is generally without walls, which is the character which usually distinguishes it from a city; but this does not hold universally.

Tithings, towns, and villages, have the same signification in law; and are said to have had, each of them, originally a church, and celebration of divine service, sacraments, and burials; though that seems to be rather an ecclesiastical than a civil distinction. The word town or vill is, indeed, by the alteration of times and language, now become a general term, comprehending under it the several species of cities, boroughs, and common towns. A city is a town incorporated, which is or hath been the see of a bishop: a borough is now understood to be a town, either corporate or not, that sends burgesses to parliament: other towns there are, to the number, according to sir Edward Coke, of 8803, which are neither cities nor boroughs; some of which have the privileges of markets, and others not; but both are equally towns in law. To several of these towns there are small appendages belonging, called hamlets.

Entire vills, sir H. Spelman conjectures, consisted of ten freemen, or frank-pledges, demi-vills of five, and hamlets of less than five. These little collections of houses are sometimes under the same administration as the town itself, sometimes governed by separate officers; in which last case they are, to some purposes in law, looked upon as distinct townships. These towns contained each originally but one parish and one tithing, though many of them now, by the increase of inhabitants, are divided into several parishes and tithings; and sometimes there is but one parish where there are two or more vills or tithings. Blackst. Com. b. i.

We have several kinds of towns; borough-towns, market-towns, county-towns, &c. See *BOROUGH*, &c.

TOWN, Freedom of a. See *FREEDOM*.

TOWNS, Hanse. See *HANSE*.

TOWN-Clerk, or *Common Clerk*, an officer in the city of London, who keeps the original charters of the city, the books, rolls, and other records, wherein are registered the

acts and proceedings of the city. He is to attend the lord-mayor and aldermen at their courts.

TOWN-Dung or *Manure*, in *Agriculture*, that sort which is scraped up and collected from the streets and other places of large towns. This kind of manure is used in large quantities in some districts near the metropolis, as in Essex and some others, with great success and advantage, though at very considerable expence. Mr. Hardy, near Bradfield, in the above county, uses to the amount, it is said, of one waggon-load to every acre of summer fallow, at the expence, for the charge of the dung or manure only, of one guinea the load: it is then mixed with his own yard-dung in heaps for the purpose of exciting fermentation, from a notion that it has this effect, and that having it, the benefit will be in proportion. In several other parts of the same district, the usual mode of manuring *per acre*, is one waggon-load of town-muck with about five times the quantity of fresh soil collected from road-sides and hedge-greens.

TOWN-House. See *HOUSE*.

TOWN-Adjutant, in *Military Language*, is an assistant to the town-major.

TOWN-Major. See *MAJOR*.

TOWN, Cape, in *Geography*, a town agreeably situated somewhat above 30 miles from the Cape of Good Hope, in a valley, between the Table and Lion mountains. It contains about 200 houses, many of which are magnificent; its streets are broad, but ill-paved. Provisions of every kind are very reasonable, and the town is well supplied with springs of excellent water, sufficient for the ships which recur to this port. S. lat. 34° 29'. E. long. 18° 23'.

TOWNSEND, a town of the state of Massachusetts; 36 miles N.W. of Boston.

TOWNSHEND, a township of the state of Vermont, in the county of Windham, containing 1115 inhabitants; 25 miles S. of Windsor.

TOWNSHEND, Cape, a cape on the N.E. coast of New Holland. S. lat. 22° 15'. W. long. 209° 43'. See also *VERMILION Point*.

TOWPAAL, a town of Meckley; 12 miles S.E. of Munnypour.

TOWRIDGE, a river of England, which passes by Biddeford, and joins the Taw near Appledore, in Devonshire.

TOWY, a river of Wales, which rises in the county of Cardigan, and runs into the bay of Caermarthen, 6 miles below Caermarthen.

TOWYN, or *TYWYN*, a small town in the hundred of Ystumanner, and county of Merioneth, North Wales, is 12 miles W. by S. from Machynlleth, and 223 miles W.N.W. from London. It is built of coarse schistose stone, commands an unbounded view of the ocean, and is backed by a range of high mountains. During the bathing season, it is frequented by several genteel families. The town is surrounded by several populous hamlets, and respectable farm-houses. In the population return of the year 1811, the parish is stated to contain 1941 inhabitants, occupying 482 houses. Though the soil is rocky, and exposed to the influence of the western gales, yet industry has surmounted these obstacles; the marsh is converted into meadows and pastures; and corn overspreads the sterile rock and bleak shore. The church contains several ancient monuments. Gwenddydd, daughter of Brychan, and wife of Cadell, prince of Powys, about the middle of the fifth century, was buried here. In the cemetery are two rude pillars: one of them, called St. Cadfan's stone, is shaped like a wedge, about seven feet in height, with a cross, and an inscription on each side in old British characters. St. Cadfan is supposed to have been interred in this church about the year

130: and this stone is preserved as a fragment of his tomb.

About a mile north-east of Towyn is Yaws Maen Gwyn, the seat of Edward Corbet, &c.

In the vicinity of the town is a vast rock, called Crug-y-Deryn, or the Rock of Birds, so called from the numbers of cormorants, rock-pigeons, and hawks which breed on it. At its verge is a prodigious mass or stream of stones, which extends some hundreds of yards from the bottom of the rock, and is formed by the continual accumulation of fragments. The vale of Towyn extends two miles further. Near its end is a long and high rock, narrow on the top. Here stood the castle of Teberri, which extended lengthways over the whole surface of the summit, and was a fortress of great strength. One apartment was thirty-six feet broad, and was cut out of the rock on two sides. The remaining walls are well built: the stones squared; the mortar, shells, and gravel are at present very rotten.—Penny's Tour through Wales, 2to. 1784. Beauties of England and Wales, vol. xvii. North Wales, by the Rev. J. Evans.

TOWYNMYN, a river of Wales, in the county of Montgomery, which runs into the Dowy. 3 miles N.E. of Machwalleth.

TOXANDRI, in *Ancient Geography*, the name of a people beyond the Scheldt, or beyond the limits of Belgium, according to Pliny. The centre of their possessions is said to have been in the environs of Maastricht. In the time of Julian the Franks had an establishment in a place called by Ammianus Marcellinus "Toxandria Locus."

TOXICODENDRUM, in *Botany*, from *toxicon*, *poison*, and *dendron*, a *tree*, because the fruit is used at the Cape of Good Hope to poison hyzants. The same name has been employed in botany before, particularly for some very poisonous shrubs, reduced by Linnaeus to *Rhus*; see that article.—Thunb. in *Stockh. Trans.* for 1796, 183. Willd. Sp. Pl. v. 4. 321. (Hyzanché: *Cortex* in Lambert's *Cinchon.* 32. *Ait. Hort. Kew.* v. 5. 209.)—Clark and order, *Douglas Polyandria.* Nat. Ord. *Trianae*, *Linna. Esplanadae.* Juss.

Gen. Ch. Male, *Cal.* Perianth of from five to seven small, ovate, acute, hairy leaves. *Cor.* none. *Stam.* Filaments from ten to twenty, very short, crowded together at the base; anthers oval, of two cells, separated by a furrow at each side.

Female, *Cal.* Perianth inferior, of seven or eight ovate, acute, erect, imbricated silky leaves, deciduous. *Cor.* none. *Pyl.* Germen superior, sessile, ovate; style solitary, the length of the germen, triangular, cloven at the top; stigmas three, oblong, reflexed, fringed, glandular. *Perr.* Capsule coated, nearly globular, three-lobed, three-celled, with six furrows and six valves. *Seeds* two in each cell, obovate, compressed, smooth, with a lateral tumid scar.

Ess. Ch. Male. Calyx of several leaves. Corolla none. Stamens from ten to twenty, very short.

Female, Calyx of several imbricated leaves. Corolla none. Style one. Stigmas three. Capsule of three cells and six valves. Seeds two in each cell.

Obs! The stigmas, and cells of the fruit, often vary to four.

1. *T. asperif.* Hyzant Petition. Thunb. as above, 189. 2. *T. Willd.* n. 1. (Hyzanché globosa; Lamb. as above, t. 10. *Jatropha globosa*; Gertn. t. 109. Cronq. in *Burm. Afric.* 131. t. 43.)—Found about two hundred miles from the Cape of Good Hope, in a rocky soil, on a single spot, or Wind-Heek mountains, near Elephant's river. It was introduced into the green-house at Kew, by Mr. Francis MaSoc, in 1783; and it blossoms there from April to Sep-

tember, as well as in the end of Tankerville's collection. Mr. Lambert was informed by Mr. Maffion, that a farmer who lived near the native place of this shrub, gained about 20*l.* a year by gathering the fruit, which being beaten to powder, is used to poison the carcasses of lambs, &c. By feeding on these, the hyzants are infallibly destroyed. This is a *shrub*, or small *tree*, six or seven feet high, with spreading branches, which appear jointed, from the scars where the footstalks have been inserted. *Leaves* three or four in a whorl, stalked, spreading, about three inches in length, obovate or oblong, entire, emarginate, coriaceous, smooth, opaque, with one red rib, and many branching lateral veins. *Fruit* thick, channelled, about half an inch long. *Male flowers* axillary, branched, yellowish panicles, shorter than the leaves; *female* ones on a separate plant, in simple, axillary, green tufts. *Fruit* smooth, about the size and shape of a Hickory-nut.

It has been debated between Mr. Miller and Mr. Ellis, whether our poison-sh. or winged-leaf American toxicodendron, be the true Japan varnish-tree: Mr. Miller maintains the affirmative, and Mr. Ellis the negative: for the arguments on both sides, see *Phil. Trans.* vol. xlix. p. 160, p. 366, vol. l. p. 230, p. 441. See VARNISH.

TOXICUM, *toxicum*, a word particularly used to express a sort of poison, said to be used by the Indians to their arrows, in order to render wounds made by them incurable.

The word, in a more general sense, signifies any poison.

The Indians are supposed to poison their arrows, daggers, &c. with the juice of vapars, the mischievous effects of which continue a long time after the matter is quite dried up.

TOXICUS, in *Botany*, a name by which some authors have called the *arundo fœtida*, of which walking-canes are made.

TOXILI, TAXILI, or Taxila, in *Ancient Geography*, a people of India, in the number of those who inhabited servitudes near the rivers Copbes, Indus, Hydaspes and Amind.

TOXOTE, *toxotes*, among the Athenians, bowmen, a sort of inferior officers, or rather servants, who attended the lexarchi.

They were much like the Roman *velites*: there were a thousand of them in the city of Athens, that lived in tents, erected first in the forum and afterwards in the areopagus. See LEXARCHI.

TOZER, in *Geography*, a town of Africa, in the country of Sahara; 30 miles S.S.W. of Gafsa. N. lat. 33° 30'. E. long. 8° 15'.

TOZZETTA, in *Botany*, was so called by professor Savi of Pisa, in honour of his learned friend Dr. Ottaviano Tarquino Tozzetti, the present possessor of the library and manuscripts of the celebrated MICHELLI, at Florence, and son of the botanist after whom TARAGONIA was named, who afterwards took the name of Tozzetti: see the articles just indicated. Savi in *Uff. Annal.* v. 24. 50.—Unfortunately the plant thus denominating is a genuine species of *Albugo*; as professor Schrader has made it, in *Fl. Germ.* v. 1. 174; and as the writer of the present article has long ago shewn, in *Tr. of Linn. Soc.* v. 7. 125, as well as in *Prodr. Fl. Græc.* v. 1. 23; it being not only the *Pulsaria veruculata* of Linnaeus, but likewise his *Cornucopia albuginaria*. We find it difficult to account for the mistake of Linnaeus in referring this grass to *Pulsaria*, of which genus it has neither the habit nor characters.

TOZZI, ANTONIO, in *Biography*, a member of the Philharmonic society at Bologna, where he was born, and where he was a disciple of Padre Martini. In 1766; he was appointed

appointed maestro di capella to the duke of Brunswick, for whose court he first composed "Andromache," and in 1775 "Rinaldo." His subsequent productions were unknown to Gerber. In Italy, Tozzi has two operas recorded; "Tigrane" in 1762, and "L'Innocenza vindicata" in 1763.

TOZZIA, in *Botany*, received its name from Micheli, in honour of the reverend father Bruno Tozzi, abbot of Vallumbrosa, who found this rare and curious plant, on the alpine heights of Tuscany, above the celebrated and romantic solitude, where his abbey is situated. This learned ecclesiastic, unlike many of his monkish brethren, delighted to adore his Creator through his works, and was the cheerful and welcome companion of Micheli, in many of his botanical excursions, over the Italian alps, as well as along the shores of the Mediterranean. He was a fellow of the Royal Society of London, and of the Botanical Society of Florence. A number of figures of rare Tuscan *Orchideæ*, drawn by him, may be seen in Petiver's Works, vol. 1. t. 128.—Linn. Gen. 306. Schreb. 403. Willd. Sp. Pl. v. 3. 202. Mart. Mill. Dict. v. 4. Mich. Gen. 19. t. 16. Juss. 97. Lamarck Illustr. t. 522.—Class and order, *Didynamia Angiospermia*. Nat. Ord. *Personate*, Linn. *Lysimachiis affine*, Juss.

Gen. Ch. Cal. Perianth inferior, of one leaf, tubular, very short, five-toothed, permanent. Cor. of one petal, ringent; tube cylindrical, longer than the calyx; limb spreading; its upper lip in two, lower in three, segments, all nearly equal and roundish. Stam. Filaments four, concealed beneath the upper lip, unequal; anthers roundish, of two lobes, each with a spur at the base. Pist. Germen superior, ovate; style thread-shaped, agreeing with the stamens in length and situation; stigma capitate. Peric. Capsule globose, of one cell and two valves. Seed solitary, ovate.

Eff. Ch. Calyx tubular, five-toothed. Corolla ringent, with five rounded segments. Capsule globose, of one cell, and two valves. Seed solitary.

Obs. Surely the affinity of this genus to *Euphrasia*, *Lathraea*, &c. is apparently, even without the character of the spurred anthers, indicated by Jacquin. The fruit, which in this tribe affords such admirable distinctions, is here peculiarly marked. *Melampyrum* alone approaches it, by the fewness, size and shape of its seeds. *Tozzia* is erroneously described by Linnæus, with a single-valved capsule. We would presume to remove this genus to the *Pedicularis* of Jussieu.

1. *T. alpina*. Alpine *Tozzia*. Linn. Sp. Pl. 844. Willd. n. 1. Savi Etrusc. v. 2. 164. Jacq. Austr. t. 165. (*T. alpina* lutea, alfine folio, radice squamatâ; Mich. Gen. 20. t. 16. *Euphrasia* lutea alfinefolia, radice squamatâ; Bauh. Pin. 234. Prodr. 111. *Anonyma* fratris Gregorii, radice dentariæ; Column. Ecphr. v. 2. 49. t. 50. *Dentaria* buguloides, &c.; Mentz. Pugil. t. 9. f. 3, 4.)—Native of moist stony alpine places, in Austria, Switzerland, Dauphiny, Italy, and the Pyrenees, flowering in May. Mentzelius gives an interesting account of his gathering it among the melting snows, on a lofty precipitous mountain, near the source of the Isar, in 1654. The perennial root consists of numerous, fleshy, imbricated scales, and bears a solitary, herbaceous, erect, branched, square, juicy stem, about a foot high, slightly downy at the angles only. Leaves opposite, sessile, ovate, ribbed, succulent, smooth, slightly but coarsely notched, an inch long at most; the numerous floral ones much smaller. Flowers axillary, solitary, on simple slender stalks, shorter than the leaves, bright yellow, a little drooping, perfectly two-lipped, and rather more irregular than Micheli represents them. Calyx oblique, smooth,

brownish. We know of no attempt to cultivate this plant, nor would it perhaps be possible.

TRAABURG, in *Geography*. See DRAABURG.

TRAARBACH, a town of France, in the department of the Sarre. Its neighbourhood is a fine wine country. Opposite the town, on the other side of the Moselle, France, after the treaty of Nimeguen, erected a fort, called Mont Royal; but the demolition of it was made an article of the peace of Ryfwick; 34 miles S.W. of Coblentz. N. lat. 50° 0'. E. long. 7° 5'.

TRABAY, a river of Spain, in the province of Grenada, which runs into the sea near Muxacra.

TRABEATION, TRABEATIO, in the *Ancient Architecture*, the same with *entablature*; which see.

TRABENKA, in *Geography*, a town of Sweden, in the island of Aland.

TRABIA, a town of Sicily, in the valley of Mazara; 2 miles W. of Termini.

TRABUNACTUM, in *Ancient Geography*, a town of Africa Propria, on the route from Tacapæ to Leptis Major, between Adaugmadun and Tramuftufis. Anton. Itin.

TRACANA, a town in the interior of European Sarmatia, in the vicinity of the river Carcinites. Ptolemy.

TRACE, a mark or impression which any thing leaves behind it in passing over another.

TRACES of the Brain, among the Cartesian philosophers, are those impressions, more or less deep, which, they say, sensible objects make on the fine fibres of the brain, by means of the organs of sense.

These impressions are also called *traces of the object*; the course of the animal spirits, they say, serves to keep them up, and to renew them.

The vivacity of the imagination, they say, arises from the prodigious quantity of traces of different objects in the brain; which are so linked together, that the spirits cannot be sent into one of them, but they run into all the rest; by which means the ideas occasioned by the application of the spirits to those several traces, are all excited, as it were, at once.

Memory, according to the same, consists in the traces which the animal spirits have impressed.

TRACE of a Hare, among Hunters, is her footing in the snow; distinct from other treadings, called *doubling* and *pricking*, &c.

TRACES also denote the tracks of ravenous beasts, as wolves, wild beasts, &c.

TRACES, *Lady's*, in *Botany*. See OPHRYS.

TRACHÆ, in *Ancient Geography*, a name which Ovid gives to Anxur.

TRACHEA, in *Anatomy*, the wind-pipe, (from τραχηα αετηριας,) a rough tube containing air, (rough from its cartilaginous rings,) whence the Latin *aspera arteria*. It is the tube conveying air into the lungs, and commencing at the root of the tongue. See LUNGS.

TRACHEA, *Wounds of*. See WOUNDS.

TRACHEÆ, in *Vegetable Physiology*, is the appellation given by Malpighi, Grew, &c. to the large spiral-coated vessels of plants; which, being generally found filled with air only, are likewise termed air-vessels. The discoveries of Dr. Darwin, Mr. Knight, and others, have shewn them rather to be sap-vessels, and that the empty state in which they are usually found, is owing to their contents having been expelled on dissection, by the elasticity and irritability of their coats. Such is known to be the fact with regard to the arteries of animals. We have explained the nature of these vessels, and their functions, under the articles

CIRCULATION of Sap, LEAF, and SPIRAL Vessels, the latter being now their most usual denomination. It is preferable to any of the above, as not involving any theoretical opinion.

TRACHEAL ARTERY, in *Anatomy*, a branch of the right subclavian, running up from it in a winding course, along the *aspera arteria*, to the glandulae thyroidea and larynx, detaching small arteries to both sides; one of which runs to the upper part of the scapula. The tracheal artery may likewise be called *gutturalis inferior*. See ARTERY, and LUNGS.

TRACHELAGRA, formed of *τραχέλος*: neck, and *αγρ*, seizure, a term used by some medical writers to express the gout in the neck.

TRACHELIUM, in *Botany*, is not derived, as De Thuis supposes, from *τραχέλος*, rough, however applicable that sense may be to the plants to which the name was originally applied, our larger *Campanula*. The word comes from *τραχέλος*, the neck, being synonymous with the Latin *Cervicaria*, and the English Throatwort. Old writers tell us, the plants so denominated were believed to be useful in complaints of the neck, or throat; whence also originated another of their synonyms, *Uvularia*. Tournefort, alluding to these reputed virtues, derives the above name from *trachea arteria*, or *aspera arteria*, the wind-pipe, which is certainly not its real source. Being superfluous as a synonym to *Campanula*, he, as well as Linnæus, retain *Trachelium* for a neighbouring genus, distinguished by the long tube, or neck, of its corolla.—Linn. Gen. 89. Schreb. 119. Willd. Sp. Pl. v. 1. 925. Mart. Mill. Dict. v. 4. Art. Hort. Kew. v. 1. 355. Thunb. Prodr. 38. Juss. 165. Tournef. t. 50. Lamarck Illustr. t. 126. Gærtn. t. 51.—Class and order, *Pentandria Monogynia*. Nat. Ord. *Campanacea*, Linn. *Campanulacea*, Juss.

Gen. Ch. Cal. Perianth superior, very small, in five deep segments, permanent. Cor. of one petal, funnel-shaped; tube cylindrical, very long and slender; limb small, spreading, in five deep, ovate, concave segments. Stam. Filaments five, capillary, nearly the length of the corolla; anthers simple, oblong. Pist. Germen inferior, roundish, with three angles; style thread-shaped, twice as long as the corolla, rather swelling upward; stigma capitate, globose, slightly three-lobed. Peric. Capsule roundish, bluntly three-lobed angular, of three cells, bursting by pores at the base. Seeds numerous, minute.

Ess. Ch. Corolla funnel-shaped. Stigma globose. Capsule inferior, of three cells, bursting by pores at the base.

Obs. Linnæus himself corrected in his *Systema Naturæ* the error in his *Genera*, of the single-celled capsule. The remark subjoined in the last-mentioned work, of some bilocular species, properly belongs to the preceding genus, *Pœstum*.

1. *T. ceruleum*. Blue Throatwort. Linn. Sp. Pl. 245. Suppl. 143. Willd. n. 1. Art. n. 1. (*Trachelis azuro umbellifero*; P. Bald. 44. *Valeriana cerulea, utrica folio*; Barr. Ic. t. 683, 684.)—Leaves ovate, serrated. Corymbs compound.—Native of shady stony places, in Italy, Spain, and Barbary. Frequent on the ancient walls of Rome, flowering in the spring and summer. It may be kept for many years: with us in a greenhouse, though usually considered as a hardy biennial. The root is tapering, white, with many fibres. Herbage smooth, dark green, about two feet high. Stem roundish, often branched, leafy. Leaves alternate, ovate, acute, veiny, an inch or two long, and full half as broad, sharply, and sometimes very deeply, serrated. Footstalks linear; the upper ones half the length of the leaves; lower longer. Flowers very numerous, of a fine

blue, in a terminal, corymbose, level-topped tuft, or panicle, with awl-shaped bractæ; in aspect, though not in colour, resembling a *Valerian*.

2. *T. diffusum*. Slender Shrubby Throatwort. Linn. Suppl. 143. Willd. n. 2. Thunb. Prodr. 38.—Leaves awl-shaped, erect. Stem panicled, with divaricated branches.—Found by Thunberg, at the Cape of Good Hope. Mr. Maillon sent it in 1787 to Kew, where it is a greenhouse plant, flowering in August. Stem a foot or more in height, woody, much branched in the lower part, the branches erect, straight, round, leafy, smooth, or very minutely downy. Leaves scattered, slender, an inch long, very narrow, revolute, entire, sharp-pointed, nearly or quite smooth. Flowers blue, with a pale tube, small, solitary at the ends of the numerous, widely spreading or deflexed, branches of the slender, rigid, smooth panicle.

3. *T. tenuifolium*. Slender Fringed Throatwort. Linn. Suppl. 143. Willd. n. 3. Thunb. Prodr. 38.—Leaves linear, flat, recurved, fringed. Stem branched. Flowers lateral.—Brought by Thunberg likewise from the Cape, but as yet a stranger to our gardens. The long woody root bears a bushy woody stem, a few inches high, divided from the bottom into many branches, clothed with crowded, narrow, recurved, sharp-pointed leaves, half an inch long; strongly fringed at the margin; flat above; keeled beneath; often somewhat downy. Flowers numerous, axillary, solitary, sessile, slender, apparently white or yellowish, except the tips of the corolla. We must rely on the authors cited for the determination of the genus. The style does not project out of the flower. The germen is inferior.

TRACHELIUM, in *Gardening*, contains a hardy herbaceous plant of the perennial kind, of which the species cultivated is the blue throatwort (*T. ceruleum*). It is a plant that is perennial in its nature, being very lasting in soils which are dry and not of a rich quality, but not so in the contrary soil.

Method of Culture.—It is raised from seeds, which should be sown in the autumn when well ripened, or in the spring, in a bed or border of light mould. And when the plants are two or three inches in height, they should be set out in nursery-rows six inches apart, to remain till the following autumn, when they should be planted out where they are to remain.

These are flowering perennials which may have their seeds sown in the crevices of old walls, ruins, and rock-works with much effect and advantage, as the plants continue several years, and display many flowers.

They afford ornament in the above sort of works, and other situations where the earth is poor.

TRACHELO-MASTOIDEUS, in *Anatomy*, complexus minor; a small narrow muscle, situated at the posterior and lateral part of the neck, and extending from the mastoid process to the transverse processes of the vertebrae. Behind, it is covered by the splenius, and the transversals colli, to which it is connected: in front, it covers the complexus, the obliqui capitis, the posterior extremity of the digastricus, and the occipital artery. Its inner edge is close to the complexus, and is sometimes united by a muscular slip to the longissimus dorsi. The outer edge is fixed by small tendinous and fleshy slips to the transverse processes of the four last cervical vertebrae: and is unattached above. The inferior extremity of the trachelo-mastoides is slender and pointed, and fixed to the transverse process of the seventh cervical vertebra, or sometimes of the first dorsal; thence it ascends perpendicularly, growing thicker and broader to its upper end, which is fixed to the back of the mastoid process in front of the splenius. It is attached to the

the vertebral processes by small tendons, which produce muscular slips united in the body of the muscle: a flattened tendon is the medium of insertion in the head. When the right and left muscle act together, they restore the head, after it has been bent forwards, and they carry it backwards. The muscle of one side inclines the head and neck laterally.

TRACHELOPHYMA, a swelling of the thyroid gland. See **BRONCHOCELE**, and **THYROID Gland**.

TRACHELOS, a word used by some anatomical authors to express the neck.

TRACHENBERG, or **DRACHENBERG**, in *Geography*, a principality of Silesia, bounded on the N. by Poland, on the E. and S. by the principality of Oels, and on the W. by Wohlau. It was formerly a part of Oels, but erected into a distinct principality, in the year 1741, by the king of Prussia, in favour of the count of Hazfeld and Gleichen, who was made a prince of the empire, by the emperor Francis, in 1748.

TRACHENBERG, or *Straburck*, a town of Silesia, and capital of the principality of the same name; 14 miles W.S.W. of Militich. N. lat. 51° 28'. E. long. 16° 50'.

TRACHEOCELE, an enlargement of the thyroid gland. See **BRONCHOCELE**, and **THYROID Gland**.

TRACHEOTOMY, (from *τραχειν*, the *wind-pipe*, and *τομή*, to cut,) in *Surgery*, denotes the operation of making an opening into the wind-pipe.

When a foreign body has entered the trachea, the only means of relief consists in making a longitudinal incision through the skin and cellular substance of the neck, in order to expose the wind-pipe, and slit it open in the same direction. Several of the old practitioners conceived the propriety of this operation, which Junkers, in his "*Conspectus Medicinæ Chirurgicæ*," proscribed in the most positive terms. How, indeed, would it be otherwise possible to put an end to the suffocation and convulsive cough, which the extraneous substance produces? Few practitioners, however, have ventured to do the operation. In the year 1650, the performance of it was recommended by Bonnet, upon a child seven years of age, who, in eating some rice-soup, swallowed a small bone, which passed into the trachea. The young patient pointed out with his finger the place where the foreign body had stopped, and which was exactly opposite the middle of the throat. A physician, who was consulted, gave it as his opinion, that the operation was improper, either because he was not convinced of the presence of the bone in the trachea, or because he thought that it could not be taken out without exposing the child to a certain death. At the end of five days the boy died, and the trachea having been opened, the extraneous substance was taken out of it with the greatest ease. Raw and Heister also successfully extracted foreign bodies from the trachea; the former, a piece of mushroom, which had been swallowed with some soup; the latter, a bean, which had fallen into the wind-pipe.

Louis was not equally fortunate, in a case where the operation would have infallibly saved the patient's life. A child seven years old, like that of Bonnet, was amusing herself with throwing up small dry beans, and catching them in her mouth. She supposed she had swallowed one of them; but was instantly seized with a difficulty of breathing, and a most fatiguing convulsive cough. It was suspected that the bean had stopped in the throat, and every thing was tried, which was thought to be likely to make it descend into the stomach, or cause it to be ejected from the mouth. The symptoms, however, recurred from time to time, with the addition of convulsions of the limbs. The

case had gone on in this manner two days, when Louis was consulted. He found the child sitting up in bed, leaning upon her two arms, and breathing with difficulty. When he asked her where she felt any thing the matter, she placed her left fore-finger upon the trachea, betwixt the larynx and the sternum. The consideration of the various circumstances of the case made him conclude, that the bean had passed into the wind-pipe, and that the practice of bronchotomy was indispensably necessary for its extraction. Others, who were called into consultation, entertained a different sentiment. M. Louis could not bring them over to his opinion. The opposition which they made even increased, as the child appeared for a time a little better. But at length a new symptom occurred, which no one had yet observed, and which two hours previously did not exist. The child was evidently affected with an emphysematous swelling on each side of the neck above the clavicle. She took an emetic, which only had the effect of disturbing her. The third day she seemed more tranquil, though her respiration was always difficult. In the evening she died. When the trachea was opened, the bean was seen lodged at the upper part of this tube, whence it admitted of being most easily extracted with a pair of forceps.

The long intervals of ease which the patient had, contributed particularly to throw doubts on the presence of the extraneous body in the trachea. It was supposed, that it would necessarily have kept up there a continual irritation, which could not have allowed of the alternations of suffering and ease which took place. But the fact is, the body was smooth, and it had descended below the glottis, the sensibility of which is doubtless greater than that of the trachea, so that it only produced urgent symptoms, when it was forced by the action of respiration against the lower part of the glottis, whose ligaments it hurt, and whose aperture it closed in such a manner, that the air was no longer capable of passing through it with its wonted freedom. It is to this cause that the emphysema, which has been spoken of, must be imputed; for the air being urged back into the lungs, must have ruptured some of the bronchial cells, insinuating itself into the cellular texture of this viscus, and extending from below upward to the lower part of the neck, the integuments of which were elevated by it. This symptom is truly pathognomonic. It was also imagined, that if the extraneous substance had been in the trachea, it would have caused more quickly a fatal suffocation; but there are many cases on record, proving that patients have survived the accident a long while. Bonnet's child, and another mentioned by Marcellus Donatus, did not die until the fifth day. The only symptom which the last experienced, was a slight cough, with a little irritation. The cough which occurred before death was attended with efforts, in which the child turned livid, as if it had been strangled with a rope. Other children also, who have swallowed beans, and whose cases are related by Louis, died; one on the eighth or ninth day after the accident; the other at the end of three weeks, and after having in the interim followed the amusements of their age.

Perhaps it may be apprehended, that a foreign body, after its entrance into the trachea, will descend by its weight to the bottom of this tube; or, that after the proper incisions are made, its extraction will be attended with too much difficulty; but to these two objections, experience gives the most decisive answer. In almost all cases of this sort, the foreign body has been found opposite that part of the trachea which would have been opened, if tracheotomy had been performed; and the experiments relating to this operation which have been made upon living animals, for the purpose

purpose of judging of the facility or difficulty of extracting foreign bodies from the trachea, have shown, not only that they remain at the upper part of the trachea, (whither they are forced by the air which endeavours to find a way out from the lungs,) but that they even of themselves come out of this tube, and are thrown out to a distance by the same cause, immediately a sufficient opening for their escape has been practised by the surgeon. We are indebted for such experiments to M. Favier, then a student in surgery at the Hotel des Invalides, and since member of the college of surgery at Paris. A large dog, which was muzzled, had an incision made under his jaw, capacious enough to let the tongue be drawn out through it. M. Favier took an opportunity, when the animal was in the act of expiration, of introducing into the glottis an extraneous substance of an irregularly spherical shape. The dog was seized with convulsive motions, which gave reason for apprehending immediate suffocation; but symptoms abated sufficiently, to allow the operation of tracheotomy to be deferred six hours. The wind-pipe was then opened by a longitudinal incision, which divided three of its cartilaginous rings. Scarcely was the buffoury withdrawn, when a strong expiration propelled the foreign body out of the wound; and as soon as it was a second time introduced, it was expelled again.

The experiment was repeated ten times with the same result. M. Sébastien informs us, that he had seen M. Favier introduce into the wind-pipes of other dogs, extraneous substances of every description and figure, and amongst other things snails and small leaden balls. These were even pushed very far down with instruments; but notwithstanding this, they were thrown out with force as soon as they were left to themselves.

The difficulty of finding and extracting foreign bodies which are lodged in the trachea, must therefore be no longer urged as a pretext for omitting the performance of tracheotomy in all cases in which there is imminent danger of suffocation, in consequence of the presence of those bodies. If, after the integuments and trachea have been divided, they should neither make their escape nor present themselves at the opening, the surgeon should at once endeavour to find them with a pair of forceps, or any other instrument calculated to facilitate their extraction. All that now remains to be done, is to dress the wound in the most simple manner, and to promote its cicatrization by the usual means. The operation which we have been speaking of, may be successfully resorted to in some other cases. When the function of respiration is materially impeded in inflammatory quinias, or by the pressure which a foreign body in the œsophagus makes on the trachea, and which foreign body cannot possibly be extracted, nor pushed down into the stomach, the patient's life may be saved by making an opening into the trachea or larynx. The necessity for such an operation was recognised in the very infancy of the art. With the same view, Hippocrates advised the introduction of a tube into the throat. This bad practice prevailed until Aësculapius, who proposed the method of making an incision into the larynx of patients who were in danger of suffocation. This operation, however, met with opposition. Cælius Aurelianus considered it as fabulous and absurd. But it met with advocates in several other skillful practitioners, such as Antyllus, Orisibius, Aësculap, and especially Paulus Ægineta, who describes it in the following terms.

"The incision must be made into the trachea, under the larynx, about the third or fourth ring. This situation is the most proper, because it is not covered with flesh, and the vessels are not near it. The patient's head is to be carried backward, so that the wind-pipe may project more

forward. We make a transverse incision between two rings, so that the cartilages may not be wounded, but only the membrane which joins them together."

The Arabians, who succeeded the Greeks, were also advocates for tracheotomy. It does not appear, however, that they often practised the operation, on account of the dangers by which they supposed it was liable to be followed. Since the revival of learning, the possibility of doing it has been more generally admitted. The subsequent frequent examples of wounds of the throat, where the trachea has likewise been divided, have now produced a conviction, that this canal may be successfully opened in such cases as require it. Fabricius ab Aquapendente was the first who proposed the operation in strong terms. He judiciously examined and considered every part of it, and was fully aware of its advantages. The cannula which has been employed for placing in the opening made in the wind-pipe, seems to have been invented by him. He recommends it to be introduced between two of the rings; to have a straight shape; and to be furnished with wings, by means of which it may be fastened in its place. Its length should not be great, lest it should reach too far, and hurt the back part of the wind-pipe. Lastly; Fabricius advises it to be worn only during the impediment to respiration, since as a foreign body it may do harm, and cause pain and coughing.

Cælius, his pupil, also carefully treats of bronchotomy. He describes the manner of performing it. By the first incision, the skin is to be opened longitudinally over the trachea. By the second, which is to be made betwixt the muscles going up to the larynx, the wind-pipe itself is to be brought into view. A transverse opening is then to be made in it below the thyroid gland. Morgagni gives much credit to this author for having first noticed this gland, which in its enlarged state may materially increase the difficulty of the operation. Cælius approves of the cannula recommended by Fabricius, which he thinks ought to be made of silver, of a flat form, curved, every where pierced with small holes, and fastened to the neck with a ribbon. He was quite apprized of all the inconveniences, which Fabricius points out as being liable to attend the employment of this instrument.

While these two skillful practitioners professed themselves to be in favour of bronchotomy in cases where the necessity for it exists, a French surgeon, M. Habicot, endeavoured to bring the operation into repute. The treatise which he has published upon this subject, is entitled, "*Question Chirurgicale, par laquelle il est démontré que le Chirurgien doit nécessairement pratiquer l'Opération de la Bronchotomie, vulgairement dite Larvengiotomie, ou Perforation de la Flûte, ou Toueu.*" This tract made its appearance in 1620. Besides the reasons upon which this author supports his observations, he relates several cases in which bronchotomy saved the patients' lives. The first is that of a young girl, who was shot in the throat. The ball, after having broken the larynx, and particularly the left side of the thyroid cartilage, made its exit below the inferior angle of the scapula. So considerable a degree of swelling followed, that the patient was almost suffocated. Habicot introduced into the trachea a leaden tube, which was worn three weeks, until the inflammation had subsided. The patient got well. The second person upon whom he performed tracheotomy, was a young man, who had received twenty-two wounds in the head, face, throat, hands, arms, chest, back, yard, and thighs. These were done with a sword, knife, and pen-knife. In the evening of the same day, Habicot perceived that the patient was nearly suffocated in consequence of the inflammation and swelling of the throat. He was therefore deter-

terminated to make an opening in the trachea, below the wound, opposite the upper part of the larynx. The respiration was immediately established again, and the wound was kept open with a grooved tent, until the tumefaction of the larynx was diminished. The cure was complete in three months. M. Louis was of opinion, that, in these two cases, the cannula only served to keep the lips of the wound in the skin apart, because, in the first, the thyroid cartilage was broken so extensively, that it could hardly be supposed to form an obstacle to the passage of the air; and because, in the second, the wound of the trachea had allowed the air to enter and come out again with ease, without the assistance of any tube.

We find in Habicot's essay a third instance in which tracheotomy was successfully performed. "A lad, fourteen years of age, who had heard that gold, when swallowed, did no harm, having sold some merchandize at Paris, for which he had received about nine pistoles, wrapped them up in a piece of cloth and swallowed them, for fear of being robbed. But as they could not pass through the narrow part of the pharynx or œsophagus, his face became so frightful and deformed with swelling and blackness, that his companions could not recollect him. Hence, having caused him to be brought to my house, and not being able to make him void, nor get the obstacle into his stomach, so closely was it fixed by the swelling of the throat; and considering that he would be suffocated, I first made a favourable prognosis, and then performed bronchotomy, which being finished, he revived so rapidly from the violence of the air, that the bystanders were alarmed; but the tumour and unfavourable colour of the face having disappeared, I assured them that he would recover," &c. The foreign bodies were then pushed down into the stomach with a leaden probe, and these were discharged about a week afterwards at different times with the stools. As the patient was so promptly relieved, probably Habicot never thought of keeping the wound open with a cannula, but endeavoured to heal it as expeditiously as possible. In the two other cases, he employed this instrument, which he has described in the last chapter of his treatise.

Since Habicot, and before the end of the seventeenth century, the testimonies to be found in favour of tracheotomy are very numerous; but no one did any thing to perfect the operation until Decker, who, in 1675, proposed to practise it with a small trocar, armed with a cannula. The method is more simple, more easy, and subject, as some have conceived, to fewer inconveniences, if the trachea be not pierced until this tube is exposed by an incision made in the anterior and inferior part of the neck, betwixt the muscles destined to depress the os hyoides and larynx. Paulus, in his notes on Van Horne, imputes the preceding method to Sanctorius, who recommends the trachea to be pierced in the operation of tracheotomy, with the same instrument which he had invented for the paracentesis of the abdomen. By this means the trachea is opened, and the cannula placed, at the same time, a circumstance which prevents the bleeding, which might otherwise escape from the edges of the wound, and occasion an inconvenient and perhaps fatal cough. Dionis, who only proposes bronchotomy in the case of inflammatory quinsy, thinks that it may be done in a more expeditious manner, with less pain, and in a way more calculated to procure a speedy cure, than the mode which was previously in use. This plan consists in performing the operation by one puncture, so that the lancet at once opens the integuments and the interspace of the cartilages of the trachea, and the instrument is not withdrawn before the introduction of the probe, which is to serve as a conductor for the cannula. The advantages which Dionis ascribes to this method

would merit the greatest attention, were they not counterbalanced by the inconveniences which result from it. There are not many subjects, whose necks are so entirely destitute of fat, that the interspace of the rings of the trachea can be felt. This tube, whose figure is cylindrical, easily slips under the fingers, and the change of position may render Dionis's manner of operating extremely difficult. The operation is not without danger of wounding the posterior parietes of the trachea, because one cannot penetrate into its cavity, through the thickness of the integuments and cellular substance, without using a degree of force which it is difficult to regulate with precision. Lastly, when the cannula is put into the wind-pipe, this canal rises, and descends so considerably in various circumstances, and especially in the action of deglutition, that the instrument must be liable to slip out of it. Verduc, before Dionis, had made some remarks on the posture of the patient during the operation. His head was extended back, and the integuments were pinched up into a transverse fold before being divided. Verduc observed, that by inclining the head back, the difficulty of breathing would probably be increased, and that when this position was adopted, the integuments of the neck could not easily be pinched up into a fold. For such reasons, he thinks that posture best, in which the patient breathes with most freedom.

Tracheotomy had been practised only with a view of relieving the suffocation arising from the quinsy, and that which is produced by the pressure of a foreign body in the œsophagus upon the trachea. Detharding, professor of medicine at Rostock, published in 1714 a dissertation, entitled "De Methodo subveniendi submersis per Laryngotomium;" the object of which was to prove, that this operation is necessary in order to restore drowned persons. The principle with which he sets out is, that drowned persons cannot breathe when taken out of the water, because the epiglottis is in contact with the glottis, and closes this opening so closely, as to leave no passage at all for the air. But some observations, carefully drawn up by M. Louis, have proved that the glottis is open and free in drowned persons, as well as in persons who have perished of any other kind of death, and that their death is caused by the water which they have forcibly inspired, and which mixing with the air and mucus with which the bronchiæ and bronchial cells are naturally filled, obstructs and blocks up these organs, so that the air can no longer enter them. But if Detharding has been mistaken upon this point, he has not been deceived in regard to the advantages of tracheotomy in every other circumstance, and the little risk there is in practising it. He states, that the integuments, and the membrane which unites the rings of the trachea, being the only parts which ought to be cut, no vessels nor nerves of importance need be wounded.

Though there are no nerves of considerable size in the track which the incision must necessarily follow, the same observation cannot be made in respect to the blood-vessels. The thyroid gland sends down, to the left subclavian, veins which, after having ramified on its anterior surface, unite into two trunks, the left of which most commonly passes in front of the trachea, at the lower part of the interspace, which lies between the sterno-hyodei muscles. In the greater number of subjects, these trunks only form one at the place of their insertion. Sometimes they continue separate. Sometimes, also, one of them terminates in the left subclavian vein, and the other in the right. The left may be injured in dividing the cellular substance which covers the trachea. This canal itself has likewise its own vessels, which may be cut, and bleed a good deal. This was

what happened in a case inserted by Hevin, in his memoir on foreign bodies lodged in the œsophagus and trachea, in the first volume of the *Mémoires de l'Acad. de Chirurgie*. A Spanish soldier, twenty-three years of age, was nearly dying of suffocation from quinsy. Tracheotomy was deemed the only means by which his life could be saved. The wind-pipe having been exposed by a longitudinal incision, an opening was made between two of its cartilaginous rings; but the patient derived no benefit from it, because the blood entered it, and occasioned a convulsive cough, which hindered the cannula from keeping in its place. The case appeared so urgent, that M. Virgili determined to divide the trachea longitudinally down to the sixth ring; and he then made the patient lean forward. The blood soon ceased, and the surgeon was enabled to place in the wound a plate of lead, pierced with several holes, and provided with two shoulders, very much like what Belloste employed in the treatment of the wound after trepanning. The next day the fever was diminished, and deglutition easier. M. Virgili suspected that the patient would be able to breathe without the assistance of the plate, and he therefore removed it. His hopes were not deceived. The only thing which remained to be done, was to bring the edges of the wound together, and endeavour to heal it, which was accomplished in a few days.

Garengot states, that in separating the sterno-thyroidæ muscles, the thyroid glands are separated, a circumstance which produces a risk of cutting them in the centre, and of wounding a great many of the vessels which are either distributed upon them or the adjacent parts, so that the blood running into the trachea, the operation must be useless. He allows that it is necessary to operate thus upon persons who are inclined to be fat; but in order to avoid so great an inconvenience, when the patients are thin, and the interspace betwixt the third and fourth ring of the trachea has been felt with the index-finger of the left hand, and the place marked, Garengot recommends introducing a lancet into the trachea at once, before the finger has been removed. The lancet is then to be moved gently towards each side, so as to enlarge the opening. A flat tube is afterwards to be introduced, the sides of which are furnished with narrow ribbands. In this manner, the vessels of the trachea are alone cut, and these are small and of no consequence, so that there is less danger of blood falling into the wind-pipe: Garengot adds, that tracheotomy was in his days accounted a dangerous operation, and that there were few who had practised it, or who mentioned their having done it with success. This want of success appeared to him to be less ascribable to the operation itself, than to its having been undertaken too late. Such was also the sentiment of M. Louis, who insists upon the necessity of having recourse to it as soon as the suffocation appears at all urgent, so as to prevent the effusions in the lungs and brain, always brought on by an extreme difficulty of respiration.

Garengot's method was not original, since it had been described by Dionis. It has also some resemblance to Decker's mode of operating, which consisted in opening the trachea through the integuments, without exposing this canal by a longitudinal incision, in the usual way. Sharp records a case, which confirms the inconveniences which have been attributed to it. A patient, who was in great danger of dying suffocated, was operated upon in the preceding manner. The motion of the wind-pipe in respiration soon separated the opening in the trachea from that in the skin, and occasioned the utmost difficulty in introducing the cannula, and keeping it in its place. Sharp rightly infers

from this fact, that it is absolutely necessary to practise a longitudinal incision, and make it of sufficient size. Platner likewise recommends this incision of the skin, after which, he says, the trachea may be opened with a lancet, or with an instrument analogous to what is employed for tapping. But though this method seemed to him the most expeditious, he deemed it less safe.

It does not appear to Sabatier, however, in what it is more objectionable than the other. On the contrary, he thinks that it has the advantage of preventing bleeding into the trachea, because the cannula immediately fills the opening made in this tube. Platner cites a case, which is recorded in the *Philosophical Transactions*, and which the celebrated commentator upon Boerhaave has also quoted. Authors who had mentioned the cannula which was to be introduced into the trachea, had contented themselves with stating, that it ought not to be too long, lest it should injure the posterior side of that canal. Garengot conceived, that the dimensions of the instrument might be determined with more precision, and he calculated that its length should be about twenty-seven millimetres. Dr. G. Martin, the author of the case to which we have alluded, found this length insufficient, and he was even obliged to use the cannula of a trocar for the paracentesis of the abdomen, instead of what he was first about to employ; but as it was too long, he was under the necessity of making it pass through an aperture made in a thick linen compress.

It has been apprehended, that the extraneous substances in the air may pass through the cannula into the lungs, and, consequently, it has been recommended to cover the mouth of the instrument with a bit of sponge, cotton, or gauze. But Dr. Martin did not find this precaution necessary. He thinks it more useful to warm the air which the patient breathes, so that the lungs may not be hurt by it. There is one serious inconvenience which experience taught him, and which arises from the mucus discharged from the lungs. By this the cannula becomes so obstructed, that its presence affords no assistance. Dr. Martin was several times compelled to take out the tube in order to clean it. He received a suggestion, that he might employ a double cannula, that is to say, two cannulæ, one within the other, so that the internal one might be withdrawn as often as necessary, without disturbing the outer one, into which it could be easily put again. In this manner, a free respiration would be assured; but Sabatier conceives, that so thick a tube would be difficult of introduction. He also doubts whether the tube, of which all practitioners have spoken, is indispensably requisite. When the trachea, or larynx, is opened in wounds of the neck, the air makes its escape with force, and the circumstance needs to be checked by inclining the patient's head forward, and confining it in this posture with bandages. Meyslonnier, who wrote towards the conclusion of the seventeenth century, and who practised tracheotomy three times, put no leaden cannula in the wound. He contented himself with applying dry lint, a pledget, and bandage. Sabatier notices, that these cases are detailed too briefly. They prove, however, that the cannula may be dispensed with, and that the making of an opening in the trachea will enable the patient to breathe.

Van Swieten, as well as Platner, rejects the plan of opening the trachea with a trocar. His reason was, because the point of this instrument being thick and short, it was difficult to make it penetrate without using a great deal of force, especially in consequence of the great moveableness of the part on which it has to act. The trials which he made of this method, both on the dead subject and on living animals, convinced him that it was difficult, and that there was danger

in the event of the trocar slipping. This risk may be avoided by fixing the trachea well, and particularly by using some instruments, which were invented by Bauchot, an old surgeon-major of the French navy. They consist of a cutting blade mounted on a handle, to which is adapted a flat cannula, the opening of which has a rim furnished with two small rings, and of a kind of steel crescent, which served to fix the trachea, and as a conductor to the first instrument, which was called the *bronchotome*. Bauchot employed these instruments successfully upon two persons attacked with quinsy, and threatened with suffocation.

It may be concluded from all which has been said, that the operation of tracheotomy, which is also named bronchotomy, and laryngotomy, may be successfully practised, when patients are in danger of suffocation in cases of inflammatory quinsy; when respiration is obstructed by the lodgment of a foreign body in the œsophagus, which body can neither be extracted, nor pushed down into the stomach; and when an extraneous substance has fallen into the wind-pipe. In quinsies, and in cases of foreign bodies lodged in the œsophagus, the operation consists in making an opening, through which the air can enter to the lungs. In the case of a foreign body in the trachea, an incision is required, which divides longitudinally several of the cartilaginous rings of this tube, which is of a size proportioned to that of the substance to be extracted.

When merely an opening is required for the passage of the air, the surgeon may proceed in several different ways. In the oldest method, the patient was placed in the recumbent posture, with his head supported on pillows, so that the skin of the front and lower part of the neck could be pinched up into a transverse fold, of which one end was held by an assistant, the other by the surgeon himself with his left hand. This fold was divided from above downwards, and the incision was continued from the lower part of the larynx to the front of the upper edge of the sternum. The cellular substance between the sterno-hyoidei and sterno-thyroidei muscles, was next divided down to the fore-part of the thyroid gland and trachea. This canal being exposed, the surgeon puts his left-hand index-finger between two of the cartilaginous rings, and then passing along his nail the instrument of which he has made choice, he makes a transverse incision in it. When he judges a cannula indispensable, Bauchot's instrument is the best, the perforating part of which should be taken out immediately the trachea is divided, so as to leave only the tube, which is to be fixed in its place with suitable ribbands passed through the little rings. In this manner, there is no risk of blood falling into the trachea, because the wound is filled by the instrument with which it is made. If, on the contrary, the tube be considered useless, the surgeon should use a lancet with rather a long point.

Instead of practising tracheotomy, or bronchotomy, surgeons have been recommended to perform the operation of laryngotomy, as more safe and easy. The lower edge of the thyroid cartilage, and the upper edge of the cricoid cartilage, are connected together by a thick ligamentous membrane, covered in front merely by the integuments. This anterior part of the crico-thyroid membrane is also immediately opposite the highest and broadest portion of the cavity of the larynx, directly below the glottis, so that it is not only easy to bring it into view by a superficial small cut through the skin and cellular substance, but the incision may be made longitudinally, by which its union will be facilitated, and there can be no risk of hurting the opposite side of the larynx. In France, this mode of operating has had several distinguished advocates, and the celebrated Vic-d'Azyr com-

municated to the Société de Médecine some observations concerning it.

In whatever manner the operation may have been practised, some attention must be paid to the dressing of the wound. If the sole object has been to restore respiration during the short period of time necessary for the removal of a foreign body lodged in the œsophagus, there is no reason why the wound should not be speedily healed. Supposing the trachea, or larynx, to have been opened by a transverse incision, the patient's head must be inclined forwards, and the edges of the longitudinal wound of the skin brought together. When the operation has been practised to relieve the suffocation caused by quinsy, the passage of the air through the wound must be promoted, until the diminution of the inflammation of the parts about the throat allows the air to pass the natural way. The cannula which is used must be covered with gauze, in order to prevent the entrance of extraneous substances in the atmosphere, or bits of the dressings. The wound should be covered with pledgets and compresses, and the whole supported with a suitable bandage. Such are at least the means recommended by methodical writers; but Sabatier observes, that experience has not confirmed their propriety. To some practitioners she has proved, that it is difficult to keep the cannula in its place; to others she has shewn, that the tube becomes filled with mucus, by which it is rendered useless. Sabatier even thinks, that it might be better to omit altogether the employment of the cannula, and nothing would be more easy, were laryngotomy performed as above explained. The superficial small wound required in this operation, may be left uncovered with dressings, and no inconvenience will follow. Sabatier's *Médecine Opératoire*, tom. iii. p. 25, &c. edit. 2.

TRACHICHTHYS, in *Ichthyology*, a genus of fishes, first described by Dr. Shaw in the "Naturalist's Miscellany," the characters of which are as follow: head rounded in front; eye large, mouth wide, toothless, descending. Gill-membrane furnished with eight rays, of which the four lowermost are rough on the edges. Scales rough; abdomen mailed with large carinated scales. There is one species; viz.

T. AUSTRALIS, or *Southern Tr.* With mailed abdomen; a native of the coast of New Holland. Its colour is a bright pink-ferruginous, or fair reddish-brown. The middle part of all the fins of a deeper colour than the rest of the animal, and the edges lighter, or of a yellowish tinge.

TRACHIDNA, a name given by Jovius and some others to the *draco marinus* of the old authors, called by us the *weever*.

TRACHINIA, in *Ancient Geography*, a canton of Thessaly, in the Phthiotide, near mount Oeta. It is also called Melide. In this country was the town of Heraclea, since called Heraclea Trachinæ. Thucydides.

TRACHINIÆ PETRÆ, high and inaccessible rocks which bordered a plain near the Maliac gulf. They surrounded the Melide. Between these rocks and the sea flowed the river Melas, whence the territory had its name.

TRACHINUS, in the Linnæan system of *Ichthyology*, the name of a genus of fish of the order of the Jugulares: the characters are, that the head is compressed and not smooth: the membrane of the gills has six rays, and the lower lamina of the opercula is serrated; and the anus is near the breast. Linnæus mentions one species, viz. the *Draco*. Artedi refers the *Uranoscope* also to this genus.

The name is originally Greek, the word τρᾶχις signifying rough, sharp, or prickly. It was given to this fish from

the rays of its back-fin being remarkably rigid, and sharp like prickles.

TRACHINUS *Lapis*, in *Natural History*, a stone mentioned by the writers of the middle ages, as possessing many great medicinal virtues. It seems to have been a kind of *lapis nephriticus*, being described as bright, but not transparent, and being of two kinds, the one blackish, and the other green.

TRACHIS, in *Ancient Geography*, a town of Thessaly, said to have been built by Hercules at the foot of mount Oeta, towards the mouth of the river Asopus. It derived its name from its mountainous and rugged situation. On the site of this town, which is mentioned by Homer, the Lacedæmonians built another, to which they gave the name of Heraclæa.

TRACHOMA, (from τριχως, *rough*,) a roughness of the inner surface of the eyelids, caused by hardened mucus and scabs. It implies the same sort of disease as the *Pterophthalmia*; which see.

TRACHON, in *Ancient Geography*, a plain which bounded the territory of the king of the Cimberian Bosphorus, on the side of Scythia.

TRACHONES, the name of two hills situated beyond the town of Damascus, in Syria. Strabo.

TRACHONITÆ ARABES, Arabs who inhabited Sacæa, at the foot of mount Alfadamus. Ptolemy.

TRACHT, or TRACHTIN, in *Geography*, a town of Moravia, in the circle of Brunn; 21 miles S. of Brunn.

TRACHURUS, in *Ichthyology*, the name of a fish of the scomber kind, called in English a *scad*, and by several authors, *sure*, *saurus*, and *acertus marinus*. See SCOMBER.

TRACHURUS *Brafilensis*, a name given by Mr. Ray to a fish of the scomber kind, the *scomber cordyla* of Linnæus, known among writers on these subjects by its Brazilian name *guaraterêba*.

TRACHYNOTIA, in *Botany*, a genus of grasses, so named by Michaux, from τριχως, *rough*, and νωτος, *the back*, because the glumes are rough in that part.—Michaux *BoREALI-AMER.* v. 1. 63.—This is the same with *Limnetis* of Richard and Persoon, adopted by Pursh, v. 1. 25 and 59, referred to *Triandria Monogynia*, and thus defined.

Est. Ch. Spike lateral-flowered; flowers imbricated in two ranks. Calyx of two valves; one smaller than the other. Corolla of two valves, pointless, compressed, keeled. Style elongated.—Three species are described.

1. *T. juncea*. Michaux v. 1. 64. (*Limnetis juncea*; Pursh n. 1. *Dactylis patens*; Ait. Hort. Kew. v. 1. 160. Donn. Cant. ed. 5. 20.)—"Leaves two-ranked, shortish, convolute and tapering. Spikes few, remote, spreading. Calyx pointed; its keels rough."—Common in dry salt meadows of North America. Perennial, flowering in July. *Pursh*.

2. *T. cynosuroides*. Michaux *ibid.* (*Limnetis cynosuroides*; Pursh n. 2.)—"Somewhat glaucous. Leaves very long. Spikes numerous, alternate, turned one way. Calyx pointed, awned; its keels prickly."—Frequent on rocky sea-shores of North America. Perennial, flowering in July. *Pursh*.

3. *T. polystachya*. Michaux *ibid.* (*Limnetis polystachya*; Pursh n. 3. *Dactylis cynosuroides*; Linn. Sp. Pl. 104, excluding the synonyms of Loesling and Ray. Willd. Sp. Pl. v. 1. 407. Linn. Fl. fasc. 1. t. 9.)—"Leaves broad, flat. Spikes several, spreading in every direction, long and linear. Keels prickly."—Common in salt marshes, from Canada to Florida. Perennial, flowering in August. *Pursh*.

These are very coarse harsh grasses; the last is said by Clayton to have a rancid smell. We mention them here, because *Limnetis* is accidentally omitted in its proper alphabetical order. Which of the two above names is to be preferred, might require consideration; but we have already declared under *DACTYLIS* that we do not see the necessity of dividing that genus. If otherwise, our British *D. striata*, Fl. Brit. 110. Engl. Bot. t. 380. Knapp Gram. t. 63, must be associated with the above three American species.

TRACHYS MONS, in *Ancient Geography*, a mountain of the Peloponnesus, in Arcadia. Pausanias.

TRACING, in *Husbandry*, a term used by our planters for the method of preserving the maize, or Indian corn. This being a large grain, is apt to spoil, if not carefully preserved.

Some thresh out the corn as soon as the ears are gathered, and lay it up in holes of the earth, which are their granaries: but those who have not opportunities of doing this, trace it, that is, they leave it in the ear, and weave, or fasten together a great number of ears by the ends of the husks: these traces of corn they hang up within doors, on such supports as will keep them from one another; and they will, in this manner, keep good the whole winter.

This is a method of our introducing; but their own, of burying the clean corn, was at least as good, and was the same practised by the Egyptians of old, and by all the wisest nations of the East at this time. But whether we have improved their husbandry in this particular, or not, it is certain that we have greatly assisted them in the planting of this corn, which we do by the plough, instead of the troublesome method they had of doing it with the hoe. The manner of our planting it is this: we plough single furrows the whole length of the field, and at about six feet distance one from another; we then plough others across at the same distance, and then, wherever the furrows meet, the corn is thrown in; it is then covered either by the hoe, or by running another furrow behind it with the plough; and when the weeds begin to overtop the corn, they plough the spaces again, and by this means destroy and turn in all the weeds, and give the earth a stirring, that greatly assists vegetation.

The famous method of horse-hoeing husbandry, so celebrated by Mr. Tull, in a book written on that subject, is no other than the bringing home this method of our American planters, on the culture of the maize, and applying it to our European corn. The Indians, and our planters, join in the method of raising a hill of earth round every stalk of the maize; and when the ground is poor, or out of heart, they bury two or three fish, of a kind called by them the *aloose*, under every hill, and by this means they have a crop double to what would otherwise have been produced. The English have learned this manure from the Indians; and in New England, where they are near the fishing-stages, they bury the heads and garbage of the cods, which succeed as well as the *aloose*, and cost nothing but the carriage.

The lands on which the maize or Indian corn has grown, are as well fitted for our European corn as if they had been laid fallow. The reason of this is, that the plants of the Indian corn standing at six feet distance from each other, the far greater part of the ground has remained unoccupied, and at the same time has had the advantage of often ploughing to kill the weeds, which is a benefit equal to that of dung and rest. All this, though it tends to prove the doctrine of horse-hoeing husbandry not new, yet it strengthens the system greatly. Phil. Trans. No. 142.

TRACING, among *Miners*. See TRAINING.

TRACING-Line, in *Sea Language*, a small cord generally passing

passing through a block or thimble, and used to hoist up any object to a higher station, in order to render it less inconvenient. Such are the tracing-lines of the awnings, and those of the yard-tackles, which, by hanging down in a cavity or bight, would be awkward and inconvenient. Falconer.

TRACK, in *Geography*, one of the Nicobar islands. N. lat. $7^{\circ} 30'$. E. long. $94^{\circ} 6'$.

TRACK of a Ship. See WAKE.

TRACK-Road, the same as *Towing-path*; which see.

TRACK-Scout, a vessel employed to carry goods or passengers up and down the rivers or canals in Holland, and the countries bordering on the Baltic sea. It is usually tracked by a horse, who trots along the margin to a limited distance, after which he is relieved by another. Falconer.

TRACKING, denotes the art of pulling any vessel or floating body along the stream of a canal or river, by means of a rope extending from the vessel, &c. to the adjacent shore, and drawn along the banks of the river by men or horses. Whence TRACK-Scout; which see.

TRACONITIS, in *Ancient Geography*, a rude and mountainous country of Palestine, on the other side of Jordan. M. d'Anville places it at the bottom of Anti-Libanus, inclosed within several branches of this mountain, extending towards the S.E. among which is found mount Hermon: the principal place was *Ænos*.

TRACOSSOZ, in *Geography*, a town of Spain, in the province of Leon; 30 miles W. of Zamora.

TRACT, TRACTUS, properly denotes an extent of ground, or a portion of the surface of the terraqueous globe.

TRACT, *Treatate*, or *Treatatus*, does also signify a small treatise or written discourse upon any subject.

TRACT, in *Hunting*, denotes the trace or footing of a wild beast.

TRACTION, DRAWING, the act of a moving power, by which the moveable is brought nearer to the mover, called also *attraction*.

TRACTION, *Line of*, in *Mechanics*. See WHEELS.

TRACTORIÆ, among the Romans, were diplomas or tickets given by the emperor to such as he sent into, or called out of, the provinces; by which they were entitled to the use of the public post, and to be maintained at the expence of the government.

TRACTRIX, in *Geometry*, a curve line, called also *catenaria*; which see.

TRADE, *Traffic*, *Commerce*, the act, or art, of dealing, buying, selling, exchanging, &c. of commodities, bills, money, &c.

For the origin, progress, &c. of trade, see COMMERCE and NAVIGATION.

It is observed by Dr. Smith, that all wholesale trade, all buying in order to sell again by wholesale, may be reduced to three different sorts; *viz.* the home trade, the foreign trade of consumption, and the carrying trade. The home trade is employed in purchasing in one part of the same country, and selling in another, the produce of the industry of that country; and it comprehends both the inland and the coasting trade. The foreign trade of consumption is employed in purchasing foreign goods for home consumption. The carrying trade is employed in transacting the commerce of foreign countries, or in carrying the surplus produce of one to another.

The capital that is employed in the first kind of trade generally replaces, by every such operation, two distinct capitals, that had both been employed in the agriculture or manufactures of that country, and thereby enables them to

continue that employment. When it sends out from the residence of the merchant a certain value of commodities, it generally brings back in return at least an equal value of other commodities. When both are the produce of domestic industry, it necessarily replaces, by every such operation, two distinct capitals, which had both been employed in supporting productive labour, and thereby enables them to continue that support.

The capital employed in purchasing foreign goods for home consumption, when this purchase is made with the produce of domestic industry, replaces, too, by every such operation, two distinct capitals; one of which only is employed in supporting domestic industry. Though the returns of the foreign trade should be as quick as those of the home trade, the capital employed in it will give but one-half the encouragement to the industry or productive labour of the country. But, in fact, the returns of the foreign trade are very seldom so quick as those of the home trade; the former coming in before the end of the year, and sometimes three or four times in the year; and the latter seldom coming in before the end of the year, and sometimes not till after two or three years. The capital, therefore, in the home trade will sometimes make twelve operations, before a capital employed in the foreign trade of consumption has made one. If the capitals are equal, therefore, the one will give twenty-four times more encouragement and support to the industry of the country than the other.

That part of the capital of any country which is employed in the carrying trade, is altogether withdrawn from supporting the productive labour of that particular country, to support that of some foreign countries. And though it may replace, by every operation, two distinct capitals, yet neither of them belongs to that particular country. See the illustration of these principles in Smith's *Wealth of Nations*, vol. ii. p. 60, &c. See CAPITAL.

The offences against trade, considered in a legal view, are *owling*, or the offence of transporting wool or sheep out of this kingdom, to the detriment of its staple manufacture, (see OWLER,) *smuggling*, *fraudulent bankruptcy*, *usury*, *cheating*, (see CHEATS,) *forestalling*, *regrating*, (see REGRATOR,) *engrossing*, *monopolsy*, exercising a trade in any town, without having previously served as an *apprentice* for seven years, punishable by statute 5 Eliz. c. 4. with the forfeiture of 40s. per month; and transporting and seducing our *artificers* and *manufacturers* to settle abroad. See each head.

TRADE, *Balance of*. See BALANCE.

TRADE, *Board of*. See BOARD.

TRADING *Society*. See SOCIETY.

TRADE-Winds, denote certain regular winds at sea, blowing either constantly the same way, or alternately this way and that; thus called from their great use in navigation, and the Indian commerce.

The trade-winds are of different kinds, some blowing three or six months of the year one way, and then the like space of time the opposite way: these are very common in the Indian seas, and are called *monsoons*; which see.

Others blow constantly the same way: such is that general wind between the tropics, which off at sea is found to blow all day long from east to west. For the phenomena of each, with their physical causes, see WIND.

Dr. Lister has a conjecture in the *Philosophical Transactions*, N^o 156, that the tropical or trade-winds arise, in great part, from the daily and constant exhalations of a sea-plant, called the *sargossa*, or *lenticula marina*, which grows in vast quantities from 36° to 18° north latitude, and elsewhere upon the deepest seas. For the matter of wind,

coming from the breath of one only plant, must needs be constant and uniform: whereas the great variety of trees and plants at land furnishes a confused manner of winds. Hence, he adds, it is, that these winds are broken about noon: the sun quickening the plant with them, and causing it to breathe faster, and more vigorously. Lastly, the direction of this wind of east to west, he attributes to the general current of the sea: for a gentle air is observed to be constantly led along with the stream of the river: nor must it be omitted, that every plant is, in some measure, an heliotope, and bends itself, and moves after the sun, and consequently emits its vapour thitherward: so that the direction of the trade-wind is, in some measure, also owing to the course of the sun.

Dr. Gordon has another hypothesis: the atmosphere, which surrounds the earth, and moves along with it in its diurnal motion, he supposes to keep pace with it: that part of it, at least, which is near the earth, if the remoter part should be judged to lose ground.

If, then, there were no changes in the atmosphere's gravity, he supposes it would always go along with the earth from west to east in an uniform motion, altogether insensible to us: but the portion of the atmosphere under the line being extremely rarefied, its spring expanded, and so its gravity and pressure much less than the neighbouring parts of the atmosphere, it is incapable of the uniform motion towards the east, and must, therefore, be pressed westwards, and make the continual breeze from east to west, between the tropics.

TRÆDESCANT, JOHN. in *Biography*. one of the fathers of natural history in England, having been the first who made any considerable collection of natural productions. (see *MUSEUM*.) as well as one of the earliest cultivators of exotic plants in this country, is reported by Anthony Wood to have been a Dutchman. His name nevertheless appears to be English, and was originally of two syllables, *Tradescant*, though it subsequently became *Tradescantus*, as appears by a line in his family epitaph,

————— beneath this stone,
Lie John Tradescant, grandfath'r, father, son."

Dr. Pulteney thinks he was not settled in England during the life of Gerard, though often mentioned in the second edition of that author's *Herbal*, by its editor Johnson, as well as in Parkinson's Works. He is recorded to have been for a considerable time in the service of the lord-treasurer Salisbury, and lord Wootton. He travelled into various parts of Europe, even as far Russia, and was on board a fleet sent against the Algerines in 1620. He brought home plants and other curiosities from these various excursions, but it does not appear what was their primary object. About the year 1629, he obtained the title of gardener to king Charles I., and about that time, or before, was settled at Lambeth, where his own garden was situated. Some remains of this were traced out by sir William Wotton 100 years afterwards. Tradescant's Ark, or Museum, became very famous as a collection of natural rarities. It was much visited by the great, and even by the royal family, all of whom took pleasure in enriching it, as in later times their descendants have done to other such collections. A catalogue of the *Museum Tradescantianum*, in 10mo., appeared in 1656, with portraits of the owner and his son, engraved by Stollar; of which however most of the copies are plundered by mere print collectors, careless of the value of any thing beyond their own object. By this catalogue, the museum appears to have been furnished, not only with birds, quadrupeds, fish, shells, insects, minerals,

fruits, &c. but also with warlike instruments, habers, vessels, coins, and medals. There is annexed a catalogue in English and Latin of the plants cultivated in the author's garden. His portrait represents him as greatly advanced in age at this period, but the time of his death is not known. His son, of the same name, visited Virginia, and returned with several new plants; amongst others the original *TRÆDESCANTIA*, hereafter mentioned. This son inherited his father's collections, and dying in 1662, bequeathed them to Mr. Elias Astmore, so that they may be said to have laid the foundation of the Astmorean Museum at Oxford, in which they, like the name of their original owner, are now sunk. The widow of the younger Tradescant, the mother probably of the grandson mentioned in the epitaph, is said to have erected the curious and rather splendid tomb, remarkable for its allusive decorations, which still exists in Lambeth church-yard. See Dr. Ducarel's account of this monument, in the sixty-third volume of the Philosophical Transactions. Pulteney's Sketches of Botany.

TRÆDESCANTIA. in *Brown*, was so named by Ruppis, in *Fl. Jen.* 55. and Linæus in *Hort. Clæ.* 127. after the two John Tradescants, father and son, commemorated in the preceding article.—*Linæ. Gen.* 159. Schreb. 215. Willd. *Sp. Pl.* v. 2. 16. Mart. *Mill. Dict.* v. 2. Art. *Hort. Kew.* v. 2. 204. Park. 218. Muhlent. *Can.* 34. Juss. 45. Lamarck *Dict.* v. 2. 570. Illustr. 2. 226. Kunth *Nov. Gen. et Sp.* v. 3. 261. *Germ.* 2. 15. (*Ephemera*; *Tournef.* 1. 193.)—Class and order, *Hexandria Monogynia*. Nat. Ord. *Engelm. Linæ. Juss.* *Commelinæ*, Brown. See his *Prodr. Nov. Holl.* v. 1. 269.

Gen. Ch. Cal. Perianth interior, of three ovate, concave, equal spreading, permanent leaves. *Cor.* Petals three, ovate, flat, equal, widely spreading, their claws sometimes combined. *Stam.* Filaments six, thread-shaped, the length of the calyx, erect, more or less clothed with jointed or beaded hairs; rarely smooth; anthers kidney-shaped, of two, somewhat separated, cells. *Pist.* Germen superior, ovate, with three blunt angles; style thread-shaped, the length of the filament; stigma triangular, obtuse. *Peric.* Capsule ovate, included in the calyx, of three cells and three valves, with partitions from their centres. *Seeds* few, angular, inserted into the inner angle of each cell, with a papillary protuberance over the transverse, contracted, imbedded embryo.

Ess. Ch. Calyx of three leaves. Petals three, equal. Filaments erect, bearing jointed hairs. Capsule of three cells. Seeds with a protuberance over the embryo.

Obf. Mr. Brown, by whose and Gærtner's observations we have endeavoured to improve the above generic characters, has most justly established a natural order of *Commelinæ*, as distinct from Jussieu's *Junci*, from which they are, as he says, very different in habit as well as structure. Indeed we were never able to conceive how any professed natural system could allow of so strange an assemblage, of plants that have so little in common, as the above-named order of the great French teacher. Nor are we less surprised at the arbitrary assumption which will still call the beautiful delicate and transient corolla of these plants, a calyx, though as different and distant from the real external perianth, as in any flower whatsoever. But it is decreed that monocotyledonous plants can have but one integument to their flowers, and that this one must be a calyx; though here they have manifestly two, of which the internal one is, as usual, a self-evident corolla. Mr. Brown indeed feels the necessity of calling these internal parts petals with Linæus, though such phraseology oversets the Jussieuian hypothesis.

The genus before us consists of various species of herbaceous

TRADESCANTIA.

aceous plants, some annual, others perennial, none of them natives of Europe. Their *leaves* are alternate, sheathing, simple, entire, with parallel ribs. *Flowers* clustered, short-lived, usually purplish, differing from those of *COMMELINA*, (see that article,) in being regular, with almost universally six perfect *anthers*. Mr. Brown proposes to separate, into a distinct genus, certain species, the claws of whose *petals* are united, and whose two *seeds*, in each cell, are directed in a contrary manner, one upward, the other downward. The scar of these *seeds*, moreover, is said to be at the base, their embryo at the opposite extremity. In this predicament are *T. axillaris*, *criflata*, and some unpublished species. We proceed to augment Willdenow's list with some new species, most of them recently published by Mr. Kunth, among the discoveries of those illustrious travellers Baron Humboldt and M. Bonpland.

1. *T. virginica*. Common Virginian Spider-wort. Linn. Sp. Pl. 411. Willd. n. 1. Ait. n. 1. Pursh n. 1. Curt. Mag. t. 105. Sowerb. Drawing-book t. 6. Redout. Liliac. t. 95. (Phalangium ephemerum virginianum; Park. Parad. 152. t. 151. f. 4.)—Stem erect. Leaves lanceolate, smooth. Flowers numerous, in a sort of terminal sessile umbel. Calyx hairy.—This, the original species of its genus, was brought from Virginia by the younger TRADESCANT, (see that article,) before the year 1629, as appears by Parkinson's *Paradisus*; and is now one of the most common hardy perennials of every country garden, blossoming copiously throughout summer and autumn. Pursh says it occurs in shady woods, from Pennsylvania to Carolina, flowering in May and June. The plant is readily increased, by parting its long fibrous roots, and thrives particularly well in shade and moisture. The stems are eighteen inches high, round, leafy, scarcely branched. Leaves sheathing, concave, taper-pointed, of a dark shining green. Flowers large, of a rich violet blue, each lasting but a day, or rather a few hours in the early part of a day, after which they roll up into a liquefying pulpy mass; but there being a great number in each umbel, or tuft, there is a long succession. The six golden *anthers* are brilliantly contrasted with the dark purple shaggy filaments.

2. *T. rosea*. Rosy-flowered Spider-wort. Venten. Hort. Celf. t. 24. Ait. n. 2. Pursh n. 2. Redout. Liliac. t. 94.—Stem erect. Leaves linear-lanceolate, elongated. Umbels stalked, of few flowers. Calyx smooth.—Native of wet sandy fields, in Carolina and Georgia, flowering in June and July. Root perennial. Flowers rose-coloured, small, but very handsome. Pursh. The whole plant is of a much more slender habit than the last. Leaves grassy, fringed. Umbels on long stalks, often rising above the uppermost leaves.

3. *T. subaspera*. Roughish Spider-wort. Curt. Mag. t. 1597. Ait. Epit. 375. (*T. crisata*; Walt. Carol. 119.)—Stem erect. Leaves ovate-lanceolate, recurved, rough-edged. Umbels lateral and terminal, many-flowered. Calyx hairy.—Native of North America, from whence it is reported to have been brought by Mr. Lyon in 1812. The plant is a hardy perennial with us, flowering from June to September, but has little superiority to claim over *T. virginica*, except what arises from novelty. The foliage is broader, and more divaricated, than in that species, as well as wavy and roughish, especially at the edge. Flower-stalks reddish or purple, becoming wrinkled as the flowers fade.

4. *T. crassifolia*. Thick-leaved Spider-wort. Cavan. Ic. v. 1. 54. t. 75. Willd. n. 2. Kunth. n. 5. Curt. Mag. t. 1598.—Stem erect, woolly. Leaves ovate, coriaceous; silky at the margin and under side; with very short sheaths. Umbels terminal, hairy.—Native of New Spain,

flowering in September. A stove plant in England, introduced by the late marchioness of Bute. The root is tuberous, perennial. Mr. Ker Bellenden describes the stem as procumbent, but by every other account it is erect. The broad thick ovate leaves, densely silky with white hairs at the margin, as well as beneath, distinguish this species from all the foregoing. The flowers are of a pale violet, expanded but for three or four hours in a morning; their size equal to our first and third species. Calyx hairy.

5. *T. speciosa*. Beautiful Mexican Spider-wort. Kunth n. 6.—“Stem erect, branched. Leaves oblong, acute, smooth on both sides; woolly at the margin. Umbels terminal and axillary, sessile, many-flowered. Calyx woolly.”—Native of the elevated plains of Mexico, near Chalottepec, flowering in May. Perennial. Stem striated, sparingly clothed with white woolly pubescence. Leaves lanceolate-oblong, membranous, somewhat channelled, three inches long, hardly one broad. Sheaths short, lax, striated, woolly at the edge. Umbels of about twenty flowers, whose stalks are divaricated, round, hairy, near an inch long. Calyx tipped with purple. Petals thrice its length, purple, combined at the base. Germen woolly. Style purplish, smooth. Kunth.

6. *T. erecta*. Upright Racemose Spider-wort. Cavan. Ic. v. 1. 53. t. 74. Willd. n. 3. Ait. n. 4. Jacq. Ic. Rar. t. 354. Redout. Liliac. t. 239. (*T. bifida*; Roth Catal. v. 1. 42.)—Stem erect, smooth. Leaves elliptical, acute at each end, smooth. Clusters terminal.—Native of Mexico. A hardy annual in our gardens, introduced by Sir Joseph Banks, in 1794, flowering in July and August. Stem a yard high, or more, branched, leafy. Leaves three or four inches long, pale or glaucous beneath, each tapering at the base into a short sheath. Clusters solitary or in pairs, gradually elongated, of many sky-blue flowers, scarcely half the size of *T. virginica*.

7. *T. undata*. Wavy Racemose Spider-wort. Kunth n. 7. Willd. Enum. 347.—Stem erect, with a hairy lateral line. Leaves oblong, acute at each end, wavy, rough on the upper side and margin, with fringed sheaths. Clusters terminal, in pairs.—Native of the sloping sides of hills in Cumana, flowering in September. An annual plant, very nearly related to the last, but more tender, and with reddish-purple flowers.

8. *T. Zanoniana*. Gentian-leaved Spider-wort. Swartz Ind. Occ. v. 1. 604. Willd. n. 4. Ait. n. 5. (*Commelina Zanoniana*; Linn. Sp. Pl. 61. Redout. Liliac. t. 192. *Campelia Zanoniana*; Kunth 264. *Zanoniana graminea perfoliata*; Plum. Gen. 38. t. 38. *Periclymenum rectum herbaceum, gentianæ folio, folii pediculo caulem ambiente*; Sloane Jam. v. 1. 243. t. 147. f. 1.)—Stem erect. Leaves elliptical, tapering at each end. Flowers capitate, on long, lateral, solitary stalks, jointed in the middle, with a pair of bracteas. Capsule clothed with the permanent pulpy corolla.—Native of woods in the West Indies and South America, flowering in autumn. A not unfrequent stove-plant in Europe, though less remarkable for the beauty of its flowers, which are small and white, than for the peculiarity of its dark-purple juicy fruit, formed of the thickened and enlarged corolla, which completely invests the capsule. The root is perennial. Stem two or three feet high, mostly branched, smooth, juicy, leafy in the upper part. Leaves near a foot long, downy beneath, fringed at the base, often red at the edges; their sheaths tumid, densely fringed. Flower-stalks opposite to each leaf, and nearly as long, with a sheath in the middle, and two ovate, spreading, leafy bracteas at the top, accompanying a head of eight or ten flowers.

9. *T. difcolor*. Purple-leaved Spider-wort. L'Herit. Serot. Angl. 8. t. 12. Willd. n. 5. Ait. n. 6. Swartz Ind. Occ. v. 1. 607. Sm. Ic. Pic. t. 10. Curt. Mag. t. 1192. Redout. Liliac. t. 168.—Smooth, with scarcely any stem. Bractæas compressed, embracing each other. Leaves lanceolate, coloured on the under side.—Native of South America, about the gulf of Mexico. Naturalized in Jamaica, and now very common in our groves, flowering early in the day throughout the summer. The leaves, forming a large tuft, are very conspicuous and handsome, in consequence of the rich violet hue of their under side, contrasted with the fine green of the upper. Flowers very copious, small, white, in stalked axillary umbels, much shorter than the leaves, and subtended by a pair of strongly compressed and keeled purple bractæas.

10. *T. malabarica*. Grass-leaved Spider-wort. Linn. Sp. Pl. 412. Willd. n. 6. Ait. n. 7. (Tabi pullu; Rheede Hort. Mal. v. 9. 123. t. 63.)—Stems erect, angular; hairy at one side. Leaves linear, channelled, recurved, clasping the stem. Flower-stalks lateral and terminal, hairy, two or three together.—Native of the East Indies. Perennial, flowering in our groves in June and July. About a foot high, with many slender, slightly branched, stems, most leafy in their lower part, and small flowers. The calyx is hairy. Capsule exquisitely polished, as if varnished.

11. *T. divaricata*. Spreading Spider-wort. "Vahl Eclog. v. 1. 34." Willd. n. 8. (Commelina hexandra; Aubl. Guian. 35. t. 12.)—Stem branched, trailing. Leaves ovate, somewhat stalked, smooth, with bearded sheaths. Panicles terminal. Filaments naked.—Found by Aublet about rivers in Cayenne and Guiana, flowering almost all the year. Root perennial. Stems rising to the height of ten feet, supporting themselves upon the neighbouring bushes. Leaves two or three inches long. Flowers blue, in compound clusters, or panicles. Their filaments are said to be smooth, white, and fleshy.

12. *T. geniculata*. Knotted Spider-wort. Linn. Sp. Pl. 412. Willd. n. 9. Ait. n. 8. Jacq. Amer. 94. t. 64. (Ranunculus aut Damasonium repens, prunastiz foliis villosis; Plum. Ic. 106. t. 116. f. 2.)—Stem decumbent, with a hairy lateral line. Leaves ovate, saggy at the base and sheath. Panicles terminal, compound, capillary, nearly smooth.—Native of the West Indies, in shady moist places, flowering in our groves about July and August. Root perennial. Stems weak; decumbent and creeping at the bottom; branched and leafy above. Leaves rather above an inch in length, pointed, hairy, especially at the margin and base; their sheaths tumid, membranous, densely saggy at the border. Flowers small, white, in loose divaricated panicles. Calyx smooth. Capsule pellucid, polished.

13. *T. monandra*. Small Monandrous Spider-wort. Swartz Ind. Occ. v. 1. 597. Willd. n. 10.—Stems diffuse, with a hairy lateral line. Leaves ovate-heart-shaped, smooth. Stalks axillary, many-flowered. Stamen solitary.—Discovered by the scrutinizing eyes of Dr. Swartz in bushy places on hills in the western part of Hispaniola, flowering from June to March. A delicate perennial herb, creeping by means of long fibrous radicles. The leaves are not an inch long, very smooth, pointed, finely reticulated when dry, with pale fringed sheaths. Flowers minute, white, in little axillary umbels. Calyx hairy. Stamen but one, slender, smooth.

14. *T. multiflora*. Many-flowered White Spider-wort. Swartz Ind. Occ. v. 1. 599. Willd. n. 11.—"Stem erect, branched. Leaves heart-shaped, fringed at the margin and

sheaths. Flower-stalks axillary, crowded, many-flowered. Stamens three."—Found in shady woods on the mountains of Jamaica. Stem one or two feet high, round, fringed, smooth. Leaves an inch long, acute, with fringed sheaths. Flowers small, white, short-lived, in little stalked umbels, from the sheaths of two or three of the upper leaves.

15. *T. cordifolia*. Heart-leaved White Spider-wort. Swartz Ind. Occ. v. 1. 601. Willd. n. 12.—"Stem creeping, thread-shaped. Leaves heart-shaped. Stalks terminal, solitary, many-flowered."—Native of moist, shady grassy spots, on the lofty mountains of Jamaica; annual, flowering in autumn. A very small herb, with numerous, white, capillary roots, and slender, branched, decumbent, creeping stems. Leaves small, nearly sessile, pellucid. Flowers minute, white, transient, with six short, uniform, naked filaments.

16. *T. procumbens*. Procumbent White Spider-wort. Willd. n. 13. (T. multiflora; Jacq. Coll. v. 3. 206. Ic. rar. t. 355.)—Stem procumbent, creeping. Leaves ovate, fringed at the base. Stalks axillary, cymose, many-flowered. Three of the filaments short and beardless.—Found in moist situations at the Caraccas. It flowers in the grove from August to December, and is perennial. Jacquin. This appears to be a much larger and flouster plant than the preceding, the stems being four feet long; their numerous flowering branches ascending. Leaves an inch and half or two inches in length, dark green, with ribbed sheaths. Flowers in many axillary, as well as terminal cymose tufts, small and white; their three longer filaments only bearded at the summit.

17. *T. axillaris*. Grass-leaved Axillary Spider-wort. Linn. Syst. Veg. ed. 13. 260. Willd. n. 14. (Commelina axillaris; Linn. Sp. Pl. 61. Ephemenum phalangoides maderaspatanum minimum, secundum caulem quasi ex utriculis floridum; Pluk. Phyt. t. 174. f. 3. "Nir-pullu; Rheede Hort. Mal. v. 10. t. 28. f. 13.")—Stem branched, decumbent. Leaves linear, acute; with short, fringed, tumid sheaths, which are longer than the axillary flower-stalks.—Native of the East Indies. Root small, fibrous, annual. Stem much branched, decumbent, taking root at the joints, leafy, smooth, a foot long or more. Leaves grassy, smooth, from three to six inches in length, and one-third of an inch in breadth; their sheaths coloured, smooth, but strongly fringed. Flowers rather small, blue, slightly stalked, scarcely projecting beyond the sheaths of the leaves, not always solitary in our specimens. Calyx-leaves lanceolate, but half as long as the tube formed by the united bases of the petals. Stamens, according to Koenig, six, with jointed hairs.

18. *T. cristata*. Crested Spider-wort. Willd. n. 16. Ait. n. 9. Jacq. Hort. Vind. v. 2. 64. t. 157. (Commelina cristata; Linn. Sp. Pl. 62. Burm. Ind. 18. t. 7. f. 4. Ephemenum zeylanicum procumbens cristatum; Herm. Parad. 148.)—Stem branched, decumbent. Leaves lanceolate, reflexed. Spikes terminal, recurved, with imbricated crescent-shaped bractæas.—Native of Ceylon; introduced at Kew in 1770 by M. Richard. It is annual, flowering in the grove from July to September, and is remarkable for its long-stalked bracteated recurved spikes, of pretty little bright blue flowers, whose six filaments are all bearded at the summit. The habit of the herb is like the last, but with shorter, broader and blunter, deflexed leaves.

19. *T. papilionacea*. Papilionaceous Spider-wort. Linn. Mant. 61. 513. Willd. n. 17. Vahl Symb. v. 1. 27? (Commelina papilionacea; Burm. Ind. 17. t. 7. f. 1.)—Stem branched, decumbent. Leaves linear, recurved. Spikes

Spikes terminal, with three clasping bractæas.—Native of the East Indies. Burmann's figure indicates a very distinct species from the last, with longer and linear leaves. Each spike moreover seems completely enfolded in one large external bractæa. Yet the Linnæan specimen, from the Upsal garden, appears scarcely different from *T. cristata*, as Linnæus himself suspected. He says the flowers are violet, not sky-blue. Those who possess both plants, in a living state, can alone clear up the uncertainty which envelopes these species.

20. *T. gracilis*. Slender Purple-veined Spider-wort. Kunth n. 1.—“Stem branched, procumbent. Leaves ovate, acute, fringed as well as their lax sheaths. Umbels terminal, aggregate, on downy stalks. Calyx coloured, rather downy.”—Native of the cooler regions of Quito, near Tarqui and Chillo; perennial, flowering in February. Stems smooth, a foot long. Leaves thickish, eight or nine lines in length. Umbels three or four together, with about seven flowers in each, whose corolla is white, veined with purple. Stamens hairy at the base. Cells of the anthers widely separated.

21. *T. debilis*. Weak White Spider-wort. Kunth n. 2.—“Stem erect, weak, nearly simple. Leaves ovate-oblong, acute, fringed as well as their lax sheaths. Umbels solitary or in pairs, on smooth stalks. Calyx hairy at the summit.”—Found with the last, to which it is confessedly nearly akin; but the leaves differ somewhat in shape, and the umbels consist of ten or twelve flowers, whose calyx is green, and their petals pure white.

22. *T. pulchella*. Dwarf Purple Spider-wort. Kunth n. 3.—“Stem procumbent, branched. Leaves ovate-oblong, pointed, smooth; rough with minute ferratures at the margin. Sheaths lax. Umbels in pairs, on smoothish stalks. Calyx gibbous at the base, smooth.”—Native of a temperate climate, on the Mexican mountains, between Guanaxuato and Santa Rosa de la Sierra, flowering in September.—Root perennial. Stem six inches or more in length, round, smooth, sometimes simple. Leaves an inch and a half long, membranous, with about thirteen ribs. Umbels terminal, of about nine purple flowers. Calyx-leaves linear-lanceolate, bluntish, gibbous at the base. Capsule oblong, smooth, of only two cells, with solitary seeds, rough with dots.

23. *T. hirsuta*. Hairy Procumbent Spider-wort. Kunth n. 4.—“Stem procumbent, branched. Leaves oblong-lanceolate, pointed, rough-edged, waved, beneath hairy, as well as their lax sheaths. Stalks three or four-flowered, terminal, in pairs, hairy like the slightly coloured calyx.”—Native of the cooler mountains of New Granada, near San Miguel on the banks of the river Putès, Teindala, and the village of La Cruz, flowering in November. The root is perennial. Stem two or three feet long, round, striated, smooth. Leaves rounded at the base, flat, with about nine ribs, an inch and a half or more in length, four lines broad; their upper surface nearly smooth. Sheaths pellucid, striated, half an inch long. Calyx-leaves lanceolate, acute, purplish-green. Petals twice as long, purple. Filaments red, hairy at the base.

24. *T. formosa*. Tall Cape Spider-wort. Willd. n. 15. (*T. speciosa*; Linn. Suppl. 192. Lamarck n. 9. *T. nodiflora*; Lamarck n. 6, according to Willdenow. *Commelina speciosa*; Thunb. Prodr. 58.)—Stem erect, zigzag. Leaves opposite, combined at the base.—Found by Thunberg at the Cape of Good Hope. The stem is two feet, or more, in height, round, smooth, except a little woolly line at each side, running down from the joints. Stem-leaves opposite, awl-shaped, keeled, from two to four inches long,

rather woolly at the margin, inserted in pairs into a tumid, entire, woolly or hairy sheath, about half an inch in length. Flowers in dense, axillary, aggregate heads, with lanceolate bractæas; the lower heads stalked. Leaves of the calyx lanceolate, keeled, combined at the base. Filaments very hairy. Style bearded at the upper part. Willdenow seems, in transferring from the *Supplementum*, to have written the name *formosa* by mistake for *speciosa*. The latter being now applied to a different species, see n. 5, we retain the former here. Lamarck may possibly have inserted the same plant twice, once after Linnæus, without seeing a specimen.

The most singular circumstance in the botanical history of *Tradescantia* relates to what Linnæus has named *T. nervosa*, Mant. 223. Willd. n. 7. This proves, by the original specimen from Mutis, accompanied with a drawing, to be a very curious plant of the Orchis family. Mutis justly remonstrated with Linnæus against making it a *Tradescantia*, and called it an *Epidendrum*. Mr. Kunth, who has seen our specimen, informs us it belongs to a new genus, and is named by him *Thelypogon angustifolius*. The style, or column, is excessively hairy, or rather bristly. The lip is very little broader than the two petals, all of them being marked with numerous parallel ribs. The whole flower is above an inch wide, and seems to be very handsome.

TRADESCANTIA, in *Gardening*, furnishes a plant of the hardy herbaceous perennial kind, the species of which that is chiefly cultivated, is the common Virginian spider-wort, or flower of a day; but there are other species that may be cultivated.

And there are varieties with pale blue flowers, with deep blue flowers, with white flowers, with red flowers, and with purple flowers.

Method of Culture.—They are readily increased by parting the roots, and planting them out in the autumn, or early in the spring, in a bed or border of common earth.

And also by seeds sown at the same seasons in similar situations, the plants being pricked out into other beds in the summer, and removed in the autumn to the places where they are to grow.

These plants are durable in the roots, but the stalks decay annually: they mostly send forth a new flower every day, hence the common name, during some weeks in the summer season, and are proper for planting out in various places in pleasure-grounds.

They afford ornament in the common borders among other flower-plants.

TRADEWATER, in *Geography*, a river of Kentucky, which runs into the Ohio, N. lat. 37° 17'. W. long. 88° 30'.

TRADITA NEXU. See ABALIENATION.

TRADITION, TRADITIO, the act of delivering a thing into the hands of another. The sale of a moveable is completed by a simple tradition.

TRADITION, in *Matters of Religion*, is applied to those laws, doctrines, relations, &c. which have been handed down to us from our forefathers, without being written.

Taking tradition in this sense, for every thing relating to faith, or the rites and ceremonies of religion thus derived down to us from the primitive church, there are two kinds, viz. *apostolical* and *ecclesiastical* tradition.

TRADITION, *Apostolical*, which is what we properly call tradition, is defined by the Romanists to be the unwritten word of God, descended from the apostles to us, through a continual succession of the faithful.

By this tradition, say they, it is, that the Holy Scriptures have been kept entire, both as to the letter, *i. e.* the text, and as to the spirit or sense thereof. This tradition the

council of Trent declares to have the same authority with the Holy Scripture itself, and pronounces every one who rejects it an heretic.

It is a question of some difficulty, when the church of Rome began to derogate from the authority of the Scriptures, and to raise these traditions to an equality with them. It is generally supposed, that pope Nicholas ordained, that the decretal epistles of the popes should be of the same authority as the Scriptures, about the year 855. Du Pleffis (*Myft. Iniq. Progress. 31.*), indeed says, that pope Agatho had, 170 years before, pronounced openly, "that all decrees made by the see apostolic, ought to be received as if they had proceeded from St. Peter's own mouth." But as this doctrine had gained no canonical authority in the pontificate of Nicholas, it ought not at so early a period be placed to the account of the church. Nor did that diligent inquirer find any formal decree to such effect till the year 1415, when the council of Constance, in the condemnation of the 38th article of Wickliffe's heresy, ordained, that such of the decretal epistles as should be found upon examination to be rightly ascribed to the popes whose names they bore, should be of equal authority with the epistles of the apostles. (*L'Enfant's Hist. Council of Constance, vol. i. p. 229.*) From this period, the sufficiency of the Scriptures alone to salvation became a formal heresy, as appears by the 12th of the interrogatories exhibited to Lambert with Fox's Martyrology in the year 1538. Hitherto, however, the Scriptures stood upon even ground with papal constitutions; and the inconsistencies between them were kept sufficiently out of sight, by depriving the people of the ordinary means of studying the sacred oracles, and entertaining them only with the ignorant and mystical comments of the monks upon them. When these would no longer pass upon mankind, it then became necessary to degrade the Scriptures to an inferior class.

TRADITIONS, Ecclesiastical, are certain statutes and regulations regarding the rites, customs, and circumstances of religion, introduced since the time of the apostles, by councils, popes, &c. and continued to our time through a constant observance of the church.

The Romanists make another division of tradition, *viz.* into *written* and *unwritten*.

TRADITION, Written, is that of which we find some traces in the ancient fathers and doctors.

TRADITION, Unwritten, is that of which there appear no signs or steps in any of the fathers extant.

The church of Rome pretends to be the depositary of each kind; tradition she holds to be absolutely necessary in the church, grounding this necessity on the promise of infallibility which Jesus Christ is pretended to have made her.

Yet others of that communion deny tradition, how excellent soever it may be for the reclaiming of heretics, to be absolutely necessary; maintaining, that the church would not be less infallible, nor less the rule of doctrine, &c. if the fathers had never written at all.

TRADITIONARY, TRADITIONARIUS, a name given among the Jews to such of them as acknowledge tradition, follow it, and explain the Scriptures by it: in opposition to the Caraites, who refuse any thing but the pure Scriptures themselves.

The traditionaries are what we more usually call rabbins, and rabbinites, or talmudists. Hillel shone among the traditionaries, and Shammai among the textuaries.

TRADITORES, a name given in the first ages of the church to such Christians as, in times of persecution, to avoid death and martyrdom, delivered up the sacred writings to the persecutors.

The enemies of religion, even under the old law, made their utmost efforts to deprive the world of the Holy Scriptures: in that cruel persecution which Antiochus raised against the Jews, the books of the law were very solicitously sought after, torn, and burnt, and such as kept them were put to death; as we read in the first book of Maccab. ch. i. v. 56, 57.

Dioclesian renewed the same impiety, by an edict published in the nineteenth year of his empire, commanding all the sacred books to be brought to the magistrates, and burnt.

Many weak Christians, and even some bishops, overcome with the fear of punishment, carried in their books to the persecutors: which the church detesting, made very severe laws against them, and gave them the infamous names of *traditores*, from *trado*, *I deliver*, *betray*.

As the great pretence of the schism of the Donatists was, that the Catholics tolerated the traditores, it was decreed in the council of Arles, held in 314, that such as should be found guilty of having delivered up any of the holy books or vessels, should be deposed from the order of the clergy, &c.

TRADUCIAN, TRADUCIANI, a name which the Pelagians anciently gave the Catholics, because of their teaching that original sin was transmitted from father to children, or that it was communicated to the children by the father in the way of generation.

The word is formed of the Latin *tradux*, which was made use of to express that communication; and which comes from *traduco*, *I transmit*, or *propagate* from one to another.

At present, some give the appellation *traduciani*, to such as hold, that the souls are transmitted to the children by the father.

TRADUCTION, formed of *trans*, *beyond*, and *duco*, *I lead*, *draw*; the act of translating, or turning out of one language into another. See **TRANSLATION**.

TRÆTH BUCHAN, in *Geography*, a bay of the Irish sea, on the west coast of Wales, in the county of Merioneth; 2 miles N. of Harlech.

TRÆTH Coch. See **REDWHARF Bay**.

TRÆTH Mawr, a bay of the Irish sea, on the west coast of Wales, between the counties of Merioneth and Caernarvon; 4 miles N. of Harlech.

TRÆTTA, TOMASO, in *Biography*, a Neapolitan composer of the first class during the last century. We have a very spirited and accurate account of the rapid progress of this master to the temple of Fame, in M. Laborde's "Essai sur la Musique," drawn up, we believe, by the animated and discriminative pen of count Benincasa; who says that, "Traetta, one of the last disciples of Durante, quitted the conservatorio at the age of twenty-one, and two years after he was chosen to compose an opera for the great theatre royal of San Carlo, at Naples, entitled 'Farnace.' His success in this first attempt was so great, that he was employed in the same city to compose six other operas, serious and comic, successively.

"The reputation of this young composer soon reached Rome, whither he was invited, and composed for the Aliberti theatre 'Ezio;' which, though it had been previously set by so many great masters, that of Traetta was, and is still, the most esteemed. All the great theatres of Italy now wished to engage him, and he composed for them all more than once, till he was fixed in the service of the court of Parma, in the splendid reign of Don Philip, where he had the honour of instructing in music the late archduchess, consort of the emperor Joseph II., and the princess of Astu-

rias, her sister. The operas which he then composed at Parma were entirely in the French taste, which was that of the court. The choruses and the ballets are not yet forgotten. It is this totality that unites the charms of all the fine arts together. The Italians have long known and applauded such splendid spectacles, and often exhibited them successfully in the last and preceding century; but with them the occasions cannot be frequent. A great capital, like Paris, is necessary, which constantly furnishes an audience and spectators able to pay for their amusements all the year round; or magnificent courts, such as those of the princes of the house of Este, Medici, Farnese, and Parma, in former times.

“The first of the six operas which Traetta composed in this style, was ‘Ipolito and Aricia,’ written by the famous poet, the abate Frugoni, in 1759. At this period Traetta was twice called to Vienna to compose ‘Armida’ and ‘Ifigenia,’ two grand operas with choruses and ballets, which were crowned with the greatest success. (This was five years previous to the performance of Gluck’s ‘Orfeo’ at Vienna.)

“These two operas were afterwards represented at Milan, Florence, Mantua, and Naples. After the decease of the infant Don Philip, Traetta was called to Venice, where he was appointed maestro to the conservatorio of l’Ospidalletto; but he could not there resist the proposals made to him from all parts of Europe. After two years’ residence at Venice, he suffered himself to be attracted to Peterburgh, where he was engaged for five years; at the end of which period he was detained two years longer, during which periods he composed seven operas, and many cantatas.”

England wished to have him in its turn; but he arrived there too late; his health was so impaired, that he seemed never to have enjoyed a day’s ease and comfort while he was here. And Sacchini, who was still in London, had taken such possession of our hearts, and so firmly established himself in the favour of the public, that he was not to be supplanted by a composer in the same style, neither so young, so graceful, nor so fanciful as himself.

Sacchini’s person and address had contributed towards endearing him to the English; but, on the contrary, Traetta’s countenance and general appearance were so chilling as to be almost frightful. A skin extremely adult, a settled gravity, discontent and gloom covered his visage so constantly, as to make a beholder shrink at the sight of him, and imagine it impossible that any thing pleasing, even to rapture, should flow from its master. But all this only proves that Horace, who says, “Fronti nulla fides,” was a much better physiognomist than Lavater.

Though many excellent songs and scenes of his composition had been introduced in pasticcio operas on our stage, yet we can remember but two entire dramas of this master that were executed here, “Germondo,” a serious opera; and “La Serva rivale,” a burletta. But the dramas which he composed in and for different parts of Europe, must amount to more than fifty.

On quitting England, he returned to Italy in an alarming state of health; however, we find that, in 1778, he produced two operas there: “La Disfatta di Dario,” and “Il Cavaliere Mante;” but 1779 was the last year of this admirable musician’s existence.

TRAFAGNOL, in *Geography*, a river of Germany, in the county of Tyrol, which runs into the Lavis, 4 miles N. of Castellier.

TRAFALGAR, CAPE, a cape of Spain, on the coast of Andalusia; about 60 miles E. of Cadiz. N. lat.

36° 10'. W. long. 6° 8'. This cape has been rendered famous by the complete victory obtained October 21, 1805, by the British fleet, commanded by lord Nelson, over the combined fleets of France and Spain off this cape. (See the biographical article of NELSON.) Among the Arabians there is a tradition, that the province of El Garb, in Morocco (see GARB), was originally united to Trafalgar and Gibraltar, shutting up the Mediterranean sea, the waters from which passed into the Western ocean by a subterraneous passage: and at this day they call Trafalgar *Traf-el-garb*, i. e. the piece or part of El Garb; and Gibraltar, *Jibbel-traf*, i. e. the mountain of the piece, or part of El Garb.

TRAFARIA, a fort of Portugal, in the province of Estremadura, on the south side of the Tagus; 6 miles S.W. of Lisbon.

TRAFFICK. See TRADE and COMMERCE.

The word is formed from the French, *trafic*, and that from the Italian, *traffico*, which is again borrowed from the Arabic.

The principal traffic in Muscovy and the North is in furs and skins: the great traffic of the Dutch in the East is in spices: the traffic of money is mostly carried on at the Exchange.

TRAFINE. See TREPAN.

TRAGACANTHA, in *Botany*, *τραγακάνθα* of Dioscorides, book 3, chap. 23, is so called from *τραγος*, a goat, and *ακανθα*, a thorn, probably because of its growing in mountainous situations, frequented by goats; or perhaps from being the food of those animals, to whom its thorny footstalks may scarcely prove any impediment. There are several species, almost all confounded by Linnæus under his *Astragalus Tragacantha*, but distinguished by Tournefort, as well as more recently by Willdenow, Lamarck, and others. Three of them are destined to appear in the *Flora Græca*. They all produce more or less of the mucilaginous substance called Gum-Tragacantha, or Gum-Dragon, and are remarkable for their dense bushy thorny habit, and copious, not inelegant, flowers. Tournefort, in his *Corolla*, p. 29, 30, has added nineteen Oriental species to the four mentioned in his *Institutiones*, p. 417; but these, though for the most part truly distinct, are some of them probably mere varieties, and are so considered by Lamarck; see his *Dictionnaire de Botanique*, v. 1. 320; where these plants compose a section of the genus *Astragalus*, characterized by the permanent, finally spinous, common footstalks of the leaves.

TRAGACANTHA, in the *Materia Medica*. The naked lillocks of mount Ida, in Candia, M. Tournefort tells us, produce much of the plant tragacantha, or goat’s thorn, which gives the gum spontaneously towards the end of June, and in the following month; when the nutritious juice of the plant, thickened by the heat, bursts most of the vessels in which it is contained.

This juice coagulates in threads, which make their way into the pores of the bark, where being pushed forward by new juice, they get through the bark, and are at length hardened in the air, either into little lumps, or into twined pieces in form of little worms, more or less long, according to the quantity of the matter of which they are formed.

It should seem, too, that the contraction of the fibres contributes to the expression of the gum; those fine fibres, like the fibres of hemp, laid bare and trampled under foot by men and horses, contract themselves, and facilitate the expression of the extravasated juice. The plant grows also in several places of the Levant, particularly about Aleppo.

M. de la Billardiere's account of the manner in which this gum is produced, differs in some respects from that of Tournefort. Having visited mount Lebanon in August, 1786, the season when this gum is collected, he found the species which afforded it to be different from that figured and described by Tournefort, and consequently not the tragacantha of Linnæus. The stem of the Cretan astragalus is blackish, that of Lebanon is yellow: the leaves of the first are downy, of the second smooth: the flowers of one are red, those of the other are of a pale yellow. Hence he infers that there are several species of astragalus which produce gum-tragacanth. He also contradicts the statement of Tournefort, who attributes the flowing of the gum to the contraction of the fibres of the bark, occasioned by the intensity of the solar heat: observing, that it is only during the night, or when the sun is obscured by clouds, that the gum issues from the plant, and that the same has been remarked at Crete.

The gum is of different colours and qualities, some being white, some greyish, some reddish, and some almost black. The white is the best: it must be chosen clear, smooth, and twisted, or vermicular. It is dry, and yet somewhat soft to the touch.

Gum-tragacanth differs from all the other known gums in giving a thick consistence to a much larger quantity of water; and in being much more difficultly soluble, or rather dissolving only imperfectly. Ruxty asserts, that in five or six hours it will dissolve in cold water. Put into water, it slowly imbibes a great quantity of the liquid, swells into a large volume, and forms a soft but not fluid mucilage; with the addition of more water, a fluid solution may be obtained by agitation, but the liquor appears turbid and wheyish, and on standing the mucilage subsides.

It is smooth and softening, and is therefore good to obtund the acrimony of any humours; which makes it of service in such coughs as proceed from catarrhs, and disfluxions of rheum. It is also very strengthening in some femoral weaknesses, and is prevalent against the whites in women.

Tragacanth is usually preferred to the other gums for making up troches, and other such purposes, and is supposed likewise to be the most effectual as a medicine: but on account of its imperfect solubility, is unfit for liquid forms. The dose is grs. x to ʒj, or more. It is commonly given in powder, with the addition of other materials of similar intention.

The mucilage of tragacanth of the Edinb. Ph. is prepared by macerating one ounce of gum-tragacanth in powder, in eight ounces of boiling water for 24 hours, and triturating the gum so that it may be dissolved, and straining the mucilage through linen. The mucilage of gum-tragacanth of the Dabl. Ph. is obtained by macerating two drachms of gum-tragacanth in powder, in eight fluid-ounces of water, in a covered vessel, until the gum be dissolved, and straining the mucilage through linen. The compound powder of tragacanth of the Lond. Ph. is formed by taking of tragacanth powdered, acacia gum powdered, and starch, of each an ounce and a half; and of refined sugar three ounces. Rub the starch and sugar together to a powder; then add the tragacanth and the acacia gum, and mix the whole together. This powder is used with effect as a demulcent in hectic fever, and to allay the tickling cough of catarrh; in gonorrhœa and strangury it is given combined with nitre, and in dysentery with ipecacuanha powder. The dose is from ʒj to ʒij, mixed in water or any bland fluid.

TRAGACANTHUM *Neurasi Indicum*, in *Natural History*, a name given by some writers to the bird's-nest: so famous in soups in China, and in some parts of Europe, for

their cordial, restorative, and provocative virtues. They are the nests of a kind of Indian sea-swallow, and are made up of a substance resembling gum-tragacanth, and, like it, melting in a jelly in any warm liquor.

TRAGÆA, in *Ancient Geography*, a town of the island of Naxos, in which particular worship was paid to Apollo Trajan.

TRAGAN, in *Geography*, a town of Africa, in Fezzan; 100 miles N. of Mourzouk.

TRAGARTH, a river of Wales, in the county of Brecknock, which runs into the North.

TRAGASÆ SALINE, in *Ancient Geography*, salt-pits of Asia Minor, in the Troade, near Hamaximum. Strabo.

TRAGASIAN SALT, a term used among the ancients for a sort of sea-salt, very little different from the common kind, being made by the evaporation of the water of some salt-ponds near the sea-shores.

TRAGEA, in *Pharmacy*, an aromatic powder grossly beaten and mixed with sugar; taken by way of carminative.

TRAGEA, or *Tragia*, in *Ancient Geography*, an island situated in the vicinity of the Cyclades.

TRAGEÆ, islands situated on the coast of Ionia, but they were joined to the continent by the depositions of the Meander. They served as a retreat for pirates, according to Strabo, and lay N. of the promontory Posidium, S.E. of that of Troglidium, and W. of the town of Mileus.

TRAGEDY, a dramatic poem, representing some signal action performed by illustrious persons, and which has generally a fatal issue or end.

Accordingly, it has been always reckoned a more dignified entertainment than comedy. The former directs our attention to the high passions, the virtues, crimes, and sufferings of mankind; the latter to their humours, follies, and pleasures. Terror and pity are the great instruments of tragedy; and ridicule is the sole instrument of comedy.

Tragedy exhibits the characters and actions of men, says Dr. Blair, in some of the most trying and critical situations of life, and serves as a direct imitation of human manners and actions. It differs from the epic poem, in which the poet narrates and describes characters, by excluding the poet, and setting before us the personages themselves, acting and speaking what is suitable to their characters. As no kind of writing affords so great a trial of the author's profound knowledge of the human heart, none, when duly executed, has so much power to raise the strongest emotions. It is, or ought to be, a mirror, in which we behold ourselves, and the evils to which we are exposed: a faithful copy of the human passions, with all their direful effects, when they are suffered to become extravagant.

Aristotle scientifically defines tragedy, the imitation of one grave and entire action, of a just length, and which, without the assistance of narration, by raising of terror and compassion, renews and purges our passions.

This definition has given the critics some perplexity; and Corneille declares he cannot reconcile Aristotle with himself: the instances Aristotle cites, he thinks, defeat his own definition. He even denies the purging of our passions to be the end of tragedy.

Our English authors are more favourable to the definition; by the purging of our passions, they understand not the extirpating of them, but the reducing them to just bounds; for by insuing the miseries that attend a subjection to them, they say it teaches us to watch them more narrowly; and by seeing the great misfortunes of others, it lessens the fate of our own.

TRAGEDY.

The ingenious writer already cited, disapproving the statement of Aristotle with regard to the design of tragedy as somewhat obscure, thinks its intention may be more shortly and clearly defined, "to improve our virtuous sensibility." If an author interests us in behalf of virtue, forms us to compassion for the distressed, inspires us with proper sentiments, on beholding the vicissitudes of life, and by means of the concern which he raises for the misfortunes of others, leads us to guard against errors in our own conduct, he accomplishes all the purposes of tragedy. Tragedy is, therefore, a moral species of composition; and the impressions left by it on the mind are, upon the whole, favourable to virtue and good dispositions. In order to produce this beneficial effect, it is necessary that the author should choose some interesting and moving story, and then conduct it in a natural and probable manner. The end of tragedy is not like that of epic poetry, to elevate the imagination by the marvellous, but to affect the heart by a stricter imitation of the life and actions of men. This principle, duly regarded, excludes from tragedy all machinery, or fabulous intervention of the gods; and, therefore, the mixture of machinery with the tragic action, is a blemish in the ancient theatre. Hence some critics have required, that in order to produce and maintain the impression of probability upon which the success of tragedy depends, the subject should not be a pure fiction, but founded on real history, or known facts. This, however, seems to be an extreme; as a fictitious tale may affect the heart as much as a true history, provided that the events related be such as might easily have happened in the ordinary course of nature. Some of the most pathetic tragedies are altogether fictitious as to their subject; such as Voltaire's *Zaire* and *Alzire*, the *Orphan*, *Douglas*, the *Fair Penitent*, &c. For the regulation of the conduct of a tragedy, critics have established the famous rule of the three unities, to which we shall presently advert.

Tragedy, in its original, M. Hedelin observes, was only an hymn sung in honour of Bacchus by several persons, who, together, made a chorus of music with dances and instruments. A goat was the sacrifice offered to that god; and from *τράγος*, a goat, and *ὤδῆ*, a song, was formed the appellation tragedy.

As this was long, and might fatigue the singers, as well as tire the audience, they bethought themselves to divide the singing of the chorus into several parts, and to have certain recitations in the intervals.

Accordingly, Theſpis (see his article) first introduced a person to speak upon the stage with this view.

Phrynichus, the disciple of Theſpis, selected that kind of verse which is most suitable to the drama, and introduced some other changes, but left tragedy in its infancy. He, it is said, introduced women's parts on the stage.

Æschylus, the father of tragedy, as he has been called, finding one person insufficient, introduced a second to entertain the audience more agreeably by a kind of dialogue: he also clothed his persons more decently, and first put on them the buskin. For his other improvements in this species of drama, see his article *ÆSCHYLUS*.

The persons who made their recitations on the scene, were called *actors*; so that tragedy at first was without many actors. And what they thus rehearsed, being things added to the singing of the chorus, of which they were no necessary part, were called *episodes*.

Sophocles found that two persons were not enough for the variety of incidents; and accordingly he introduced a third: and here the Greeks seem to have stopped; at least,

it is very rare that they introduce four speakers in the same scene.

The progress of the art under the culture of Æschylus, and his immediate successors, was extremely rapid. He had for contemporaries and competitors, Chærilus, Pratinas, and Phrynichus already mentioned, whose glory he eclipsed; and Sophocles, who rivalled his own. Sophocles censured in Æschylus three defects: the excessive elevation of his ideas, the gigantic style of his expressions, and the difficult conduct of his plots; and these faults he flattered himself for having avoided. By reducing heroism to its just standard, Sophocles lowered the style of tragedy, and banished those expressions which a wild imagination had dictated to Æschylus, and which diffused terror through the souls of his spectators. His style, like that of Homer, is full of strength, magnificence, sublimity, and mildness. Even in depicting the most violent passions, he happily suits his style to the dignity of his personages. See the article *SOPHOCLES*.

Euripides, at an early age, emulated the fame of Sophocles, and aspired to the sovereignty of the stage. See the biographical article *EURIPIDES*.

Notwithstanding the prejudices and hatred of Aristophanes against Euripides, his decision in assigning the first place to Æschylus, the second to Sophocles, and the third to Euripides, was conformable to the opinion of the greater part of the Athenians. Æschylus, it is said, painted men greater than they can be, Sophocles as they ought to be, and Euripides as they are. The two former had neglected passions and situations, which the latter thought capable of producing great effects. He sometimes represented princesses inflamed with love, and respiring only adultery and crime; and sometimes kings debased by calamity to such poverty, as to be covered with rags, and solicit a wretched alms. These scenes, in which no resemblance was discernible of the manner of Æschylus or Sophocles, at first disgusted the spectators. It was said, that under no pretext ought the character and rank of the heroes of the stage to be so degraded; that it was highly reprehensible to pourtray with so much art images so shameful, and dangerous to supply vice with the authority of great examples. But at this time the Athenians in general were less offended at the attacks which the pieces of Euripides made on received ideas, than hurried away by the sentiments with which he had animated them; for this great poet, capable of managing at pleasure all the passions of the soul, is especially admirable when he paints the furies of love, or excites the emotions of pity; then, surpassing himself, he sometimes attains the sublime, for which he seems not to have been intended by nature. While he was accused of enervating tragedy, he had proposed to render it the school of wisdom. Euripides, whose eloquence sometimes degenerated into a redundant profusion of words, and whose rhetorical phrases, learned digressions, and idle disputes reduced him much below Sophocles, who has said nothing which has not its utility, is nevertheless said to have fixed the language of tragedy. He retained scarcely any expressions that are especially appropriated to poetry; but he so judiciously selected and employed those of ordinary language, that, under their happy combination, the feebleness of the thought seemed to disappear, and the most common word to become ennobled. Such was the magic of that enchanting style, which, preserving a just medium between meanness and inflation, is almost always eloquent, clear, harmonious, flowing, and so flexible, that it seems to adapt itself without effort to every feeling of the soul. Whilst Sophocles admitted into his choruses the Phrygian

Plagiarist humour, the object of which was to moderate and temper the passions, and which was adapted to the worship of the gods: Euripides, favouring the innovations made by Timotheus in the ancient music, employed almost all the modes, and especially those, the sweet sounds and forms of which accorded with the genius of his poetry. Accordingly the audience were accustomed to hear in the theatre effeminate tones, and sometimes divisions on a single syllable. Hence the author was represented as a feeble artist, who, incapable of raising himself to the sublimity of tragedy, had degraded tragedy to the level of his own inferior abilities.

Euripides rarely succeeded in the disposition of his subjects: sometimes he offends against probability, sometimes the incidents are forced, and sometimes the action wants unity: almost always the combinations and developments of his plots are in some respect imperfect; and his characters have frequently only an indirect relation to the action.

He invented the method of explaining his subject in a prologue, or long preface, almost entirely detached from the piece, in which usually one of the persons of the drama comes forward, and fugidly details all the events antecedent or relative to the action, gives his own genealogy, or that of one of the principal characters, informs us of the occasion of his descent from heaven, if he is a deity, or who has called him forth from the tomb, if a mortal: and addresses himself to the spectators by declaring his name.

It is hardly necessary in this connection to mention Democritus the elder, king of Syracuse: who was aided in the composition of his tragedies by some men of genius, but was indebted to their assistance for the victory he obtained in this species of literature. *Æschylus*, *Sophocles*, and *Euripides* were, and ever will be, placed at the head of those who at various times rendered the stage illustrious. Nevertheless, though the number of pieces now presented in the theatrical competitions was very great, the first obtained the crown only thirteen times, the second but eighteen, and the last only five times: because the victory was decided by the multitude, which had patrons whose passions it espoused, and favourites whose interests it supported. It is remarkable, in how short a space of time tragedy grew up among the Greeks, from the modest beginning to the most perfect state. For *Sophocles*, the greatest and most correct of all the tragic poets, flourished only twenty-two years after *Æschylus*, and was little more than seventy years posterior to *Thespis*. The chorus was the basis of the ancient tragedy, and the dramatic dialogue was superadded to it. In process of time, the chorus, from being the principal, became only the accessory in tragedy: till at last, in modern tragedy, it has disappeared altogether: which forms the chief distinction between the ancient and the modern stage.

Each tragedy required three actors for the three leading parts: and the same actors sometimes performed both in tragedy and comedy: but persons very rarely excelled in both. Actors who had acquired great celebrity received considerable pay: not less than a talent (or 20*l*. sterling) in two days. The kind of verse generally employed in tragedy was the iambic, a species of measure that frequently occurred in conversation. The actors had habits and symbols fixed to their several parts: and tragedy almost from its earliest invention employed the mask, which was completed under the hands of *Æschylus*. In tragedy the stature of the actors was frequently increased to four cubits (six English feet and nearly half an inch): which was effected by bolkins, that raised them four or five inches;

guards also lengthened their arms: and their breasts, sides, and every part of the body, were rendered apparently thicker in proportion. The subject, in the composition of the Greek tragedy, was diversified by variety in the fable, which was simple or complex: by variety in the incidents, which excites terror and pity: by variety in the discoveries, which are one of the most copious sources of the pathetic, especially when they produce a sudden revolution in the condition of the persons of the drama: by variety in the characters, and by variety in the catastrophe, in which latter respect some dramatic pieces conclude happily, and others disastrously: and there are some, in which, by a double revolution, both the virtuous and the wicked experience a change of fortune. The first of these terminations, however, seems only suitable to comedy. The manners in this species of drama, as well as in others of a similar kind, teach the exact conformity of the actions, sentiments, thoughts, and language of the personage with his character: and it is, therefore, necessary, that from the very first scenes, we should be able to discover, from what he does and what he says, the nature of his present inclinations, and his ultimate designs. Accordingly, the manners should be proper and uniform: suitable to the age and dignity of the person; neither contrary to the idea of the hero delivered down to us by ancient tradition, nor inconsistent in any part of the piece. The writers of tragedy should, like our actors, inspire spectators and judges with pity, terror, or indignation: and like them, demonstrate a truth, or refute an objection, aggravate or diminish an object. In many of the ancient tragedies we perceive beauty of thought: and elevation of sentiment in all their lustre, triumph in the language of truth, and the eloquence of the unfortunate. When this view behold *Merope*, *Hecuba*, *Electra*, *Antigone*, *Philoctetes*, succeeded sometimes by the horrors of death, and sometimes plunged in frame or despair, or listen to those accents of grief, those piercing exclamations, those passionate expressions, which, from one end of the theatre to the other, make the voice of nature rebound in every heart, and compel all eyes to dissolve in tears. The style of tragedy, though not pompous, should nevertheless be suitable to the dignity of the ideas. All mean expressions should be avoided. See *Travels of Anacharsis the younger, in Greece*, vol. vi.

Tragedy and comedy were at first confounded with each other: but they were afterwards separated: and the poets in general applied themselves to the cultivating of tragedy, neglecting comedy.

When tragedy was got into a better form, they changed the measure of its verse, and endeavoured to bring the action within the compass of a day, or of a revolution of the sun.

We now proceed to give some account of the three unities of action, place, and time, which have been considered as essential to the proper conduct of the dramatic fable. The first of these is the most important, and it consists in a relation which all the incidents introduced bear to some design or effect, so as to combine naturally into one whole. This unity of subject is more essential to tragedy than to epic poetry: for a multiplicity of plots or actions, crowded into so short a space as tragedy allows, must necessarily distract the attention, and prevent passion from rising to any height. (See *Action* and *Eric Pium*.) All sub-plots should be rendered subservient to the main action. Addison's "Cato" is defective in this respect. The subject of the tragedy is the death of Cato, which the author supports with dignity: but all the love-scenes in the play are mere episodes, unconnected with the principal action.

TRAGEDY.

Unity of the action should not be confounded with the simplicity of the plot. The plot is simple, when a small number of incidents are introduced into it; but it may be complex, in the language of critics, or include a considerable number of persons and events, and yet not be deficient in principle, if all the incidents tend towards the principal object of the play, and be properly connected with it. Congreve's "Mourning Bride" is adduced as an instance which stands in perfect opposition to the simplicity of the ancient plots. The incidents succeed one another too rapidly, and the play is too full of business. Unity of action must not only be regarded in the construction of the fable, or plot, but it must also regulate the several acts and scenes into which the play is divided. The division of the play into five acts is altogether arbitrary, and rests merely on common practice, and the authority of Horace, *De Art. Poet.* (See *ACTS*, in *Poetry*.) The pauses between the acts should be duly adjusted; so that there are corresponding pauses in the action. The fifth act is the feat of the *Catastrophe*; which see. For the several parts of tragedy, see *ACT, ACTION, CHARACTER, FABLE, PLOT, MANNERS, and SCENE.*

It has been a question much agitated among philosophical critics, how it comes to pass that those emotions of sorrow which tragedy excites afford any gratification to the mind? Sorrow, it is said, is a painful passion: scenes of misery exhibited in tragedies excite a degree of sympathy and agitation that occasions anguish and distress. The spectators cannot suppress their feelings; they are indicated by their tears: and yet they applaud such exhibitions, and recur to them with satisfaction and pleasure. That such exhibitions should draw such crowds of spectators, and that they should be so highly gratified by them, appears to be somewhat mysterious. The fact is acknowledged, and many hypotheses have been proposed for the satisfactory explanation of it. In order to account for it, we can by no means recur to an innate principle of malice, which prompts us to extract delight from the sufferings of others, and as it were to enjoy their calamities. Dr. Campbell, in his "Philosophy of Rhetoric," (vol. i. chap. 11.) has detailed and examined the various hypotheses that have been devised by ingenious men for the solution of this difficulty. The theory of the abbé du Bos, in his "Reflections on Poetry and Painting," is as follows. Few things, according to him, are more disagreeable to the mind, than that listlessness into which it falls, when it has nothing to occupy it, or to awake the passions. In order to get rid of this most painful situation, it seeks with avidity every amusement and pursuit; business, gaming, news, shows, public executions, romances; in short, whatever will rouse the passions, and take off the mind's attention from itself. It matters not what the emotion be, only the stronger it is, so much the better. And for this reason, those passions which, considered in themselves, are the most afflicting and disagreeable, are preferable to the pleasant, inasmuch as they most effectually relieve the soul from that oppressive languor which preys upon it in a state of inactivity. They afford it ample occupation, and by giving play to its latent movements and springs of action, convey a pleasure which more than counterbalances the pain.

Mr. Hume, in reference to this theory, observes, that the same object of distress which pleases in a tragedy, were it really set before us, would, without doubt, give the most unfeigned uneasiness, though it should be the most effectual cure of languor and indolence; and Dr. Campbell says, that the most which can be concluded from the abbé's premises is, the utility of exciting passion of some kind or other,

but nothing that can evince the superior fitness of the distressful affections.

The next hypothesis is that of M. Fontenelle, in his "Reflexions sur la Poétique." According to this writer, pleasure and pain, which are two sentiments so different in themselves, differ not so much in their cause. From the influence of tickling it appears, that the movement of pleasure, pushed a little too far, becomes pain; and that the movement of pain, a little moderated, becomes pleasure. Hence it proceeds, that there is such a thing as a sorrow, soft and agreeable. It is a pain weakened and diminished. The heart likes naturally to be moved and affected. Melancholy objects suit it, and even disastrous and sorrowful, provided they are softened by some circumstance. It is certain that, on the theatre, the representation has almost the effect of reality; but yet it has not altogether that effect. However we may be hurried away by the spectacle, whatever dominion the senses and imagination may usurp over the reason, there still lurks at the bottom a certain idea of falsehood in the whole of what we see. This idea, though weak and disguised, suffices to diminish the pain which we suffer from the misfortunes of those whom we love, and to reduce that affliction to such a pitch as converts it into a pleasure. We weep for the misfortunes of a hero to whom we are attached. In the same instant we comfort ourselves by reflecting, that it is nothing but a fiction; and it is precisely that mixture of sentiments which composes an agreeable sorrow, and tears that delight us. But as that affliction which is caused by exterior and sensible objects, is stronger than the consolation which arises from an internal reflection, they are the effects and symptoms of sorrow, which ought to prevail in the composition. To Mr. Hume this solution appeared just and convincing; but to Dr. Campbell it appeared unsatisfactory. The ingenious author begins with laying it down as a general principle, that however different the feelings of pleasure and of pain are in themselves, they differ not much in their cause; that the movement of pleasure, pushed a little too far, becomes pain; and that the movement of pain, a little moderated, becomes pleasure. Dr. Campbell has shewn, that on this principle, exemplified in a few instances, and not warranted by others more immediately connected with the subject in question, we are not justified in founding a general theory. "The only truth," says our author, "which I can discover in the preceding hypothesis is, that the mind, in certain cases, avails itself of the notion of falsehood, in order to prevent the representation or narrative from producing too strong an effect upon the imagination, and consequently to relieve itself from such an excess of passion, as could not otherwise fail to be painful. But let it be observed, that this notion is not a necessary concomitant of the pleasure that results from pity, and other such affections, but is merely accidental. It was remarked above, that if the pathetic exceeds a certain measure, from being very pleasant it becomes very painful. Then the mind recurs to every expedient, and to disbelief amongst others, by which it may be enabled to disburden itself of what distresseth it. And, indeed, whenever this recourse is had by any, it is a sure indication that, with regard to such, the poet, orator, or historian, hath exceeded the proper measure.

"But that this only holds when we are too deeply interested by the sympathetic sorrow, will appear from the following considerations: first, from the great pains often taken by writers (whose design is certainly not to shock, but to please their readers) to make the most moving stories they relate, be firmly believed: secondly, from the tendency, nay fondness of the generality of mankind, to believe

what moves them, and their averiness to be convinced that it is a fiction. This can result only from the consciousness that, in ordinary cases, disbelief, by weakening their pity, would diminish, instead of increasing, their pleasure. They must be very far then from entertaining Fontenelle's notion, that it is necessary to the producing of that pleasure; for we cannot well suspect them of a plot against their own enjoyment: thirdly, and lastly, from the delight which we take in reading or hearing the most tragical narrations of orators and historians, of the reality of which we entertain no doubt; I might add, in revolving in our own minds, and in relating to others, disastrous incidents, which have fallen within the compass of our own knowledge, and as to which, consequently, we have an absolute assurance of the fact."

The third hypothesis produced and examined by Dr. Campbell is Mr. Hume's, which he proposes as a supplement to the former two, in the doctrine of both which he, in a great measure, acquiesces. "What is it then," says Mr. Hume, "which in this case (that is, when the sorrow is not softened by fiction) raises a pleasure from the bosom of uneasiness, so to speak: and a pleasure, which still retains all the features and outward symptoms of distress and sorrow? I answer: This extraordinary effect proceeds from that very eloquence, with which the melancholy scene is represented. The genius required to paint objects in a lively manner, the art employed in collecting all the pathetic circumstances, the judgment displayed in disposing them: the exercise, I say, of these noble talents, together with the force of expression, and beauty of oratorical numbers, diffuse the highest satisfaction on the audience, and excite the most delightful movements. By this means, the uneasiness of the melancholy passions is not only overpowered and effaced by something stronger of an opposite kind, but the whole movement of those passions is converted into pleasure, and swells the delight which the eloquence raises in us. The same force of oratory employed on an uninteresting subject, would not please half so much, or rather would appear altogether ridiculous; and the mind, being left in absolute calmness and indifference, would relish none of those beauties of imagination or expression, which, if joined to passion, give it such exquisite entertainment. The impulse or vehemence arising from sorrow, compassion, indignation, receives a new direction from the sentiments of beauty. The latter being the predominant emotion, seize the whole mind, and convert the former into themselves, or at least tincture them so strongly, as totally to alter their nature: and the soul, being at the same time roused by passion, and charmed by eloquence, feels on the whole a strong movement, which is altogether delightful."

The insufficiency of this hypothesis is very satisfactorily evinced by Dr. Campbell; and he has shewn, that instead of being supplementary to M. Fontenelle's, as he intended it to be, it is subversive of the principles on which the French critic's theory is founded. The effect, according to the latter, results from moderating, weakening, softening, and diminishing the passion: according to the former, it results from what is directly opposite, from the arts employed by the orator for the purpose of exaggerating, strengthening, heightening, and inflaming the passion. Indeed, neither of these writers seems to have attended sufficiently to one particular, which of itself might have shewn the insufficiency of their systems. The particular alluded to is, that pity, if it exceed not a certain degree, gives pleasure to the mind, when excited by the original objects in distress, as well as by the representations made by poets, painters, and orators: and, on the contrary, if it exceed a certain degree, it is on the

whole painful, whether awakened by the real objects of pity, or roused by the exhibitions of the historian or of the poet. Indeed, as sense operates much more strongly on the mind than imagination does, the excess is much more frequent in the former case than in the latter. But our limits will not allow our enlarging.

A fourth hypothesis is that of those who maintain that compassion is "an example of unmixed selfishness and malignity," and may be "resolved into that power of imagination, by which we apply the misfortunes of others to ourselves;" that we are said "to pity no longer than we fancy ourselves to suffer, and to be pleased only by reflecting that our sufferings are not real; thus indulging a dream of distress, from which we can awake whenever we please, to exult in our security, and enjoy the comparison of the fiction with truth."

This is no other, as Dr. Campbell observes, than the antiquated doctrine of the philosopher of Malmesbury rescued from oblivion, to which it had been fast descending, and re-published with improvements. Hobbes, indeed, thought it a sufficient stretch, in order to render the sympathetic sorrow purely selfish, to define it "imagination or fiction of future calamity to ourselves, proceeding from the sense of another man's calamity." This paradoxical conceit, as our author has denominated it, has been adopted by Hawkesworth in the "Adventurer." In the selfish system, it appears to be a great objection, that in pity we are affected with a real sorrow for the sufferings of others, or at least that men have universally understood this to be the case, as appears from the very words and phrases expressive of this emotion to be found in all known languages. But to one who has thoroughly imbibed the principles and spirit of a philosophic sect, which hath commonly as violent an appetite for mystery (though under a different name, for with the philosopher it is paradox) as any religious sect whatever; how paltry must an objection appear, which hath nothing to support it but the conviction of all mankind, that only excepted whose minds have been perverted by scholastic sophistry?

It is remarkable, that though it has been contended by a great number of persons, that some fiction of the imagination is absolutely necessary to the production of pity, and though the examples of this emotion are so frequent, as to give ample scope for examination, they disagree with regard to their fiction. Some contend only, that in witnessing tragedy, one is under a sort of momentary deception, which a very little reflection can correct, and imagines that he is actually witnessing those distresses and miseries which are only represented in borrowed characters, and that the actors are the very persons whom they exhibit.

Others, who refer every thing to self, maintain, that by a fiction of the mind, we instantly conceive some future and similar calamity as coming upon ourselves; and that it is solely this conception, and this dread, which call forth all our sorrow and our tears. Others not satisfied with this, maintain boldly, that we conceive ourselves to be the persons suffering the miseries related or represented, at the very instant that our pity is raised. When nature is deserted by us, it is no wonder that we should lose our way in the devious tracks of imagination, and not know where to settle.

Dr. Campbell's hypothesis is illustrated by the following general observations, of which the following detail is an abstract. He observes, first, that almost all the simple passions, of which the mind is susceptible, may be divided into two classes, viz. the pleasant and the painful, differing considerably both in kind and degree. Secondly, Among the passions,

TRAGEDY.

passions, as well as among the ideas of the mind, there is an attraction or association. 3dly. Pain of every kind generally makes a deeper impression on the imagination than pleasure does, and is longer retained by the memory. 4thly. From a group of passions associated together, and having the same object, some of them pleasant, and others painful; if the pleasant predominate, there arises often a greater and a more durable pleasure to the mind, than would result from these, if alone and unmixed. 5thly. Under the name *pity* may be included all the emotions excited by tragedy. It has been usual, however, to comprehend pity and terror under the class of passions that are moved by tragedy; but our author observes, that this enumeration is more popular than philosophical, though adopted by the Stagyrte himself. For what is pity but a participation by sympathy in the woes of others, and the feelings naturally consequent upon them, of whatever kind they be, their fears as well as sorrows: whereas, this way of contradicting terror from pity, would make one, who knew nothing of tragedy but from the definition, imagine, that it were intended to make us compassionate others in trouble, and dread mischief to ourselves. If this were really the case, Dr. Campbell thinks there are few or none who would find any pleasure in this species of entertainment. If all the sympathetic affections excited by theatrical representations were enumerated, our author cannot see why hope, indignation, love and hatred, gratitude and repentment, should not be included as well as fear. 6thly. Pity is not a simple passion, but a group of passions strictly united by association, and as it were blended, by centering in the same object. Of these, some are pleasant, some painful, but commonly the pleasant preponderate. In pity there are three different emotions: *first*, commiseration, purely painful; *secondly*, benevolence, or a desire of the relief and happiness of the object pitied, a passion, as was already observed, of the intermediate kind; *thirdly*, love, in which is always implied one of the noblest and most exquisite pleasures whereof the soul is susceptible, and which is itself, in most cases, sufficient to give a counterpoise of pleasure to the whole.

The principal pleasure in pity arises from its own nature, or from the nature of those passions of which it is compounded, and not from any thing extrinsic or adventitious. Nevertheless, certain adventitious circumstances may contribute to heighten the effect; but they cannot be regarded as essential to the passion. Of this sort is the satisfaction which arises from a sense of our own ease and security, compared with the calamity and the danger of another.

“ ’Tis pleasant, safely to behold from shore
The rowling ship, and hear the tempest roar:
Not that another’s pain is our delight;
But pains unfelt produce the pleasing sight.
’Tis pleasant also to behold from far
The moving legions mingled in the war.”

Another adventitious source of pleasure is, the satisfaction that results from the conscious exercise of the humane affections, which it is our duty to cherish and improve. Sense, as we have frequent occasion to observe, invariably makes a stronger impression than memory, and memory a stronger than imagination; yet there are particular circumstances which appear to form an exception, and to give an efficacy to the ideas of imagination, beyond what either memory or sense can boast. So great is the anomaly which sometimes displays itself in human characters, that it is not impossible to find persons who are quickly made to cry at seeing a tragedy, or reading a romance, which they know to be fictitious, and yet are both inattentive and unfeeling in

respect of the actual objects of compassion who live in their neighbourhood, and are daily under their eye.

Men, says our author, may be of a selfish, contracted, and even avaricious disposition, who are not what we should denominate hard-hearted, or insusceptible of sympathetic feeling. Such will gladly enjoy the luxury of pity, (as Hawkefworth terms it,) when it nowise interferes with their more powerful passions; that is, when it comes unaccompanied with a demand upon their pockets. With the tragic or the romantic hero or heroine they most cordially sympathise, because the only tribute which wretches of their dignity exact from them is sighs and tears. And of these their consciences inform them, to their inexpressible consolation, that they are no niggards. But the case is totally different with living objects. Barren tears and sighs will not satisfy these. Hence it is that people’s avarice, a most formidable adversary to the unhappy, is interested to prevent their being moved by such, and to make them avoid, as much as possible, every opportunity of knowing or seeing them. See this observation admirably exemplified in the parable of the compassionate Samaritan, Luke, x. 30. Our author concludes with observing, that compassion alone, especially that displayed on occasion of witnessing public spectacles, is at best but a very weak evidence of philanthropy.

Dr. Blair, agreeing in the main with the hypothesis of Dr. Campbell, introduces the following observations on this subject, which we cannot forbear transcribing. “ By the wise and gracious constitution of our nature, the exercise of all the social passions is attended with pleasure. Nothing is more pleasing and grateful than love and friendship. Wherever man takes a strong interest in the concerns of his fellow-creatures, an internal satisfaction is made to accompany the feeling. Pity, or compassion, in particular, is, for wife ends, appointed to be one of the strongest instincts of our frame, and is attended with a peculiar attractive power. It is an affection which cannot but be productive of some distress, on account of the sympathy with the sufferers, which it necessarily involves. But, as it includes benevolence and friendship, it partakes, at the same time, of the agreeable and pleasing nature of those affections. The heart is warmed by kindness and humanity, at the same moment at which it is afflicted by the distresses of those with whom it sympathises: and the pleasure arising from those kind emotions prevails so much in the mixture, and so far counterbalances the pain, as to render the state of the mind, upon the whole, agreeable. At the same time, the immediate pleasure, which always goes along with the operation of the benevolent and sympathetic affections, derives an addition from the approbation of our own minds. We are pleased with ourselves for feeling as we ought, and for entering, with proper sorrow, into the concerns of the afflicted. In tragedy, besides, other adventitious circumstances concur to diminish the painful part of sympathy, and to increase the satisfaction attending it. We are, in some measure, relieved, by thinking that the cause of our distress is feigned, not real; and we are also gratified by the charms of poetry, the propriety of sentiment and language, and the beauty of action. From the concurrence of these causes, the pleasure which we receive from tragedy, notwithstanding the distress it occasions, seems to me to be accounted for in a satisfactory manner. At the same time, it is to be observed, that, as there is always a mixture of pain in the pleasure, that pain is capable of being so much heightened, by the representation of incidents extremely direful, as to shock our feelings, and to render us averse, either to the reading of such tragedies, or to the beholding of them upon the stage.”

Under the general head of the unity of action, to which
P after

after a long digression we now return, it may not be improper to make a few remarks on the conduct of the several scenes which make up the acts of a play. See SCENE.

The entrance of a new personage upon the stage forms what is called, a new scene. These scenes, or successive conversations, should be closely linked and connected with each other. For this purpose, two rules should be regarded. The *first* is, that, during the course of one act, the stage should never be left vacant: for whenever the stage is evacuated, the act is closed. This rule is very generally observed by the French tragedians: but the English writers, both of comedy and tragedy, seldom pay any regard to it. The *second* rule, little better regarded by English writers than the former, is, that no person should come upon the stage, or leave it, without a reason appearing to us, both for the one and the other.

In order to render the unity of action more complete, critics have added the other two unities of time and place. The unity of place requires, that the scene should never be shifted; but that the action of the play should be continued to the end, in the same place where it is supposed to begin. The unity of time, strictly taken, requires, that the time of the action be no longer than the time that is allowed for the representation of the play; though Aristotle seems to have given the poet a little more liberty, and permitted the action to comprehend the whole time of one day. During the course of each act, the unities of time and place ought to be strictly observed; that is, during each act the scene should continue the same, and no more time should be supposed to pass, than is employed in the representation of that act. This is a rule which the French tragedians regularly observe. To violate this rule, as is too often done by the English; to change the place, and shift the scene in the middle of an act; shows great incorrectness, and destroys the whole intention of the division of a play into acts. Mr. Addison's "Cato" is remarkable beyond most English tragedies for regularity of conduct. The author has limited himself in time, to a single day; and in place, has maintained a most rigorous unity. The scene is never changed; and the whole action passes in the hall of Cato's house, at Utica.

The *characters* most proper to be exhibited in tragedy have been already considered by writers on this subject. (See CHARACTER.) Several critics require that the principal personages should be of high or princely rank, because their misfortunes and sufferings interest the imagination, and impress the heart more forcibly, than those of persons in humbler condition or more private life. But this observation is more specious than solid, and is refuted by facts. The distresses of Desdemona, Monimia, and Belvidera, affect us as much as if they had been princesses or queens. The moral characters of the persons represented are much more important than the external circumstances in which they are exhibited. The personages presumed to view, and the incidents relating to them, should be so described, as to leave upon the spectators impressions favorable to virtue, and to the admiration of Providence. Mixed characters, such as occur in the world, afford the most proper field for displaying, without any bad effect on morals, the vicissitudes of life; and they interest us the more deeply, as they display emotions and passions, of which we have all been conscious. The subjects of the ancient Greek tragedies were too often founded on mere destiny, and inevitable misfortunes; and though in the course of the drama, many moral sentiments occurred, the misfortune conveyed by the fable of the play was seldom any more than that reverence was owing to the gods, and submission due to the decrees of destiny. Besides, their tales about oracles, and the vengeance of the gods, led to many incidents more melancholy and tragical than moral

and useful. Modern tragedy has aimed at a higher object. An Othello, hurried by jealousy to murder his innocent wife: a Jaffier, ensnared by repentment and woe to engage in a conspiracy, and then stung with remorse, and involved in ruin: a Siffredi, through the deceit which he employs for public-spirited ends, bringing destruction on all whom he loved: a Camilla, seduced into a criminal intrigue, which overwhelms herself, her father, and all her friends in misery: these, and such as these, are the examples which tragedy now displays to public view: and by means of which, incalculates or men the proper government of their passions.

The *sentiments* of a tragedy should be suited to the characters of the persons to whom they are attributed, and to the situations in which they are placed. Moral sentiments and reflections should not occur too often, because they would thus lose their effect, and they would render the play pedantic and declamatory. This is the character, in a great degree, of Seneca's tragedies. Nevertheless, moral reflections, properly introduced, give dignity to a composition, and, on many occasions, are extremely natural. Much of the merit of Addison's Cato depends upon that moral turn of thought which distinguishes it. The *style and versification* of tragedy should be free, easy, and varied. Our blank verse is happily suited to this purpose. The style of tragedy ought always to possess force and dignity, but at the same time that ease and briskness, which are adapted to the freedom of dialogue, and the distractions of passion.

Of the Greek tragedy and tragedians we have already given some account. In the compositions of some of the French dramatic writers, particularly Corneille, Racine, and Voltaire, tragedy has appeared with much lustre and dignity. But though they have improved upon the ancients; though they are attentive to all the unities, and to all the decorums of sentiment and morality: and though their style is generally very poetical and elegant: yet they want fervour, strength, and the natural language of passion: too declamatory, when they should be passionate: and too refined, when they should be simple. These defects of the French theatre are freely acknowledged by Voltaire. (See their respective biographical articles.) The general character of tragedy in Great Britain is, that it is more animated and passionate than French tragedy, but more irregular and incorrect, and less attentive to decorum and to elegance. See the biographical articles of SHAKESPEARE, DRYDEN, OTWAY, ROWE, YOUNG, CONGREVE, THOMSON.

We shall close this account of tragic compositions with the following extract from Dr. Blair's Lectures, vol. iii. "A Greek tragedy is the relation of any distressful or melancholy incident: sometimes the effect of passion or crime, often of the decree of the gods, simply exposed; without much variety of parts or events, but naturally and beautifully set before us: heightened by the poetry of the chorus. A French tragedy is a series of artificial and refined conversations, founded upon a variety of tragical and interesting situations: carried on with little action and vengeance; but with much poetical beauty, and high propriety and decorum. An English tragedy is the combat of strong passions, set before us in all their violence: producing deep distresses: often irregularly conducted: abounding in action; and filling the spectators with grief. The ancient tragedies were more natural and simple: the modern are more artificial and complex. Among the French, there is more correctness; among the English, more fire. Andronicus and Zoyre, soften; Othello and Venice Preserved, rend the heart. It deserves remark, that three of the greatest masterpieces of the French tragic theatre turn wholly upon religious subjects: the Athalie of Racine, the Polyxene of Corneille, and the Zoyre of Voltaire. The first is founded upon an

historical passage of the Old Testament; in the other two, the distress arises from the zeal and attachment of the principal personages to the Christian faith: and in all the three, the authors have, with much propriety, availed themselves of the majesty which may be derived from religious ideas."

The English received the first plan of their drama from the French, among whom it had its first rise towards the end of the reign of Charles V. under the title of the *chant-royal*; which consisted of pieces in verse, composed in honour of the Virgin, or some of the saints, and sung on the stage: they were called by the title *chant-royal*, because the subject was given by the king of the year, or the person who had borne away the prize the year preceding.

The humour of these pieces took wonderfully among the people, insomuch, that in a little time there were formed several societies, who began to vie with each other in them: and one of these, to engage the town from the rest, began to intermix various incidents or episodes, which they distributed into *acts* and *scenes*, and had as many different persons as were necessary for the representation.

Their first essay was in the Bourg St. Maur, and their subject the passion of our Saviour. The prévot of Paris prohibiting their continuing of it, they made application to court; and to render it the more favourable to them, erected themselves into a friary, or fraternity, under the title of "Brothers of the Passion;" which title has given some occasion to suspect them to have been an order of religious.

The king, on seeing and approving some of their pieces, granted them letters of establishment in 1402, upon which they built a theatre, and for an age and a half acted none but grave pieces, which they called *moralties*; till the people growing weary of them, they began to intermix farces or interludes taken from profane subjects. This mixture of farce and religion displeasing many, they were re-established by an arret of parliament in 1548, on condition of their acting none but profane, yet lawful and decent subjects, without intermeddling with any of the mysteries of religion; and thus were the Brothers of the Passion despoiled of their religious character; upon which they mounted the stage no more in person, but brought up a new set of comedians, who acted under their direction.

Thus was the drama established, and on this foundation arrived in England. In process of time, as it was improved, it became divided into two branches, agreeable to the practice of the ancients, and the nature of things, *viz.* into tragedy and comedy properly so called; and this last again was subdivided into pure comedy and farce. See each under its proper head, COMEDY, &c.

TRAGEDY, *Hilaro*. See HILARO-TRAGEDIA.

TRAGEIN, in *Geography*, a town of Austria; 10 miles E.N.E. of Steyregg.

TRAGELAPHUS, in *Zoology*. See CERVUS and OVIS.

TRAGEN, in *Geography*, a town of Africa, in Fezzan; 25 miles E. of Mourzouk.

TRAGIA, in *Botany*, received its name from Plumier, in memory of Hieronymus Tragus, or Jerome Bock, a famous old German botanist, who was both a divine and a physician, and discovered a number of rare plants in Germany, which Haller enumerates, *Bibl. Bot.* v. 1. 266. He is chiefly known to us by the Latin edition of his herbal, published in quarto by David Kyber in 1552, with a learned historical preface, by his illustrious friend Conrad Gesner. Some of the cuts, often coloured, give a ludicrous exhibition of the medical qualities of the plants, or of some particulars in their history. Tragus died in 1554, aged 56.

Adanson always called him Le Bouc, as if we were to say in English Mr. He-goat; and would not retain the Linnæan name of the present genus, preferring that used in the Hortus Malabaricus, *Schorigenam*, spelling it, by a fatality incident in orthography to many of his countrymen, *Schorigeram*, which blunder he seems to have copied from Linnæus. Nobody has attended to this erudite alteration.—*Linn. Gen.* 483. *Schreb.* 627. *Willd. Sp. Pl.* v. 4. 322. *Mart. Mill. Dict.* v. 4. *Ait. Hort. Kew.* v. 5. 255. *Pursh* 604. *Juss.* 390. *Plum. Gen.* 14. t. 12. *Lamarck Dict.* v. 7. 722. *Illustr. t.* 754.—Class and order, *Monœcia Triandria*. *Nat. Ord.* *Tricocœ*, Linn. *Euphorbia*, Juss.

Gen. Ch. Male, *Cal.* Perianth in three deep, ovate, acute, flat, spreading segments. *Cor.* none. *Stam.* Filaments three, the length of the calyx; anthers roundish.

Obs. Linnæus remarks, that Plumier took this calyx for a funnel-shaped monopetalous corolla.

Female, on the same plant, *Cal.* Perianth inferior, in five, sometimes six, deep, ovate, concave, acute, permanent segments. *Cor.* none. *Pist.* Germen superior, roundish, with three furrows; style one, erect, longer than the calyx; stigma in three spreading segments. *Peric.* Capsule of three globular lobes and three cells, bristly, each cell marked at the base externally with a pair of dots. *Seeds* solitary, globose.

Ess. Ch. Male, Calyx in three deep segments. Corolla none.

Female, Calyx in five deep segments. Corolla none. Stigmas three. Capsule three-lobed, of three cells. Seeds solitary.

Obs. Some species have the style more or less deeply split into three parts.

Tragia is an unfightly genus, with the aspect of a nettle, or a *Croton*. The flowers are green and inconspicuous; the herbage mostly hispid or hairy; the stem either twining, often shrubby and perennial; or erect, herbaceous, with an annual root.

Sect. 1. *Stem climbing*.

1. *T. volubilis*. Twining *Tragia*. *Linn. Sp. Pl.* 1390. *Willd. n.* 1. *Ait. n.* 1. "Trew *Pl. Rar.* v. 2. 7. t. 15." *Lamarck f.* 1. (*T. alia scandens, urticæ folio; Plum. Ic.* 251. t. 252. f. 2.)—Leaves ovate, somewhat heart-shaped, pointed, strongly ferrated, rather hairy. Footstalks bristly above. Segments of the female calyx undivided. Stem twining.—Native of dry, calcareous situations in the West Indies, blossoming in our stoves in June and July, provided it be admitted there. The stem is round, hairy, leafy, branched, twining from west to east. Leaves alternate, about two inches long; paler beneath. Flowers axillary; the males in long bracteated clusters; the females solitary, on a long stalk at the base of each cluster. Capsule the size of a large pea. Browne's specimen has the leaves more soft and downy beneath than in the original one from the Upsal garden. Whether the β of Linnæus, *Plum. Ic.* t. 252. f. 1, be a variety, or a distinct species, we have no means of determining.

2. *T. cordata*. Heart-leaved *Tragia*. *Vahl Symb.* v. 1. 76. *Willd. n.* 2. (*Jatropha pungens; Forsk. Egypt.-Arab.* 163.)—"Leaves heart-shaped, pointed, ferrated; bristly beneath. Segments of the female calyx pinnatifid, hairy. Stem twining."—Gathered by Forskall near Yemen, in Arabia Felix, where it is called *Hörekrek*, *Meberkaka*, or *Humejta*. *Vahl* says the stem is shrubby, twining, and, like the whole plant, bristly. Leaves paler beneath. Spikes terminal.

3. *T. hispida*. Bristly *Tragia*. *Willd. n.* 3.—"Leaves lanceolate,

lanceolate, pointed, hispid, nearly entire; heart-shaped at the base. Segments of the female calyx pinnatifid, rough with bristles. Stem climbing."—Native of the East Indies. *Lower* on very short, very hispid footstalks, most bristly beneath, two inches long, occasionally furnished with an obsolete tooth at the base, or near the point. *Spikes* axillary, stalked. *Calyx* densely covered with white bristles.

4. *T. macrocarpa*. Large-fruited Tragia. Willd. n. 2. Parib. n. 3. (*T. cordata*; Michx. Borel.-Amer. v. 2. 176.)—"Leaves ovate, sharply toothed, hispid; deeply heart-shaped at the base. Stem twining."—Found by Michx. in Kentucky. Annual, flowering in July. *Perf.* Each lobe of the *capsule* is said to be the size of a large pea.

5. *T. villosa*. Shaggy Tragia. Thunb. Prodr. 14. Willd. n. 5.—"Leaves heart-shaped, crenate; hairy beneath. Stem climbing."—Gathered at the Cape of Good Hope by Thunberg, who alone appears to have seen this or the next species.

6. *T. capensis*. Cape Tragia. Thunb. Prodr. 14. Willd. n. 6.—"Leaves heart-shaped-ovate, toothed, hispid. Stem twining. Segments of the female calyx pectinate. From the same country.

7. *T. involucrata*. Calycine Tragia. Linn. Sp. Pl. 1391. Willd. n. 7. Ait. n. 2. Lamarck n. 3. Jacq. Misc. v. 2. 372. Ic. Rar. t. 190. (*Ricinokarpus zeylanica hirsuta*, foliis lanceolatis serratis; Burm. Zeyl. 200. t. 92. Schorrigem; Rheed. Hort. Mal. v. 2. 72. t. 39.)—"Leaves ovate, pointed, serrated, hispid. Stem climbing. Segments of the female calyx pinnatifid, bristly.—Native of the East Indies, in sandy ground. The *stem* is annual. *Stems* twining, rising to the height of ten feet, much branched, leafy, round, densely covered with pale bristly hairs. *Lower* about three inches long, ribbed and veiny, paler beneath, on short hispid stalks. *Clusters* lateral, stalked, short and simple, each of several little green male flowers, with a solitary female one at the base. *Capsule* woody, hairy, enveloped in the large, very bristly, strongly pinnatifid, or pectinate, permanent calyx.

SECT. 2. *Stem erect, herbaceous.*

8. *T. zapotilana*. Nap-leaved Tragia. Cavan. Ic. v. 6. 37. t. 557. f. 3. Willd. n. 8. Lamarck n. 6.—"Leaves oblong-heart-shaped, strongly serrated, hispid. Stem erect, much branched.—Native of New Spain, flowering in August. An annual herbaceous plant, 2 feet high, very much branched. *Lower* about an inch long, alternate, stalked; glaucous beneath. *Clusters* axillary and terminal, capillary, rather shorter than the leaves. Female calyx with entire segments.

9. *T. urticoides*. Nettle-leaved Tragia. Michx. Borel.-Amer. v. 2. 176. Willd. n. 9. Parib. n. 2. (*Croton foliis cordatis serratis petiolatis alternis, floribus spicatis*; Gron. Virg. ed. 2. 153.)—"Leaves heart-shaped, ovate, serrated. Stem erect, very hairy."—In fields, from Virginia to Georgia; annual, flowering in July. *Perf.*

10. *T. Mercurialis*. Mercury-leaved Tragia. Linn. Sp. Pl. 1391, excluding the reference to Gronovius. Willd. n. 10. Lamarck n. 7. (*Mercurialis maderaspatensis truncocosa, acutabulis definita*; Pluk. Phyt. t. 205. f. 4. "Pee-cupamemi; Rheed. Hort. Mal. v. 10. t. 52.")—"Leaves heart-shaped, ovate, pointed, serrated. Spikes pinnated. Stem erect."—Native of the East Indies. Apparently annual, with the aspect of a *Mercurialis*. We have examined no specimens.

11. *T. corniculata*. Horned Tragia. Vahl Eclog. v. 2. 55. Willd. n. 11. Lamarck n. 8.—"Leaves ovate, somewhat heart-shaped, pointed, nearly entire. Stem erect,

branched, hairy. Each valve of the capsule with two horns.—Native of Trinidad and Guiana. *Root* annual. *Lower* occasionally furnished with a tooth or two near the base, with slender downy veins. *Spikes* axillary. *Capsule* depressed, its valves two-horned at each extremity. *Wall.*

12. *T. urens*. Stinging Tragia. Linn. Sp. Pl. 1391. Willd. n. 12. Ait. n. 3. Parib. n. 1. Lamarck n. 12. (*Ricinus parvus urens, foliis quercinis, virginianus*; Pluk. Phyt. t. 107. f. 5.)—"Leaves oblong-lanceolate, sessile, obtuse, more or less toothed towards the extremity, downy, as well as the upright branched stem.—In cultivated and waste ground, and by road-sides, from Virginia to Carolina; annual, flowering from June to August. *Perf.* The name of *urens* seems to have remained with this species on the authority of Plukenet. Its pubescence appears to be of a very fine kind; nor has any recent botanist attributed to it any stinging property. The habit of the herb is like a *Mercurialis*. The *lower* are from one to two inches long, very variable in breadth; usually deeply toothed, or almost finuated; rarely linear and entire. *Clusters* axillary, longer than the leaves. *Capsule* slightly hairy.

13. *T. Chamaelea*. Lance-leaved Tragia. Linn. Sp. Pl. 1391. Willd. n. 13. Ait. n. 4. Lamarck n. 13.—(*Chamaelea foliis linearibus, floribus spicatis, echinato fructu*; Burm. Zeyl. 59. t. 25. Codi avanacu; Rheed. Hort. Mal. v. 2. 65. t. 24.)—"Leaves linear-lanceolate, stalked, obtuse, fringed with close bristles. Stem branched, diffuse. Lobes of the capsule toothed at the back.—Native of the East Indies, in grassy places; rare on the coast of Malabar. It was first in 1793 by Dr. Roxburgh to Sir Joseph Banks, and flowered in the stove at Kew, in the middle of summer. The *root* is annual. *Herb* twelve or eighteen inches high, nearly smooth, and somewhat glaucous. *Stems* slender, angular, diffuse. *Lower* very variable in length and breadth, undivided, entire, curiously fringed with dense, close, white, callous, bristly teeth. *Clusters* small, simple, axillary. The lowest *lower* are sometimes nearly orbicular.

14. *T. crotolaria*. Hemp-leaved Tragia. Linn. Suppl. 475. Willd. n. 14. Ait. n. 5. Lamarck n. 14. (*Croton hirsutum*; Linn. Sp. Pl. 1407. Burm. Ind. 305. t. 63. f. 1. *Ricinus asperior, alceae venetae foliis abquastendis accedens maderaspatensis*; Pluk. Phyt. t. 200. f. 2.)

5. *Croton urens*; Linn. Sp. Pl. 1428. (*Ricinus urens, canaliculatis foliis triphyllis*; Pluk. Phyt. t. 200. f. 6.)

"Leaves deeply three-lobed, or ternate, toothed; the middle lobe longest; ribs most bristly beneath. Stem erect.—Native of the coast of Malabar, in grassy places. A perennial herb, whose *juice* bears a considerable resemblance to the Venice Mallow, *Hibiscus Trionum*. The lobes of the *lower* are obtuse, jagged and toothed, bristly on both sides, but particularly along the ribs and veins beneath. The *juice* and *branches* are also bristly. *Clusters* on long, axillary, very bristly, stalks. *Calyx* of the fruit pinnatifid, thickly covered, as well as the *capsule*, with pale rigid bristles. When the lobes of the *lower* are quite separate to the very base, the plant becomes *Croton urens* of Linnaeus; but this affords no permanent specific distinction. Plukenet's figures of both varieties are infinitely preferable to Burmann's plate.

SECT. 3. *Stem erect, woody.*

15. *T. colurna*. Red-leaved Tragia. Lamarck n. 9. ("Gagana, seu Valli-vira; Rheed. Hort. Mal. v. 12. 59. t. 30. foliis acutis." *Lon.*)—"Leaves lanceolate, obtuse, smooth, with shallow serratures; somewhat heart-shaped at the base. Stem erect. Male flowers in sessile cylindrical spikes; female separate, solitary; both axillary. *Capsule* prickly.

prickly.—Native of the East Indies. Commerſon gathered it in the Mauritius. The *ſtem* is ſhrubby or perhaps arborescent, with angular *branches*, finely downy when young. *Leaves* ſtalked, two or three inches long; their midrib and margin ſtained with a vinous red, as are ſometimes the fine tranſverſe veins. *Stipulas* rounded. *Flowers* all axillary; the males in denſe ſpiral ſpikes, ſometimes compound, half the length of the leaves; females ſolitary, ſeſſile, ſeparate from the males, though ſometimes on the ſame branch. *Capſule* beſet with ſtout ſpines.

16. *T. marginata*. Pale-bordered Tragia. Lamarck n. 10.—Leaves ovato-lanceolate, acute, toothed; finely downy on both ſides. *Stem* erect. Male flowers in axillary cylindrical ſpikes. *Capſule* hairy.—Gathered by Commerſon in the iſle of Bourbon. The young *branches* are finely downy, as well as the *footſtalks*, *ſpikes*, and *foliage*. *Leaves* three or four inches long, ſometimes more, diſtinguiſhed by a pale marginal diſcoloration, more or leſs dilated or limited. Male *ſpikes* ſomewhat ſtalked, two inches in length. The female *flowers* we have not ſeen. The *capſule* is ſaid to be hairy; its *calyx* deciduous.

17. *T. reticulata*. Reticulated Tragia. Lamarck n. 11.—Leaves ovate, obtuſe, ſmooth; reticulated with fine veins beneath. *Stem* erect. Male flowers in lax, ſlightly downy cluſters.—Gathered in the iſle of Bourbon, by Commerſon, whoſe ſpecimen is before us, agreeing in every point with the deſcription of M. Poiret in Lamarck, except that the *leaves* are not crenate, but quite entire. They are an inch or two long, thin, not coriaceous, obtuſe at the baſe, pale and ſhining at the back. The *branches* are woody, much divided, round, ſmooth, ſcarred with pale warts. Male *cluſters* about the ends of ſmall lateral ſhoots, ſomewhat ſtalked, an inch and half long. *Flowers* on ſhort, diſtant, partial ſtalks, with a little *bractea* at the baſe of each. We know nothing of the female *flowers*, or the *capſules*.

18. *T. virgata*. Wand-like Tragia. Lamarck n. 15. *Illustr.* t. 754. f. 2.—Leaves on ſhort ſtalks, ovato-lanceolate, acute, ferrated, ſmooth. *Stem* erect. Male ſpikes axillary, as long as the leaves.—The native country of this ſpecies has not been aſcertained. We know it only from the materials above cited. The *leaves* are delineated about an inch long, ſtrongly ferrated. If the plate be exact, the *female flowers* compoſe a long lax terminal ſpike, and the ſegments of their *calyx* are finely pinnatifid. But of this nothing is ſaid in the deſcription. The *male ſpikes* are like thoſe of ſeveral preceding ſpecies in the preſent ſection, axillary, ſolitary, ſlightly ſtalked.

19. *T. filiformis*. Thread-shaped Tragia. Lamarck n. 16.—Leaves ovato-lanceolate, pointed, ſmooth, diſtantly toothed. *Stem* erect. *Spikes* thread-shaped. *Bracteas* of the female flowers rounded, very large.—Deſcribed by Poiret from Lamarck's herbarium. We have ſeen no ſpecimen. The *ſtem* is ſhrubby, with ſmooth, cylindrical, ſtriated *branches*. *Leaves* thin, an inch or two long, pale green, blunt with a point, ſmooth on both ſides, on almoſt capillary ſmooth *footſtalks*, half an inch long, accompanied by ſetaceous *bracteas*. *Flowers* in very ſlender axillary ſpikes; the *males* minute, greeniſh, ſeſſile; *females* in the lower part of the ſame ſpike, accompanied by very large, roundiſh, ſmooth, ſomewhat crenate *bracteas*, which give this plant the aſpect of an *Acalypha*. *Poiret*.

We are poſſeſſed of ſeveral incomplete and undetermined ſpecimens, which by their habit ſhould ſeem probably to belong to this laſt ſection, but there being no poſitive certainty of their genus, we muſt leave them undeſcribed.

TRAGIC DANCE. See EMMELIA.

TRAGI-COMEDY, a kind of dramatic piece, repreſenting ſome action paſſed among eminent perſons, the

event of which is not unhappy or bloody, and in which is ſometimes admitted a mixture of leſs ſerious characters.

The ancients, M. Dacier obſerves, knew nothing of ſuch compositions, in which the ſerious and comic are blended; nor does the epithet M. Corneille gives them, of heroic comedies, excuſe their irregularity.

Their foundation is certainly bad; for, endeavouring both to make us laugh and cry in their turns, they endeavour at contrary emotions, which the heart can never undergo; every thing that diſpoſes for the one, indiſpoſing for the other.

The tragi-comedy was formerly very common on the Engliſh ſtage; there was ſcarcely ſuch a thing in the ſeventeenth century as a pure tragedy, without a ſpice of comedy or farce to make the people laugh. Now that the ſtage and our taſte are brought nearer to the model of nature and the ancients, the tragi-comedy is diſuſed.

Tragi-comedy is the only caſe wherein comedy is allowed to introduce kings and heroes.

TRAGICUS, in *Anatomy*, a muſcle of the external ear. See EAR.

TRAGILUS, in *Ancient Geography*, a town of Thrace, between the Cherſoneuſus and Macedonia. Steph. Byz.

TRAGIUM, in *Botany*, a new umbelliferous genus of Sprengel's, ſeparated by him from PIMPINELLA; ſee that article. The name is borrowed from Dioſcorides, whoſe *τραγιον* appears to belong to our *Pimpinella*, and to have been ſo denominated from *τραγος*, a goat; becauſe when the wild goats fed upon it, the arrows with which they were wounded would drop out; as Ælian relates of the Cretan Dittany.—Sprengel Prodr. Umbellif. 26.—Clasſ and order, *Pentandria Digynia*. Nat. Ord. *Umbellata*, Linn. Sect 5. *fructu armato*, Sprengel.

The learned author whom we have juſt quoted, in his new mode of arranging the UMBELLIFERÆ, of which, as well as of other attempts of the ſame kind, we propoſe to treat hereafter in its proper place, lays conſiderable ſtreſs on the hairy or brifly clothing of the ſeeds in ſome ſpecies. Such are all ſeparated by him from thoſe with ſmooth ſeeds, and diſpoſed in different genera, compoſing by themſelves a particular ſection characterized "*fructus armati*." Among them is *Tragium*, diſtinguiſhed from *Pimpinella* chiefly by the circumſtance juſt mentioned, and the almoſt total abſence of ribs to the ſeeds.

Eff. Ch. Fruit ovate-oblong, downy, with ſcarcely any ribs. Seam flattiſh. Skin rather looſe. No general or partial involucre.

Obſ. The ſeam, *commiſſura*, is the line by which the two ſeeds touch each other.

The ſpecies enumerated by profeſſor Sprengel are

1. *T. Columnæ*. (*Pimpinella* *Tragium* of Villars. See our PIMPINELLA, ſp. 4, where notice is taken of the importance of the downineſs of the ſeeds, as a *ſpecific* diſtinction; and where for *Columba* read *Columna*.)

2. *T. peregrinum*. (*P. peregrina*; Linn. Sp. Pl. 378. Marſch. a Bieberſt. Taur.-Caucaſ. v. 1. 241; ſee ſp. 7.)

3. *T. aromaticum*. (*P. aromatica*; Marſch. a Bieberſt. Taur.-Caucaſ. v. 1. 241.)—"Hoary with down. Leaves pinnate; leaflets all wedge-shaped, lineated; with deep ſerratures at the extremity."—Native of the borders of woods, and banks of torrents, on the eaſt ſide of mount Caucaſus, flowering in July. *Root* biennial. Akin to *Pimpinella Aniſum*, with which it exactly agrees in the taſte and ſmell of its *ſeeds*. But the preſent plant has all the *leaves* pinnate and glaucous, more ſlightly ſtriated, or ribbed, and the *ſeeds* are downy.

4. *T. villoſum*. (*Pimpinella villoſa* of Schouſboe; unknown to us.)

5. *T. Brsteri*. (*P. bubonoides*; n. 5.)

The fruit of this last is much more hairy than that of the first species. On a review of the whole genus of *Pimpinella*, there appears to us not the slightest difference in the form of the seeds, nor in the distinctness of the ribs in the several species, except that the latter are concealed by the hairs in *P. bubonoides*, though this is by no means the case in *P. Tragium*, whose ribs are more prominent than in any other under our inspection. There seems to be no reason for changing the specific name *bubonoides*, which is singularly expressive of the habit of the plant.

TRAGIUM *Germanicum*, a name given by some authors to the *arriples olida*, or stinking orach.

TRAGOI, in *Geography*, a town of Bulgaria; 24 miles E. of Ternova.

TRAGOLLES, a town of Africa, in the kingdom of Bamboouk.

TRAGONERA. See DRAGONERA.

TRAGONICE, in *Ancient Geography*, a town of Asia, in the interior of the Perride, according to Ptolemy and Ammianus Marcellinus.

TRAGONISI, or DRAGONISI, in *Geography*, an island in the Grecian Archipelago, so called from the number of goats, which are its only inhabitants; 2 miles W. of Myconi. N. lat. $37^{\circ} 25'$. E. long. $25^{\circ} 30'$.

TRAGOPOGON, in *Botany*, Goat's-beard, from *tragos*, a goat, and *podogon*, a beard, a name adopted from Dioscorides, whose *μασκαριον* may very well belong to the genus which now bears it. His description answers in every particular to our *T. porrifolius*, except the shortness of the stem. He says it is "an eatable herb, with leaves like Garlic or Saffron, a short stem, a long sweet root, with a large flower-cup on the top of the stalk, and a black, or dark, seed," according to some readings, "from whence," it is observed, "the name is derived." But Saracenus, the best commentator on this ancient author, instead of *μασκαριον*, and *μασκαριον*, would read *μασκαριον* and *μασκαριον*; for he justly remarks that "a black seed could never have given rise to the name of Goat's-beard." With this explanation, the dark calyx, and the large *pappus*, or seed-down, are intelligible enough, as describing the deep purple florets lining the calyx, and the feathery seed-down, of *T. porrifolius*. So Matthioli likewise understands the matter.

Dr. Sibthorp indeed did not meet with this plant in Greece, and it finds a place in his *Prodr. Fl. Græc.* merely as having been observed by the abbat Sestini, near Constantinople; but it might have been cultivated in Greece, as well as elsewhere.—Linn. Gen. 398. Schreb. 505. Willd. Sp. Pl. v. 3. 1492. Mart. Mill. Dict. v. 4. Sm. Fl. Brit. 812. Prodr. Fl. Græc. Sibth. v. 2. 120. Ait. Hort. Kew. v. 4. 432. Juss. 170. Lamarck Illustr. t. 646. f. 1. Germ. t. 159. *T. pratense*.—Class and order, *Synopsis Polyanthæ equalis*. Nat. Ord. *Compositæ semipinnatis*, Linn. *Cichoraceæ*, Juss.

Gen. Ch. *Common Calyx* simple, of about eight, (from five to twelve,) lanceolate equal leaves, four of which are interior when closed. *Cor.* compound, imbricated, uniform. *Florets* numerous, all perfect, of one petal, ligulate, abrupt, with five teeth, the outermost rather the longest. *Stam.* Filaments, in each floret, five, capillary, very short; anthers united into a cylindrical tube. *Pist.* Germen, in each floret, oblong; style thread-shaped, the length of the filaments; stigmas two, revolute. *Peric.* none, except the converging pointed calyx, the length of the seeds and their down, slightly tumid, finally reflexed. *Stach.* solitary, oblong, tapering at each end, angular, rough, each terminating in a longawl-shaped stalk, bearing the flat, feathery seed-down, consisting of about thirty horizontally spreading rays. *Recept.* naked, flat, rough.

Obf. Vaillant distinguished his *Tragopogon* by having straight seeds, and a calyx longer than the corolla: while his *Tragopogonoides* has incurved seeds, and a calyx shorter than the corolla. Linnaeus makes no such distinction. Jussieu, and after him Willdenow, have adopted the latter genus of Vaillant, though by a different character and name, referring thereto such species as have a turbinate simple-leaved calyx, in eight segments only, not eight leaves. Of this we shall treat at the end of the present article, describing first the genuine species of *Tragopogon*, all caulescent, from which are to be removed what constitute the *TRAXIMON* of Gærtner, to be described in its proper place.

Ed. Ch. Receptacle naked. Calyx of several leaves in a simple series. Seed-down stalked, feathery.

1. *T. pratensis*. Common Goat's-beard. Linn. Sp. Pl. 1109. Willd. n. 1. Fl. Brit. 2. 1. Engl. Bot. t. 434. Fl. Dan. t. 966. Bulliard. t. 209. (*Tragopogon*; Fusch. Hist. 821. Math. Valgr. v. 1. 490. *T. lateum*; Ger. Em. 735.)—Calyx nearly as long as the corolla. Leaves keeled, pointed; dilated at the base. Flower-stalk round.—Native of dry grassy pastures, in England, and other parts of Europe, flowering in June. The root is biennial, tapering, milky and sweet. Whole herb perfectly smooth, and destitute of hairiness, branched, erect, eighteen inches or more in height; the stem leafy, often purplish. *Leaves* alternate, undivided and entire, tapering; flaccid at the point; clasping the stem with their tumid and somewhat undulated base. *Stalk* terminal, solitary, precisely cylindrical, each bearing one very large bright-yellow flower, opening in a morning, and closing at noon, except in cloudy weather. *Anthers* brownish. *Seed* rough, with a broad feathery crown.—The character of "*foliis integris*" is now needlessly retained by Willdenow, as contrasting only with species that he himself has removed to his genus ARNOPOGON, hereafter described.

2. *T. maritima*. Changeable Goat's-beard. Jacq. Misc. v. 2. 316. Ic. Rar. t. 157. Willd. n. 2.—Calyx as long as the corolla. Leaves lanceolate, rough-edged; recurved at the point; somewhat ovate at the base.—Supposed to be a native of Siberia, the seeds having been sent to Jacquin by Pallas. We have seen no specimen. The *leaves* appear to be broader at the base, and less sheathing, than in the foregoing, and their points rather revolute than flaccid. The *flowers*, which open at sun-rise, and close about ten in the forenoon, for three successive days, are usually whitish; in some individuals rose-coloured, with red streaks; in others yellow, with purple ones; but these varieties are not constant from seed.

3. *T. undulata*. Wave-leaved Goat's-beard. Jacq. Misc. v. 2. 317. Ic. Rar. t. 158. Willd. n. 3. Ait. n. 2. Martich. von Bieberst. Taur.-Caucas. v. 2. 232.—Calyx as long as the corolla. Leaves nearly linear; those of the stem very much waved, revolute at the point.—Found in the meadows of Tauris, along with *T. pratensis*, of which some think it a variety: but the *flowers* are much smaller and paler, and the strongly undulated *leaves* are remarkable.

4. *T. orientalis*. Oriental Goat's-beard. Linn. Sp. Pl. 1109. Willd. n. 4. Ait. n. 3. (*Barbula hirci*; Camer. Epic. 312.)—Calyx shorter than the corolla. Leaves tapering, somewhat wavy, with spiral points.—Found by Tournefort in the Levant, and by Camerarius, as it seems, in Germany. M. Thoin sent seeds to Kew garden in 1787. It is a hardy biennial, flowering, like all the foregoing, in June and July, nor does the plant seem to differ much from the first, or most common, kind, except in the greater size of its golden *flowers*, whose marginal *florets* extend far beyond the calyx.

5. *T. canus*. Hoary-stalked Goat's-beard. Willd. n. 5. Willd.

TRAGOPOGON.

Waldst. et Kitaib. Hung. t. . . . —“ Calyx nearly equal to the corolla. Flower-stalks woolly. Leaves linear, straight.”—Found in meadows in Hungary. Biennial. *Stem* much branched and divaricated. *Leaves* ribbed, not undulated. *Calyx*, *flower-stalks*, and younger *branches*, clothed with white woolly down. *Corolla* pale yellow. *Willdenow*.

6. *T. major*. Great Goat's-beard. Jacq. Austr. v. 1. 19. t. 29. Willd. n. 6. Ait. n. 4. Marfch. von Bieberst. Taur.-Caucas. v. 2. 233.—Calyx longer than the corolla. Leaves tapering, straight. Flower-stalks swelling upward. Florets rounded at the tip.—Native of meadows, vineyards, &c. in Germany and Austria, as well as near Branfon, in Switzerland, where it was found flowering in August, by the late Mr. Davall, who sent its seeds to Kew in 1788, and whose own specimen is now before us. The gradual dilatation of the *flower-stalks* upward, the great size of the *flowers*, at least of their *calyx*, which extends much beyond the *corolla*, and consists of a greater number of leaves than the generic character requires, even as many as twelve or thirteen; these circumstances led Jacquin to consider the present plant as a distinct species from *T. pratensis*, or at least as a remarkable variety. We believe it remains constant from seed. Some of the preceding are but too nearly akin, or this ought to stand next to the *pratensis*.

7. *T. porrifolius*. Purple Goat's-beard, or Salsafie. Linn. Sp. Pl. 1110. Willd. n. 7. Fl. Brit. n. 2. Engl. Bot. t. 638. Jacq. Ic. Rar. t. 159. Fl. Dan. t. 797. (*T. purpureum*; Ger. Em. 735. *T. alterum*; Matth. Valgr. v. 1. 491.)—Calyx almost twice as long as the corolla. Florets tapering, abrupt. Leaves straight. Flower-stalks swelling upwards.—Native of meadows in Switzerland, Germany, England, and about Constantinople, flowering in May and June. Cultivated in the kitchen gardens of the more opulent, the roots being esteemed a delicacy, and known by the name of Salsafie. They resemble *Scorzonera hispanica*, and have a sweetish delicate flavour, when dressed with cream, but are esteemed chiefly for the sake of variety. This plant having been perhaps more cultivated when esculent vegetables were fewer in England, has become naturalized in various situations, chiefly of a low or moist description. We have alluded to it above as the *τραγοπωγών* of the Greeks. The *herb* is biennial, erect, glaucous, smooth, four or five feet high. *Leaves* slightly, or not at all, wavy. *Flowers* of a violet-purple, with black *anthers*; they close before noon. Linnæus, in his Dissertation on the Sexes of Plants, English ed. 54, relates that he obtained a mule plant, by sprinkling the *stigmas* of *T. pratensis* with the pollen of the present species. The progeny of the seeds had purple flowers, yellow at the base, evidently of an intermediate nature between the two parents; nor can any thing, as Linnæus observes, more decidedly evince the generation of plants.

8. *T. angustifolius*. Narrow-leaved Goat's-beard. “Belardi MSS.” Willd. n. 8.—“Calyx of eight leaves, longer than the corolla. Leaves straight, smooth.”—Found near Nice. Biennial. Like *T. crocifolius*, but the *calyx* consists of eight leaves, and the *foliage* is entirely smooth at the base. The *stem* is but four inches high. *Willdenow*. We are not sure whether one of our specimens from Dauphiny be referrible to this species. It is hardly three inches high; the *foliage* quite smooth and naked throughout; but the *calyx* has only six leaves. Another from the same country seems intermediate between it and *crocifolius*. The species of few genera are less satisfactorily defined than those of *Tragopogon*.

9. *T. crocifolius*. Crocus-leaved Goat's-beard. Linn.

Sp. Pl. 1110. Willd. n. 9. Ait. n. 6. Sm. Fl. Græc. Sibth. t. 779, unpublished. (*T. crocifolium montanum*, flore nigro-purpureo; Column. Ecphr. v. 1. t. 230.)—Calyx longer than the corolla. Leaves tapering; loosely woolly at the base on the upper side.—Native of Italy, the south of France, and the isle of Cyprus. Miller is said to have cultivated this species, but we do not remember to have met with it in gardens. The *root* is tapering and biennial, like all the rest of this section. The *stem* is scarcely above a foot high, branched, nearly or quite smooth, clothed with numerous, narrow, spreading, drooping, white-ribbed *leaves*, very remarkable for a quantity of loose, shaggy, cottony wool, about their base on the upper side, which is sometimes found also on the *branches* and *flower-stalks*. *Flowers* of a violet-purple, with yellow *stigmas* and blackish *anthers*; their *florets* more spreading than in *T. porrifolius*, and their *calyx* greatly deflexed, twice as long as the *corolla*, consisting of from five to eight acute leaves. Columna represents five broad ones only; Dr. Sibthorp found eight, which are narrower. The humble stature of the plant, and its woolly *leaves*, afford its most striking distinctions. The *seeds* are beautifully adorned with ascending scales, which prevent their escaping, when once lodged in the earth, the agitation of their feathery wings, by the wind, serving only to force them further down, till each wing shrivels at its base, and easily breaks off. The same economy is apparent in other species of this and similar genera, but peculiarly admirable in that before us. It is analogous to what has been observed in the first species of *STIPA*; see that article.

10. *T. villosus*. Hairy-Goat's-beard. Linn. Sp. Pl. 1110. Willd. n. 10. Ait. n. 433.—Calyx longer than the corolla. Stem much branched, corymbose, clothed, like the bases of the ovato-lanceolate leaves, with shaggy wool.—Native of Spain and Siberia; introduced at Kew, in 1794, by Mr. Hunnemann. *Root* biennial. *Herb* as tall as *T. porrifolius*, but the *stem* is very much more branched, and more slender, clothed with loose, scattered, cottony wool, as well as with numerous, short, ovato-lanceolate, pointed *leaves*, those about the corymbose upper part of the stem measuring from one and a half to two inches in length. *Flowers* a little drooping, pale yellow, rather smaller than those of *porrifolius*, on cylindrical striated stalks. *Calyx* of about nine leaves, nearly half as long again as the *corolla*. *Anthers* brownish. *Rays* of the *seed-down* rough, very woolly, with long, naked, taper points. This, at least, is an unquestionably distinct species.

For *Tragopogon virginicum*, Linn. Sp. Pl. 1111. (*Hyoseris prenanthoides* of Willd. Sp. Pl. v. 3. 1615.), as well as the two stemless species of Linnæus and Willdenow, see *TRUXIMON*.

Other Linnæan species are separated, as we have already said, into a no less distinct and natural genus, for which we here retain Willdenow's name.

ARNOPOGON. This word is composed of *αρσ*, *αρσος*, a *lamb*, and *πωγων*, a *beard*, alluding to the peculiarly white, soft, and dense woolliness which crowns the seeds.—Willd. Sp. Pl. v. 3. 1496. Ait. Hort. Kew. v. 4. 433. Sm. Prodr. Fl. Græc. Sibth. v. 2. 121. (*Urospermum*; Juff. 170. *Tragopogon picroides* et *Dalechampii*; Gartn. t. 159. *Tragopogon*; Lamarck Illustr. t. 646. f. 2, 3.)—Class and order, *Syngenesia Polygamia-aqualis*. Nat. Ord. *Compositæ semisfoculose*, Linn. *Cichoraceæ*, Juff.

Gen. Ch. *Common Calyx* simple, of one leaf, ovate, tumid at the base, deeply divided into eight equal, lanceolate segments. *Cor.* compound, imbricated, uniform. Florets numerous, all perfect, of one petal, ligulate, abrupt, with five teeth; their tubes about the length of the calyx. *Stam.* Filaments,

Filaments, in each floret, five, capillary, short: anthers united into a cylindrical tube, projecting out of the tube of the floret. *Pist.* Germen in each floret obovate: style tumid and oblique at the base, with a kind of joint, then thread-shaped, straight, the length of the stamens: stigmas two, revolute. *Peric.* none, except the permanent closed turbinate calyx, shorter than the seed-down, finally reflexed. *Seed* solitary, obovate, oblique, angular, rough, each crowned, at an obtuse angle, with a stalk, various in length, tumid and inflated at the base, bearing the spreading feathery seed-down. *Rays.* naked, flat, roughish.

Eff. Ch. Receptacle naked. Calyx turbinate, of one leaf, in eight deep segments. Seed-down feathery, on an oblique inflated stalk.

1. *A. Dalechampii.* Great-flowered Sheep's-beard. Willd. n. 1. Ait. n. 1. Sm. Fl. Græc. Sibth. t. 78c, unpublished. (*Tragopogon Dalechampii*; Linn. Sp. Pl. 1110. *Hieracium magnum*; Dalech. Hist. 569, bad. *H. purpureum*, incis. foliis. montanum; Barlet. Ic. t. 209.)—Calyx finely downy, without bristles. Leaves runcinate, toothed.—Native of Spain, the south of France, Italy, and the Levant. We have seen it, adorning sunny hills about Genoa, in the early part of a summer's day, when its copious large flowers, of a delicate sulphur-colour, purple underneath, make a fine appearance, intermixed with the blue *Centaurea*, and other handsome plants, while the great *Myrmica tibellinoides* is seen softly fluttering over their blossoms. Miller appears to have cultivated this plant, which is a tolerably hardy perennial in warm dry situations, flowering from June to October, but not often seen in gardens. The stem is from two inches to a foot high, purplish at the base, leafy, roughish, as well as the alternate, clasping, runcinate leaves, of which the upper ones are oblong, and nearly entire. *Flowers*: two inches wide, solitary, on very long, simple, terminal, round, rough, furrowed stalks. *Calyx* even, covered with peculiarly soft short down. *Fibres*: hairy at the base. Stalk of the seed-down tapering, hollow throughout, nearly vertical, about thrice the length of the seed.

2. *A. picoides.* Prickly-cupped Sheep's-beard. Willd. n. 2. Ait. n. 2. Sm. Fl. Græc. Sibth. t. 78c, unpublished. (*Tragopogon picoides*; Linn. Sp. Pl. 1111. *Sonchus asper laciniatus creticus*; Bauh. Prodr. 6c.)—Calyx hispid, with prominent bristles. Leaves toothed: the upper ones jagged; dilated at the base, clasping the stem.—Native of the south of France, and the shores of Italy, Sicily, Crete, &c. Dr. Sibthorp found it frequent in Greece and the Archipelago, especially among rubbish near the sea. He suspected it might be the Greater Hawkweed, *Ἰσάκος ἢ ἄσπρος*, of Dioscorides. Curious cultivators have often raised the plant in England, where it proves a hardy annual, but is too like a common Sow-thistle to be much cherished. The herb varies in luxuriance and roughness, but is not at all hoary. Lower leaves obovate, tapering much at the base, where they clasp the stem: upper greatly dilated in the same part, and furnished throughout with many sharp segments and teeth; their mid-rib prickly beneath. *Flowers*: several, bright yellow, not half the size of the former, on long, terminal, solitary, bristly stalks. *Calyx* tumid, clothed with towzy, rigid, projecting bristles. *Seed* dark-brown, depressed, scaly, as is the tumid base of the otherwise slender, longish, and white stalk which sustains the snow-white feathery down.

3. *A. asper.* Rough Sheep's-beard. Willd. n. 3. Ait. n. 3. Sm. Fl. Græc. Sibth. t. 78c, unpublished. (*Tragopogon asperum*; Linn. Sp. Pl. 1111. *Sonchus asper, subrotundo folio*; Bauh. Prodr. 6c, no figure.)—Calyx

hispid, with prominent bristles. Leaves undivided, toothed; those of the stem oblong, contracted towards the rounded clasping base.—Found on the shores of Montpellier, Italy, and Asia Minor. Sent to Kew by M. Richard in 1772. Annual, with the habit and flowers of the last, but the leaves are very different, at least those of the stem, which, instead of being dilated and deeply jagged, are merely oblong and toothed. The stalk of the seed-down moreover seems much shorter, though equally tumid at the base.

4. *A. asperif.* Cape Sheep's-beard. Willd. n. 4. (*Tragopogon capensis*; Jacq. Coll. v. 2. 320. Ic. Rar. t. 57.)—Calyx hispid, with prominent bristles, and deeply channelled. Leaves runcinate, toothed; the upper ones arrow-shaped at the base, nearly entire. The seeds were received by Jacquin from the Cape of Good Hope, and produced biennial plants, three or four feet high, branched, having much of the appearance of a Sow-thistle, like our second species. But the leaves are much less dilated at the base, and the calyx is more deeply channelled, having eight tumid ribs, or angles. The slender and elongated stalk of the seed-down is very like that species, of which it is possible the present may be but a variety. We know it only from Jacquin's works.

TRAGOPOGON, in *Gardening*, contains plants of the hardy, herbaceous, biennial, and perennial kinds, among which the species mostly cultivated are, the purple goat's-beard, or false (T. porrifolius); the common yellow goat's-beard (T. pratensis); the crocus-leaved goat's-beard (T. crocifolius); and the great-flowered goat's-beard (T. Dalechampii).

The first sort is cultivated in gardens under the name of false principally for the use of the root parts of the plant and the young shoots. The roots, when boiled or stewed, have a mild sweetish flavour. The stalks are also cut in the spring, when they are four or five inches high, and dressed like asparagus, in which way they eat very tender and well.

Method of Culture.—The first sort is only raised from seed, which should be sown in the spring, in an open situation to remain, either broad-cast and raked in, or in shallow drills eight or nine inches asunder, scattering the seeds thinly, and covering them half an inch deep; and when the plants are come up two or three inches in height, they should be thinned and weeded by hand or the hoe, leaving them eight or ten inches asunder, repeating the weeding as required during the summer, which is all the culture they require, and they will have large roots by the autumn, as September or October, when they may be begun taking up for use; and in November, when the leaves begin to decay, a quantity be preserved in sand for use in time of severe frost, when those in the ground cannot be got up.

In the spring, when those remaining in the ground begin to shoot, the shoots, when a few inches high, may be cut for use, which, when quite young and tender, on being boiled, are excellent eating. A few plants should be suffered to run up to stalk every spring, to produce seeds.

The shoots are brought to market in bunches during the autumnal and winter seasons.

The two following sorts may also be raised from seed in the same way, and the plants, when a little advanced in growth, be planted out if they are required for variety in any particular part.

The third sort may also be propagated by parting the roots in autumn and spring, and planting them where they are to remain.

The first is cultivated wholly as a culinary plant, but the others afford variety in the borders of pleasure-grounds, &c.

TRAGORCHIS, in *Botany*, from *τραγος*, a goat, and **ORCHIS**, see that article, has been used by several old authors to designate certain species of that beautiful and curious tribe, whose flowers were thought to have a goat-like scent. Two in particular have thus been called; the *Satyrium hircinum* of Linnæus, now *Orchis hircina*, and his *Orchis coriophora*.

TRAGORIGANUM, from *τραγος*, a goat, and *οριγανος*, *marjoram*, a name applied by the older botanists to several plants, mostly belonging to our present genus **ORIGANUM**, which may be found in its proper place, or to some aromatic plants allied thereto. The original meaning of the word was founded in the idea of *Marjoram* being agreeable to goats, and especially of the Cretan *Marjoram*, or *Dittany*, being a sovereign remedy for such as were wounded by arrows. *Tragoriganum nothum*, Bastard Goat-marjoram, Dalechamp Hist. 889, has indeed no connexion or affinity with other plants that bear this name, being the *Lithospermum fruticosum*, whose leaves only possess a slight resemblance to the ringent plants, without any of their flavour or qualities.

TRAGOSELINUM, from *τραγος*, a goat, and *σελινοι*, *parsley*, a name first used by Tabernæmontanus for the *Pimpinella saxifraga* of Linnæus, which some have called **TRAGIUM**; see that article and **TRAGUS**.

TRAGULA, among the Romans, a strong kind of javelin, with a barb'd head.

TRAGUM, in *Ichthyology*, the name given by Aristotle, and others of the old Greek writers, to the *trugum* of Ælian, Athenæus, and Oppian. Both names are used to express the fish called by authors the *pastinacha marina*, and by us the *fire-flaw*, or *fire-flaire*.

TRAGURIUM, in *Ancient Geography*, a town of Dalmatia, famous for its marble. Ptolemy.

TRAGUS, a river of the Peloponnesus, in Arcadia. Pausanias.

TRAGUS, in *Anatomy*, an eminence of the external ear. See **EAR**.

TRAGUS, in *Botany*, a name which has been variously applied. One *Τραγος* of Dioscorides, book 2. chap. 115, appears to be a kind of meal or flour. Hence perhaps Haller was led to use this name for a genus of grasses, now denominated **LAPPAGO**; see that article. Such an application is like the old derivation of *lucus*, "a non lucendo;" few of the tribe being likely to yield less meal. Another *τραγος* of the above Greek author, book 4. chap. 51, is described by him as "a maritime shrub, of humble growth, without leaves, whose branches are beset with a kind of reddish berries, the size of grains of wheat, pointed, and very astringent." Whether this may be the *Ephedra*, or any thing else, it is difficult to determine. Valerius Cordus thought it *Sedum album*, which is a common Greek plant. We might rather indicate *S. anglicum*, were that found in Greece, the leaves, in both cases, being taken for berries. Camerarius gives *Salsola Kali* for the plant of Dioscorides, annexing an abstract of his description of its form and qualities, the former of which, at least, does not agree with this *Salsola*; any more than with *S. Tragus*, so called by Linnæus, apparently because the name was at hand when he was intent on distinguishing it from *S. Kali*; see *Amoen. Acad.* v. 4. 310. We collect these particulars to shew the difficulty of the enquiry, as well as its inutilty. Dioscorides is amusing enough, as a botanical riddle-book, because, while some of his descriptions are elaborate and precise, others are just sufficiently vague to afford room for conjecture. Theophrastus, though far more philosophical, is in but a few instances clearly intelligible. The greater number of his plants are merely

named, as being supposed well-known to his readers, and therefore he scarcely affords matter to found any conjectures upon.

TRAHINA, in *Geography*, a town of Sicily, in the valley of Demona; 28 miles N.W. of Catania. N. lat. 37° 40'. E. long. 14° 40'.

TRAHONA, a town of Italy, in the Valteline, on a small river which runs into the Adda, 2 miles N. of Morbegno.

TRAJAN, **M. ULPUS TRAJANUS**, in *Biography*, a Roman emperor, the son of a distinguished commander under Vespasian in the Jewish wars, was born at Italica in the Spanish province of Bœtica, entered betimes into the army, and accompanied his father in several military expeditions; acquiring the hardiness, submitting to the discipline, and uniformly practising the duties of a soldier. In the career of public honour, he was first made prætor A.D. 86, consul A.D. 91, and raised by Nerva to the rank of Cæsar A.D. 97, being at this time in the 42d or 45th year of his age, according to the statements of different writers, and possessing a majestic stature, manly features, and dignified aspect. Upon the death of Nerva in the following year, Trajan succeeded, without opposition, to the imperial throne. He was at this time at Cologne, and remained for some time in Germany. In 99 he set out for Rome, and entered the city on foot, preceded by the lictors as an ordinary magistrate, and followed by a few soldiers exhibiting the demeanour of citizens. Affable in his manners, bountiful in his largesse to the Roman people, and anxious to procure a supply of corn by allowing free importation from the colonies, Trajan acquired and maintained a very great degree of popularity. He likewise very much contributed to the tranquillity and good order of the city, by removing to exile the infamous tribe of delators, who had been encouraged by the tyranny of Domitian, and not sufficiently repressed by the lenity of Nerva, and by issuing an edict with some penalties against all false accusers. He also reduced the tax of the twentieth upon collateral successions, imposed by Augustus, and formed a fund for the exercise of liberality by his own economy and frugality. He encouraged merit, and advanced to posts of trust men distinguished by their integrity and talents. He associated on the most condescending terms with persons of various rank and condition, and treated the citizens of Rome in general more as friends than as subjects. Although his military education and employments allowed him no leisure for acquiring the accomplishments of literature, he was the patron of learned men, and by founding libraries and other methods, he promoted the diffusion of learning. As he was moderate and frugal in his own habits, and in the entertainments he provided for his guests, he checked and restrained the prevalence of luxury and extravagant expenditure in others. By pursuing various methods for rendering the people happy, he obtained, by the unanimous voice of the senate, the title of "Optimus," which glorious distinction he retained through life and transmitted to posterity. In the third year of his reign he was honoured with a third consulate; and during his exercise of this office, Pliny pronounced that panegyric which is still extant, and which presents to view a finished portrait of a perfect prince. In the following year, when he was again consul, he was engaged in a war with Decebalus, king of the Dacians, from which he returned victorious, and obtained a triumph with the surname of "Dacicus." Having spent the two following years in an attention to objects that contributed to the improvement of the empire, one of which was the establishment of a port at Centumcellæ, now Civita-Vecchia, the close of the latter of these years was rendered

dered important and interesting, by the appointment of Pliny, A.D. 103, as governor of Pontus and Bithynia, and by the correspondence to which this appointment gave occasion, and which portrays in the most pleasing characters the enlightened and benignant spirit by which he was actuated. (See CHRISTIAN RELIGION and PLINY.) In the following year the war with Decebalus was renewed, and on this occasion Trajan constructed a bridge over the Danube, which was long admired as one of the most considerable relics of antiquity. When Decebalus had dispatched himself after the loss of his capital, Dacia was constituted a Roman province, and colonized from other parts of the empire. (See DACIA.) Upon his return to Rome, he employed himself in carrying on some works of public magnificence and utility: but success in his military expeditions unfortunately cherished the insatiate propensity of war, which seems to have been his most censurable foible; and accordingly the subsequent period of his reign was too ardently devoted to the gratification of his ambition, in extending the boundaries of the Roman empire. In the year 107, he reduced Armenia into a Roman province; the whole of Mesopotamia was also subdued; Arabia Petraea was likewise made a Roman province; and all the barbarous tribes situated north of Armenia, between the Euxine and Caspian seas, were reduced to submission. After the lapse of some years, of which no regular account remains, we find Trajan, A.D. 112, dedicating the magnificent forum, which he had constructed at Rome, and erecting the column on which his exploits are sculptured (see COLUMN and FORUM); and also renewing the war with the Parthians. In 115 he crossed the Tigris on a bridge of boats, and subdued Adiabene and the whole of Assyria; and having captured Ctesiphon and Susa, he descended the Tigris with his fleet, and had the honour of being the first and last Roman general who navigated the Indian ocean, ravaging the coast of Arabia Felix. He even indulged the ambition of visiting India. On his return he laid siege to Atura, the capital of an Arabian tribe, which he was obliged to raise and to withdraw to Syria. In the year 117 he was attacked with a paralytic disorder, attended with dropsy, and he therefore hastened his return to Italy. At Selinus in Cilicia he had another attack, which proved fatal. In his last moments, the empress Plotina secured the adoption of Adrian for his successor. Trajan died in the sixty-fourth year of his age, after a reign of nineteen years and a half, and his remains were deposited under his own column. This emperor's virtues were shaded by weaknesses and vices. His passion for war has been already mentioned; he was also addicted to sensual indulgences, of which intemperance in drinking was the least scandalous. Notwithstanding the blemishes of his character, his memory was long held in veneration, inasmuch that 250 years after his death, the senators, in their acclamations on the choice of a new emperor, vociferated the wish that he might be "more fortunate than Augustus, and better than Trajan." *Anc. Ul. Hist. Crevier's Rom. Emp.*

TRAJAN Column, a famous historical column, erected in Rome, in honour of the emperor Trajan. See COLUMN, *Col. Ul.*

TRAJAN, in *Geography*, a town of European Turkey, in Moldavia, on the Pruth; 16 miles N. of Galatz.

TRAJANA, or **TREA**, in *Ancient Geography*, a town of Italy, in the interior of Picenum. *Ptol. and Itin. Anton.*

TRAJANOPOLI, in *Geography*, a town of European Turkey, in the province of Romania, on the Mariza. This is an ancient town, and took its name from the emperor Trajan, who repaired and adorned it: it afterwards became very considerable, and now, though much reduced from its

ancient splendour, is still the see of a Greek archbishop; 40 miles S. of Adrianople.

TRAJANOPOLIS, in *Ancient Geography*, a town in the interior of Thrace, upon the banks of the river Hebrus. In the *Itin. Anton.* this town is placed between Bricozes and Cypselæ.—Also, a town of Myzia, near the sea, between Antandrus and Adramyttium.—Also, a town of Asia, in Cilicia Trachea, where the emperor Trajan died: the same with Selinunte.

TRAJANOPOLIS, or *Tranopolis*, a town of Asia, in Phrygia Pacatiana.

TRAJANUS PORTUS, a port of Italy, on the coast of Etruria, at the mouth of the Tiber; constructed by the emperor Claudius, and repaired by Trajan, who rendered it more secure and commodious, and gave it his name.

TRAJECTORY of a comet, is its path or orbit, or the line it describes in its motion.

This, Hevelius, in his *Cometographia*, will have to be very nearly a right line: but Dr. Halley concludes it to be a very eccentric ellipsis.

Sir Isaac Newton, in prop. xli. of his third book, shews how to determine the trajectory of a comet from three observations; and, in his last proposition, how to correct a trajectory graphically described. See COMET.

This term is often used, in general, for the path of any body moving either in a void, or in a medium that resists its motion; or even for any curve passing through a given number of points. Thus Newton, *Princip. lib. 1. prop. 22.* proposes to describe a trajectory that shall pass through five given points.

TRAJECTUM, in *Ancient Geography, a town of the Batavi upon the Rhine. Trajectum is thought to be one of the fifty mansions erected by Drusus in this country, to ascertain the course of its rivers. This place sustained a variety of vicissitudes, till at length it was established by the Romans. It had the name of Trajectum Ulpium, in honour of Ulpus Trajan. In its environs are found many ancient remains. See UTRECHT.*

TRAJECTUS, a place in the isle of Albion, upon the route from Callera to Ilica, between Abone and Aquæ Solis. *Anton. Itin.* Antiquaries are generally of opinion, that Trajectus should have been placed before Abone, and that it was situated at Oldbury, where, as they suppose, was a ferry over the Severn: but Mr. Horley imagines that Trajectus was situated at the passage over the Avon, near Henham, 9 miles from Bath.

TRAJETTO, in *Geography*, a town of Naples, in Lavora, near the mouth of the Garigliano, the see of a bishop, built on the ruins of the ancient Minturnæ; 6 miles S.W. of Sezza.

TRAIGUERA, a town of Spain, in Valencia; 12 miles N.W. of Peniscola.

TRAIL-BOARDS, in *Ship-Building*, a term for the carved work between the cheeks of the head, at the heel of the figure.

TRAILING ARBUTUS, in *Gardening*, the common name of a curious ornamental plant. See EPIGEA.

TRAIN, the attendance of a great person, or the trail of a gown, or robe of state.

In *Falconry*, it denotes the tail of a hawk.

TRAIN is likewise used for the number of beats which a watch makes in an hour, or any other certain time. See WATCH-work, &c.

TRAIN is also used for a line of gunpowder laid to give fire to a quantity thereof, in order to do execution, by blowing up earth, works, buildings, &c.

TRAIN or **TRAIL** of *Artillery*. See ARTILLERY.

TRAIN-

TRAIN-Bands, or **TRAINED-Bands**, a name given to the militia of England, particularly to those of the city of London.

TRAIN-Oil, the oil procured from the blubber of whales, by boiling. See **WHALE** and **Whale-FISHERY**.

TRAIN-Roads, a slight kind of rail-ways for small waggons, used in mines.

TRAIN-Scout, in the *Manege*, a method of trying the speed and goodness of the horses destined to the sport of hunting, so denominated because the scent which the hounds hunted, proceeded from some animal which had previously been *trained* along the fields and over hedges and ditches, according to the pleasure of the person who trained or dragged it after him. The rival horses were to follow the hounds which hunted this scent, and give proofs of their speed and merit, in competition with one another. Of all chases this was reckoned the swiftest and most trying, because the scent lies the hottest; so that the hounds run all the time at the utmost stretch, and the horses must have been exerted to their utmost powers to keep pace with them. Besides, in this manner of hunting, the sport was always ready when a fox or hare might not easily be found; and this mode of matching and running hunters, in order to try their speed against one another, while they followed the dogs, was thought to be more cheering both to the riders and horses, than to make them run simply against one another, or against *time*, as the present practice is. When neither the hunting of the hare, nor the running of train-scents, could not decide which horse is the best, recourse was had to another kind of chase, called by horsemen the *wild-goose* chase or chafe. See **CHASE**.

TRAIN, in *Geography*, a river of France, which runs into the Dyle, about 9 miles S. of Lovain.—Also, a town of Bavaria, on the Ambs; 5 miles S. of Abensperg.

TRAINA, a town of Sicily, in the valley of Demona, on a river of the same name; 56 miles S.E. of Cefalu.

TRAINED TREES, in *Gardening*, such young fruit-trees as are designed for walls and espaliers, being trained in the nursery to the intended form, by planting them against any kind of walls, pales, reed-hedges, or other close fences; when a year old from the grafting or budding, training them in the manner of wall or espalier trees, for two, three, or more years, till they obtain a good spread of branches, and are arrived to a fruitful state, in order that those who are in haste to have their walls or espaliers covered at once with bearing trees, may have it accomplished in one season. The trees thus trained in the nursery, &c. on being planted out in autumn or spring to the places intended, cover the wall or espalier in some manner at once, and often bear fruit the ensuing summer, when the season proves favourable for the purpose.

In the public nurseries, large quantities of these sorts of trees are always kept ready trained for sale, particularly peaches, nectarines, and apricots for walls; in many places also, cherries and plums, &c. likewise apples, pears, and other fruit-trees, for espaliers; and are proper to furnish the walls and espaliers of new gardens, and occasionally those of old ones, to bear fruit till younger trees, planted untrained, become fruitful, or for supplying the places of old trees that fail, or bear bad fruit. In all cases of this sort, this mode of planting may often be adopted with great propriety and benefit, and besides much time and trouble be saved by it, in waiting for the trees to become in a bearing state, as well as the expence which is constantly incurred in carrying on the operations and processes of preparing young fruit-trees. The difference in the prices of trained trees over those of untrained ones is a mere trifle, and of no consideration in such

undertakings. Therefore, in all nurseries some of the best sorts of these trained fruit-trees, both for walls and espaliers, may be kept ready for these purposes with great utility and advantage.

When, of course, it is intended to raise trained fruit-trees for walls and espaliers, a quantity of the best young plants of the respective sorts, dwarfs and half-standards, of one year old, with the first shoots from the budding and grafting entire, should be planted out in autumn against some kind of fence in a free open situation, not less than four or five feet high, placing them from five or six to eight or ten feet distant, to remain for training. These in the spring following, just as they begin to make an effort for shooting, should be headed down, with a clean sloping cut upward, to within four, five, or six eyes or buds of their origin, or place of insertion in the stock, especially those intended for dwarfs, and the half-standards, if worked on tall stocks; which prevents their running up too high with a single naked stem, and causes them to throw out lateral shoots from the lower part to fill the wall or espalier regularly with branches quite from the bottom upward; as they soon after push forth strong shoots from all the remaining lower buds, sufficient to give the tree its first proper formation as a wall-tree, &c.; which shoots, when advanced in length in summer, should be trained along to the fence equally to the right and left, in a somewhat slanting or inclined position at full length till next spring, when these shoots may also be cut down to the length of six or eight inches, to force out a further supply of more branches near the bottom, as it is proper that they should be well furnished with branches below, in order to cover the wall, &c. at the bottom part, that none of it may be lost or left in an uncovered state.

The summer's shoots should be shortened in this manner; more or less the two or three first springs, as may be necessary, in order to obtain a proper spread of lower branches to give the tree its intended form; though this work of cutting in short to obtain laterals, may also be performed occasionally in summer, in May or early in June, on the strong young shoots of the year, cutting or pinching them down to a few eyes; but the first is the best mode. This last mode, by forcing out lateral shoots the same year, often saves time.

As the supply of branches thus obtained arrive at proper lengths, in the summer they should be all trained in along close to the wall, and if any fore-right or back shoots come out, they should be rubbed off close, leaving all the well-placed side and terminal shoots in every part, and letting the whole, or as many as possible, be trained in during this season, to have a plenty to choose from in the general pruning seasons of winter and spring, laying them in close to the wall, &c. equally to the right and left, on each side of the tree, in a spreading somewhat horizontal or fan-like manner, no where crossing one another but at parallel distances, and mostly all at full length during the summer's growth, to remain till the general winter or spring pruning.

In the winter pruning, where more wood was trained up in summer than appears necessary, or that can be trained in with due regularity, it should be retrenched, as well as any remaining fore-right or back shoots and other irregular growths omitted in the summer, be now all pruned out, cutting them quite close to their origin. The whole should then be close-nailed to the wall, in somewhat the fan manner, removing in the first place all the irregular side and other shoots of the different branches before they are laid in and nailed. See **PRUNING**.

Having thus procured proper heads, they should afterwards be pruned or cut in according to the method peculiar

to each respective sort, as directed under the culture, some requiring the branches to be shortened annually, others to be mostly trained at full length. See DWARF and ESPALIER *Trees*, PRUNING, &c.

The training of espalier trees is effected exactly in the same manner, only these may be trained as they stand in the nursery lines, in the open quarters or borders, &c. by ranging some stout stakes in the ground along one side of each tree, not in a continued straight range immediately the way of the row, but those of each tree ranged separate and obliquely, somewhat crossways the row as it were, that the branches of the different trees may range beside one another, and thereby have more room to extend the branches both ways, than the common distance in the nursery lines would admit, if ranged directly the way of the row.

It may be noticed, that occasionally it may happen that some particular trained trees of both the wall and espalier kinds may assume in the course of their training a state of extremely vigorous and luxuriant shooting and growth either in the whole of them, or in some particular parts, by which very strong rampant, rude shoots that have a peculiar unfruitful-like nature and appearance are sent forth, which in all such cases and circumstances should be ordered and directed in a particular manner, according to their nature and situation, until they have in a great measure exhausted their too great abundance or redundancy of sap which caused their excessive luxuriance, and they begin to take on a more moderate state of shooting and growth. In consequence of which, therefore, wherever there appears to prevail a general luxuriance and excess of growth in the whole trees, or parts of them, while under the course of training, or afterwards, it will be advisable to use proper and necessary caution in the work of pruning, employing the knife in rather a moderate manner in the way of thinning out and shortening the branches, and in some degree humouring, as it were, the trees in their natural tendency of shooting and growth, by leaving the young shoots and branches thicker and closer together than what is the common rule in all such cases, the whole being left at their full lengths particularly during their summer's growth: and to all those which are usually shortened in their winter pruning, as in the peach, nectarine, and other similar sorts of trees, they should be shortened much less in proportion than the other kinds; but those of the apple, pear, plum, cherry, and others of the same sorts, should always be continued at their whole lengths; that, on the whole, by thus dividing the sap-juice among a greater number, as well as larger extent of branches, that luxuriance may be checked which would take place in the case of a smaller number and less extent of growth. As, in general, the more wood can be cut out of a vigorous shooting tree, and the more the shoots are shortened, practices which are erroneously too frequently had recourse to, the more vigorously it will continue to shoot, without ever becoming properly fruitful; and if severe cutting-in be repeatedly practised and continued, the tree will often exhaust itself so greatly by its luxuriant shooting, that it suddenly becomes in a weak, imperfect, and decayed state of growth. But, on the contrary, if the natural inclination of the very vigorous-shooting young trees be somewhat consulted and indulged, in the first instance, by training in as many branches as can be conveniently had for the purpose, and those which require shortening, be cut in moderately only, or some which are very luxuriant hardly at all, and these methods continued to be practised for two or three years with proper discretion, the trees will be gradually reduced to a moderate state of growth, and good condition of bearing, after which they

may be managed and directed in the common way which is proper for each of the different sorts.

And, on the other hand, such trees as are only vigorous in particular shoots, may, in some cases, have such shoots radically retrenched, but in others reserved; and if a very vigorous shoot runs considerably stronger than all the rest, and seems to support its vigour at the expence of the others in its vicinity, it should be retrenched to its very origin as early in the summer as it is perceived: in other cases, if a luxuriant shoot arises in any vacant space, especially towards the bottom part, where a supply of more wood is wanted, it may be retained, and pinched off or topped down to a few eyes in the late spring or beginning summer months, when it will send out several lateral shoots below, the same season, and instead of one rude luxuriant shoot, there will probably be four, five, or more of a moderate growth to fill the vacancy in a more effectual manner, and which will much sooner attain the state of fruitfulness.

The trees having been thus in training in the nurseries for the space of three, four, or five years, they will have obtained a handsome spread of fruitful branches fanned in the regular proper and necessary forms for the different purposes which are intended, so as that when planted out, they may at once cover a large space, and become quickly fruitful and productive. The particular method of culture which is proper for each of the sorts, is more fully given in speaking of them individually under their several heads.

But it may be remarked that, in general, unless good trained trees can be readily obtained, of from three or four to five or six years old, of a clean free growth, it will be better to plant entire young untrained trees of one or two years old, immediately from the nursery, putting them at once where they are to remain, managing them afterwards as the trained trees, to give them the proper form of head.

Some, in order to have as great a chance as possible, plant young untrained trees to remain, and trained trees of a bearing state, dwarfs and half-standards between, to cover the wall more effectually at once, and furnish a supply of fruit, until the young ones are trained and arrive at the bearing state; then, according as the trees of both sorts advance in that state of growth, those which appear the most prosperous are retained, and the others are gradually cut away, leaving the more thriving trees to occupy the wall wholly at last.

In most of the public nurseries, they raise trained trees for sale, which occupy all their close fences of walls, pales, &c. where they may be procured of almost any size, differing in price from three to five or ten shillings or more per tree, according to the sorts, age, and goodness of growth.

TRAINEL, in *Geography*, a town of France, in the department of the Aube; 6 miles S. of Nogent sur Seine.

TRAINING, in *Planting and Gardening*, the practice of regulating the forms and growth of forest and fruit trees, by the proper lopping and retrenching of their side or other branches in the first kind, and by the cutting-in and distribution of their shoots and branches in the latter. What is principally necessary in the management of the former of these sorts of trees, in this respect, has been already pointed out under the heads to which it properly belongs. See PRUNING and TIMBER.

And in regard to the latter, or garden kinds of trees, it has been remarked, that when by fixtures it is properly a practice much connected with that of pruning, and which is employed, either for the purposes of protecting exotics of the tender fruit-tree kinds from the wind, for improving their climate by spreading them in a regular manner upon a wall or fence, or for supporting climbing or trailing

trailing plants. In the first case, it is performed in a great variety of modes and manners, according to the nature and kind of support which is made use of for the purpose. In the second intention too, it is done differently, as the circumstances may be, and mostly against walls, as in the fan and horizontal modes; the former of which is said to be calculated for soonest covering the walls, and to be likewise the most proper for such kinds of trees as do not abound in superfluous wood, as the cherry, peach, and apricot. The latter mode, however, is said to fill the walls more completely, though longer in accomplishing the business; and to be the best suited for such trees as run much to wood, as is the case with many apple and pear trees. See these different sorts of trees.

In the work of training for the support of climbing plants, nature should, it is supposed, be imitated as nearly as possible. That with the kinds which twine round other trees or supports, or that fasten themselves to walls, nothing more is thought necessary, than to put them on similar objects which are within their reach; but that with others, which support themselves by clasps or tendrils, it is requisite to fasten them by art when these clasps fail; which, in nature, is commonly the second year; when the whole twining shrub or climber falls down, or hangs by its last-formed tendrils in such a manner, as that its shoots are bent, twisted, or inclined in almost every direction. This is the case with many sorts of tree plants, such as vines, passion-flowers, and others, and strongly suggests the advantage of training such kinds in a twisted or serpentine manner; as nothing can be more unnatural than to train them in an upright mode, as is too commonly done with the first of these sorts, where set against the back walls of hot-houses, &c. In training them along a trellis, under the sloping glass of such houses, they are said to be in a more natural situation, and are more likely to send out shoots, or to break, as it is often termed, at every joint; but still experience has, it is thought, proved the vast advantage of training in a serpentine or twining direction in every situation. In a great many houses of the above sort in all parts of the country, nearly two-thirds of the crops which might annually be produced, are, it is supposed, lost for want of attention to this circumstance. And, that as the practice is natural, uniformly successful, so far as it has been yet tried, and without injury, it ought to be more generally had recourse to in the business.

Great uses and benefits are capable of being taken of the same principle in the training of other sorts of trees; as whenever the sap is constrained by twisting a shoot or branch, it is sure at such places as are most bent, or which have most of the angle of the curve, to send out a shoot, as has been well noticed, illustrated, and taken advantage of by both ancient and modern writers on horticulture. See Hitt's and Forfyth's Treatises on Fruit-Trees, &c.

In the training of fruit-trees, few who have been engaged in the work have, it is supposed, fully understood or sufficiently availed themselves of the advantages which might be taken of this general law in vegetable economy, that the extreme branches bent downward, or the extreme roots turned upward and exposed to the air, throw the tree more or less into a fruiting state. It has lately, however, been done by turning the branches of such trees over the tops of walls, or in other modes, with astonishing effects in the production of fruit. The great effects of this sort of training are evident too in many other instances, where binds, twists, and downward directions are given to shoots and branches by different circumstances in the objects to which they are trained. The powerful and excellent effects of cutting the

roots of trees either at some distance from or near to the chief stem, as well as those of cutting the stem itself, in order to throw them into a fruiting condition, have, it is said, been fully recorded by former writers on gardening, and been recently practised with complete success. See *ESPALIER Trees, PRUNING, TRAINED Trees, and WALL-Trees.*

TRAINING, or TRACING, in *Mineralogy*, a term used by our miners to express the tracing up of the mineral appearances on the surface of the earth to their head or original place, and there finding a mine of the metal they contain: or, training or tracing a lode, denotes the fame with backing of it; that is, laying open the bryle, and discovering the back of the lode, by many pits for several fathoms in length, east and west. The bryle of a lode, is that mineralized substance which lies loosely upon the top of it under the loose mould and rubbish of the earth.

The principle on which this practice depends, is the change wrought in the face of the earth by the deluge, of the effects of which these remains are a very great proof. The superficial or upper part of veins, or lodes of ore, is always the poorest, the richer ores lying deeper down, the poor ones only serving to lead the way. These poor ores, or stones impregnated with the metalline matter of the mine, and called by our workmen shoad-stones, were, probably, at the creation of the earth, brought regularly up to the surface, and shewed the place of the metals below. But at the time of the covering of the earth by the waters of the deluge, they were, with the rest of the surface, washed off, and carried with the descent of the water down into the plains, or into the beds of rivers, and there carried many miles down the stream. This being an allowed truth, the art of training a mine is easy; for though this carrying of the shoad-stones and poor ore was done so many ages ago, yet all the way that some pieces were carried on, others would be deposited by the way, and the heaviest and richest falling first, the lightest would always be carried farthest, and there would be always left a stream of the matter all the way from the place where it was first produced, that is, where the mine now is: for the breaking of the surface of the earth at this great catastrophe was not so deep as to reach that, and this stream or train of matter will be found richer and richer as it approaches the mine, and finally will stop at the place where it is.

Where there is supposed to be a mine of any metal, the hills and country all about are diligently searched; the situations and descent of the lands, and the earth, stones, and other fossile bodies, are examined, particularly the colour and nature of the various sorts of earths and stones which are found on the hills where the mine is suspected to lie, that they may be readily known again if any of them are found in the neighbouring valleys. The stones which denote the lodes, and are called shoad-stones, are found two, three, four, or even five miles from the hills where they originally lay; but if the same sort of stones are remembered on the hills, the train is to be made out. After any great land-flood, in which it is supposed there are usually some new frets made in the banks of the rivers, these are carefully examined, to see whether any metalline stones may be found in their sides and bottoms, all being then so clean, that the smallest shoad-stone may usually be seen. If no stones of this kind are found, it sometimes is of use, in order to farther researches, to examine whether any pieces of earth, of a different colour and nature from that of the rest of the bank, be found; for these being, if any such are found, washed also from the neighbouring hills, afford a great direction which side of the hill to search into.

If no shoad-stone or growth of a different nature from the rest be found in these frets or newly worn banks, the miners leave the place for the present. For though the bed of the river afford many metalline stones, they never regard them, the continual change of place they receive from the current of the water rendering them only tokens that there is metal somewhere in the country; but they confound and perplex rather than instruct in the search after the places where it is.

If there be found indeed stones of the shoad-kind, full of protuberances, or having sharp angles, as if newly broken, it may be worth while to see whether they are not washed out of some part of the neighbouring banks by the late floods; as this sort of appearance is a token of their having been newly taken into the bed of the river. But if they are rounded and smooth, it may be concluded they have been long subject to the action of the water, and brought, perhaps, many miles from the places where they were originally lodged in the earth, and where only they could have been of any use to the tracers of the mine.

When the frets in the sides of rivers have been traced in vain, the searcher after a mine goes up to the sides of the hills most suspected to have mines in them, and there seeks for a convenience of bringing a little stream of water to run down. When this is found, he cuts a trench about two feet over, and as deep as the shelf. The water is turned into this cut, and after two or three days running in it, all the filth will be washed away, and the loose part of the earth cleared off; and if any shoad-stones are lodged within the whole course of this cut, they will be found. If any such are found, it is an unquestionable proof that there is ore in the higher parts of the hill; this encourages the work, and there is always found a mine, or at least a squat, which will, without much danger, repay the expence and trouble. The squats are flat parcels of the ore, lying in different and distinct places of the hills, and not communicating with one another.

Sometimes a great deal of this labour is saved, and the shoad-stones are found on the surface of the ground, either turned up by the plough, or thrown up in small quantities in mole-hills, or raised by some other accident, for they are seldom found naturally lying on the very surface of the earth; for the putrid remains of vegetable and animal substances, and other adventitious matter, has raised the surface of the earth in all places, since the time of the flood, and made indeed a sort of new surface. These stones were certainly laid bare on the surface of the ground, at the time of their being carried down from the mines; but this adventitious matter has buried them in this long tract of time, and they are generally found under about a foot of a sort of vegetable mould. If, by any of these searches, a shoad is found, the miners have nothing to do but to follow it to its head, and there make the opening; but if no such direction can be had, nor any shoad found, and there is yet suspicion that there is a mine in the hill, the method is to make an *essay-hatch*, as it is called: this is sunk near the foot or bottom of the hill, and is an opening of about six feet long, and four feet broad, made in search of a vein as deep as the shelf: this is a caution that must be always carefully observed, for if they are made less deep than this, they may miss of the vein, though there is one. And the sinking thus deep is always attended with certainty, for if no shoad is found on this, it may be concluded there is none there; except that sometimes it is found that the shoad has been washed clean away, within two or three feet from the land; and then the lode or vein is two feet farther or thereabouts up in the hill. If any shoad is found in the

essay-hatch, there is a certainty of a vein of ore; neither doth it add a little toward the making of a conjecture how high up the hill, or how far off the vein-string, or bonny, is, carefully to mark how deep from the surface of the earth the shoad lies, for this is held an infallible rule, that the nearer the shoad lies to the shelf, or fast ground, the nearer the vein itself is, and *vice versa*.

When there is no shoad or appearance of a mine found in the first essay-hatch, if the conjecture of a mine being in the hill has any tolerable foundation, the tracing it does not end here; but they go ten or twelve fathoms up the hill, and there open a second essay-hatch, and if no ore or shoad-stone is found in this, they go as many fathoms on each hand at the same height with the second hatch, and there open a third and a fourth hatch, of the same depth and dimensions with the first: if in neither of these there is found any shoad-stone, they ascend proportionably with three more hatches, if the space of ground require, at every ten or twelve fathoms, and in this manner open them three abreast, at twelve fathoms distance up to the top of the hill. If no shoad is found in any of these, it is concluded then that there is no tracing of a mine there, and the hill is left.

If any shoad is found in any of these hatches or openings, the ascending hatches from this are kept on in a direct line, and the deeper the shoad lies the nearer the vein is. The shoad grows gradually deeper from the surface, but nigher the shelf as they approach the mine: as suppose it to be but half a foot from the shelf, and seven feet from the surface, the vein is then concluded to be within a fathom or two; and on this the first proportion of twelve fathoms between every hatch is lessened to six, four, two, one, or even less than that, as the vein is conjectured to be more and more near.

It often happens, for want of a good guess in this matter, that the diggers over-shoot the lode; that is, they open their next hatch too high up the hill, or above the lode or vein: this is a mistake easily discovered, and easily rectified. If a shoad is found lying near the shelf in one hatch, and in the hatch above there is no shoad at all, it is a proof that the hatch is too high, and the remedy is only to sink a hatch at a middle distance between the last two, which will probably fall upon the very point of the lode, and finish the work of tracing.

Sometimes it happens, that in continuing the tracing of the first shoad, a second or new one is found: it is not uncommon for two shoads to be thus found in one hatch, and this is easily discovered without any danger of mistake; for suppose in the last hatch the shoad which they trace lay at eight feet deep, and in this it lies at ten feet, and besides this there is a shoad found at two feet depth: it is very certain that the shoad at ten feet deep is the same they were before tracing, and this is a new one pointing to another vein or lode, which is now first discovered so near the surface of the earth. This has generally gravel or earth mixed with it, and is to be carefully examined: when the higher hatches are opened, this is continually found as well as the old lode; and when the first is traced to the point of the vein, this second is to be continued in the same manner, by other hatches opened at the same distances above: it often happens, that in tracing this second shoad, the hatches dug for it discover another new one, or a third shoad; all these are to be traced one over the other by the same hatches, and will all be found worth the seeking after.

The old writers on mineralogy agree with us in this observation, and tell us, it is not uncommon in some places to find as far as seven lodes lying parallel to one another in the same hill. In these cases, however, there is usually one master-lode, or a grand vein; the other six, that is, three on each

each side, being the lesser or concomitant veins. Five in the same manner sometimes lie in this order, the grand lode in the middle and two on each side; but the more common method is three, a large one, and two smaller.

Every lode has a peculiar coloured earth or grewt about it, which is found also with the shoad, and this always in a greater quantity the nearer the shoad lies to the lode, and becomes lessened by degrees to the distance of about a quarter of a mile, farther than which that peculiar grewt is never found in any quantity with the shoad; so that this is a proof that the lode or vein is near, when it is found in any quantity.

A valley may chance to lie at the foot of three several hills, in such a manner as to contain three several grewts, or that earth which was moved with the shoad in the concussion of the strata at the deluge, with as many different shoads or trains of shoad-stones in the midst of each: in this case it will be very necessary to know the cast of the country, and of each hill in respect to its grewt, for the surer training of them one after another as they lie in order: according to the foregoing rules of essay-hatching, the uppermost in this case always directs which shall begin with first.

It sometimes happens, that after having trained the shoad found in a valley up to the upper parts of a hill, there is only a squat, or bonny, found instead of a right vein of ore; for these detached parcels of ore have their shoads as well as the right veins. These are usually about two or three fathoms long, and a fathom broad, few of them are larger, most less, and they never communicate with any other lode or vein, nor ever send forth any of their own. The extremities of these beds of ore terminate without sending out any frings, not lying within walls as the lodes; but though they are in the shelf or fast ground, not moved by the flood, their surface is equal every where with that of the imaginary shelly one, and they go down five or six fathoms deep, and there terminate at once. The ore contained in these is rich, and they are always wrought out to the considerable advantage of the owners.

These are the general rules of tracing mines, and though somewhat tedious and expensive, they are certain, and never subject to the error and disappointment the other shorter ways, as they are called, are liable to. These short ways are by the *virgula divinatoria*, or the hazel-wand, whose bending in certain places without any external visible force, is to point out where the place the vein of ore lies: the waters thought to issue from the particular lodes, are also used by some as a short means of finding the veins; other of these ways are also by mineral streams and effluvia, by the barrenness of the soil, and the pitching of nocturnal lights on the supposed orifices of mines. But these methods are too extravagant or too uncertain to be used in cases of so much consequence.

Another way of discovering lodes, is by working drifts across the country, as it is called, that is, from north and south, and *vice versa*.

When the mine is found by the more certain rules of tracing, the digging of it is a matter of less difficulty. Phil. Trans. No. 69. See MINERALOGY, and Pryce's Mineral. Cornub. book iii. cap. 1.

TRAINING of Cattle, in *Agriculture*, the practice of taming and breaking in oxen and other neat cattle for the purpose of team-labour. It is performed in many different ways in different districts and places; but principally by first gradually accustoming them to be led by means of a halter or rope, and then using them to travel in other forts of teams after the yoke or harness has been put on and rendered familiar to them; when afterwards they may be wrought in the plough-teams with the old labouring oxen, being placed between

them both before and behind, and with such as are not too free workers. See TEAM, YOKE, and YOKING.

TRAISENDORF, in *Geography*, a town of Germany, in the principality of Culmbach; 5 miles N.E. of Bayreuth.

TRAIT, Fr. *Tractus*, is the name of an ancient musical character, called likewise in old Latin treatises, *plica*; which see.

TRAIT, or *Tedia*, in *Geography*, a town of Romania, on the Mariza; 12 miles S.W. of Philippopoli.

TRAITOR. See TRAYTOR.

TRAITOR'S Cove, in *Geography*, a harbour on the west coast of the island of Revilla Gigedo, in the North Pacific ocean; so called by captain Vancouver, from the circumstance of being attacked, and two of his men wounded, by the natives of this place. N. lat. 55° 40'. E. long. 228° 31'.

TRAITOR'S Head, the north-east point of Erromango, one of the New Hebrides, so called by captain Cook in 1774, from the treacherous conduct of its inhabitants. S. lat. 18° 43'. E. long. 169° 28'.

TRAITOR'S Islands, a cluster of small islands, in a bay of the Pacific ocean, on the coast of New Guinea. S. lat. 1° 12'. E. long. 137°.

TRAITOR'S Island, an island in the Pacific ocean, discovered by Le Maire and Schouten in 1616, and so called from an attempt made by the natives to seize the vessel. M. Perouse discovered this island to be divided into two parts, by a channel about 150 toises wide. It belongs to the Friendly islands, and is called by the natives Neoota-bootaboo; 16 miles from mount Cocos. N. lat. 15° 55'. W. long. 173° 48'.

TRAITOR'S Island. See KEPPEL'S Island.

TRAITTE. See FOREIGN *Traitté*.

TRALEE, in *Geography*, a post-town in the county of Kerry, Ireland, pleasantly situated at the bottom of Tralee bay, on the banks of the river Lee. It is the shire and assizes town of the county; was incorporated in 1612 by James I.; and sends one member to the imperial parliament. There were formerly four strong castles erected in this town, of which only one remains, which was the chief residence of the Desmond family, in which they exercised their jurisdiction during the continuance of the Palatinate. Tralee bay is shallow and unsafe, and therefore not much frequented. Near the town is a chalybeate spring, which is drunk medicinally with success. Tralee is 144½ miles S.W. by W. from Dublin, and 48 S.W. from Limerick.

TRALLEBORG, a sea-port town of Sweden, in the province of Skone, near the Baltic; 19 miles S. of Lund. N. lat. 55° 20'. E. long. 12° 54'.

TRALLES, BALTHASAR-LEWIS, in *Biography*, an eminent physician, was born at Breslau in 1708, and having studied medicine at Hall under Frédéric Hoffman, settled in his native city, where he gained great reputation. His works were numerous and valuable, and caused him to be admitted into the Imperial Academy at Vienna, and the Royal Society of Berlin. But his most celebrated work was that on opium, entitled "Ufus Opii salubris et noxius in Morborum Medela, solidis et certis principiiis superstruc-tus," 1757-1762, 2 vols. 4to. He also published a treatise against the materialism of La Mettrie. He declined, in 1767, accepting the offer of first physician at Warsaw to Stanislaus, king of Poland, partly on account of his advanced age, and principally from his attachment to the reformed religion. Haller. Eloy.

TRALLIA, called also *Troalicida*, in *Ancient Geography*, a country of Illyria.

TRALLIANA, in *Botany*, was so named by Loureiro, from whom alone we have any knowledge of this genus, in memory of Alexander Trallianus, a celebrated physician and naturalist, whose works are said by De Theis to have been published at Paris in 1548, and republished by Haller in 1748. He wrote a letter on intestinal worms, which is mentioned in Dryander's *Bibl. Banks.* v. 2. 356; but we find no traces of his botanical information. Loureir. *Cochinch.* 157.—Clafs and order, *Pentandria Monogynia.* Nat. Ord. *Menispermata.* Juff. ?

Gen. Ch. *Cal.* Perianth inferior, of five short, rounded, permanent leaves. *Cor.* Petals five, oblong, spreading, reflexed, longer than the calyx. Nectary large, erect, with ten notches. *Stam.* Filaments five, short, inserted into the receptacle; anthers roundish, of two cells. *Pist.* Germen superior, roundish; style the length of the stamens; stigma (simple?) *Peric.* Berry roundish, of two cells, with two seeds, which are angular on the inside, rounded externally.

Eff. Ch. Petals five, oblong, reflexed. Nectary with ten notches. Calyx inferior, of five leaves. Berry of two cells, with two seeds.

1. *T. scandens.* Cày rác of the Cochinchinese.—Found running up all kinds of trees in Cochinchina. *Stems* numerous, shrubby, long, climbing, without thorns or prickles; their branches copious, jointed. *Leaves* alternate, roundish-heart-shaped, pointed, crenate, smooth. *Clusters* lateral, forked, each on a long common stalk. *Flowers* of a whitish green.

TRALLIANUS, in *Biography.* See **ALEXANDER TRALLIAN.**

TRALLICON, in *Ancient Geography*, a town of Asia Minor, in the vicinity of Caria, watered by the river Harpasus.

TRALLIS, or **TRALLES**, a town of Asia Minor, in the interior of Lydia, which, according to Strabo, was rich and populous, and strongly fortified by nature. According to Plutarch, here was a temple of Victory. The town had been denominated Antheia, Euanthia, Seleucia, and Antiochia.

TRA-LOS-MONTES, in *Geography.* See **TRAS-OS-MONTES.**

TRAM, in the *Silk Trade.* See **SILK.**

TRAM-Road, the same with **RAIL-Road**; which see.

TRAMACASTREL, in *Geography*, a town of Spain, in Aragon; 12 miles S.S.E. of Albarazin.

TRAMANDI, a town of Brazil, on a river of the same name, which runs into the Atlantic, S. lat. 27° 15'.

TRAMARICIUM, in *Ancient Geography*, a place of Africa Propria, upon the route from Carthage to Alexandria, between Scina and Aubureum. Ant. Itin.

TRAMAYE, in *Geography*, a town of France, in the department of the Saone and Loire; 9 miles W. of Mâcon.

TRAMAZA, a town of Sardinia; 8 miles from Oristagni.

TRAMBLING of *Tin-Ore*, among *Miners*, is the washing of it very clean: which is done with a shovel, and in a frame of boards. See **TIN.**

TRAMIN, in *Geography*, a town of the county of Tyrol, on a small river which runs into the Adige, 8 miles S.S.W. of Bolzano.

TRAMIS, a word used by some medical writers, to express the line running along the middle of the scrotum from the penis to the anus.

TRAMMEL, an instrument or device, sometimes of leather, more usually of rope, fitted to a horse's legs, to regulate his motion, and form him to an amble.

It is also taken in many places for an iron moveable instrument in chimneys, to hang pots over the fire.

TRAMMEL-Net, or **TRAMEL**, is a long net with which to take fowl by night in champaign countries, much like the net used for the low-bell both in shape, size, and meshes.

The word comes from the French *tremail*, formed of the Latin *tremaculum* or *tremaculum*; of *tres* and *macula*, because it is composed of three rows of meshes.

To use it, they spread it on the ground, so as the nether or farther end, fitted with small plumbets, may lie loose thereon: then the other part being borne up by men placed at the fore-ends, it is thus trailed along the ground. At each side are carried great blazing lights, by which the birds are raised; and as they rise under the net, they are taken. See **LARK.**

TRAMMELLED, in the *Manege.* A horse is said to be trammelled, that has blazes or white marks upon the fore and hind-foot of one side; as the far foot before and behind. He is so called, from the resemblance the white foot bears to a half-trammel.

TRAMMELLED-Horse, *Crofs*, is one that has white marks in two of his feet that stand crofs-ways, like St. Andrew's crofs; as in the far fore-foot and the near hind-foot, or in the near-foot before and the far-foot behind.

TRAMMELS, in *Mechanics*, an instrument so called by the joiners, and used by them for drawing ovals upon boards. One part of it consists of a crofs with two grooves at right angles; the other is a beam carrying two pins which slide in those grooves, and also the describing pencil. All the engines for turning ovals are constructed upon the same principles with the trammels: the only difference is, that in the trammels the board is at rest, and the pencil moves upon it: in the turning engine, the tool, which supplies the place of the pencil, is at rest, and the board moves against it. See a Demonstration of the principal properties of these instruments, by Mr. Ludlam, in *Phil. Trans.* vol. lxx. part ii. p. 378, &c.

TRAMONNEL, in *Geography*, a town of France, in the department of Mont Blanc; 14 miles W. of Chambéry.

TRAMONTANE, or **TRAMONTAIN**, formed from the Italian *tra*, of the Latin *trans*, which signify *beyond*; and *mons* or *mont*, *mountain*; something beyond, or on the farther side, the mountains.

The term is particularly applied, by the Italian painters, to all such as live on the other side the Alps, *i. e.* all out of Italy; as the Germans, Flemish, French, &c.

The French lawyers give the same title of *tramontans*, or *ultramontans* doctors, to the Italian canonists, Gomez, Hostiensis, Panorm, &c. who go upon rules and maxims too favourable to the court of Rome, and contrary to those of France, &c. On the Mediterranean, and in Italy, a north wind is called *tramontane*, a *tramontane wind*.

Some also call the pole-star, *tramontana*. Hence the proverb, *to lose the tramontans*, that is, to be out of one's aim, to be disconcerted.

TRAMORE, in *Geography*, a small post-town of the county of Waterford, on a bay of the same name, where there is a very fine strand, from which it takes its appellation. It has a handsome market-house and assembly-room, and is much frequented for sea-bathing. It is 82 miles S.S.W. from Dublin, and about 6 S. from Waterford.

TRAMUTUL, a town of Naples, in Basilicata; 13 miles S.E. of Potenza.

TRANADUCTA, in *Ancient Geography*, a town of Hispania, in Bætica, in the country of the Betuli, between Menralia and Barbesola. Ptolemy.

TRANCAULT, in *Geography*, a town of France, in the department of the Aube; 9 miles S. of Nogent sur Seine.

TRANCHE,

TRANCHE, or **TRENCHÉ**, is used by the French armorists, to express that manner of partition called among us, *party per bend dexter*.

A scutcheon is said to be *tranché* cut, when it is divided in two diagonally, the division coming from the dexter angle of the chief to the sinister angle of the point. When it is divided contrariwise, it is said to be *taillé*, or *party per bend sinister*.

TRANCHEFILE, in the *Manege*, the cross chain of a bridle, that runs along the bit-mouth, from one branch to the other.

TRANCOSO, in *Geography*, a town of Portugal, in the province of Tra-los-Montes. In the beginning of the 12th century, Alboacan, a Moorish king of Badajoz, laid siege to this town, and persevered with great obstinacy, till the inhabitants were driven to the last extremity, but were relieved by king Alphonso Henriquez, who defeated the Moors with great slaughter; 9 miles W. of Pinhel.

TRANE, a town of Sweden, in the province of Skone; 9 miles W. of Christianstadt.

TRANEKIAR, an ancient fortress of Denmark, in the island of Langeland.

TRANEMO, a town of Sweden, in West Gothland; 46 miles E.S.E. of Gotheborg.

TRANENT, a market-town in the presbytery and shire of Haddington, Scotland, is situated on the eastern side of a narrow valley, 10 miles E. from Edinburgh, and 380 miles N. by W. from London. It was anciently called Tree-arent and Travernent, signifying the habitation in the vale. The church is an ancient incommensurable fabric, of a very peculiar form. On the outside, it appears to consist of three separate oblong houses; but when entered, is found to be only one building. A square tower rises from the centre, supported by the side-walls of the middle building, and by cross arches. Two weekly markets are well supplied with butcher's meat. The parish of Tranent extends about six miles in length, and three miles in breadth, and is divided by the great east road into two nearly equal parts. It comprises the villages of Cockenzie, Port Seaton, Seaton, St. Clement's Wells, and Wester Falide. The surface is level and well cultivated. The coast abounds with oyster-beds, but they are nearly exhausted by over-dredging. Coal is abundant, and is worked at three collieries to a great extent. At Cockenzie is a great manufactory of common salt; and at St. Clement's Wells is the most considerable distillery in Scotland. According to the population return of the year 1811, the inhabitants of this parish were 3036, occupying 640 houses. Here is a parochial school, with a salary to the master of 300 merks and perquisites: here are also seven other schools. After the reformation, the parish of Seaton was annexed to that of Tranent; but it was reduced in 1606, by making the baronies of Preston-Grange and Preston-Pans a new parish, under the name of Preston. In 1695, the parish of Tranent was further diminished, by the north-east corner of it being annexed to the new parish of Glades-Muir. In 1493, a collegiate church was founded in the village of Seaton, by George, lord Seaton, which is still nearly entire. The most ancient edifice in the parish is that of St. Germans, now the seat of David Anderson, esq. where an hospital was founded previous to the year 1296. It was afterwards possessed by the Knights Templars; and after its suppression, was granted in 1494, with most of its revenues, by king James IV., to the King's College of Aberdeen. The battle of Preston, in 1745, was fought partly in this parish.—*Beauties of Scotland*, vol. i. 1805. Chalmers's *Caledonia*, vol. ii. 1810. Carlisle's *Topographical Dictionary of Scotland*, 1812.

TRANFRANT, a town of Algiers, near the coast; 30 miles S.W. of Oran.

TRANG, a river of Lower-Siam, which runs into the Indian sea, N. lat. 7°. E. long. 99° 33'.

TRANGANO, a town of Asia, in the kingdom of Johore, near the sea, on the side of a river, which has a shallow bar and several rocks scattered about. There are about 1000 houses; 110 miles N. of Pahang. N. lat. 5° 30'. E. long. 103° 5'.

TRANGARDE, a town of Hindoostan, in the county of Calicut; 8 miles N.E. of Paniany.

TRANGLE, in *Heraldry*, the diminutive of a fesse, commonly called a *bar*.

TRANI, in *Geography*, a city of Naples, and capital of the province of Bari; the see of an archbishop, and residence of the governor; 21 miles W. of Bari. N. lat. 41° 19'. E. long. 16° 28'.

TRANKEY, a name given in the island of Carrick, near the Persian shore, to a vessel about the size of a Peter-boat, sharp at both ends. It is built of very rough pieces of wood, rudely put together, and covered over with a thick coat of bitumen, with which the country abounds. These vessels sail with great speed with either end foremost, having no distinction of head from stern. The island of Carrick is about twelve miles long and seven broad, and contains between 600 and 700 inhabitants. It abounds with goats, but has very few cows, and no beasts of prey; nor are there any fowls, tame or wild, except flocks and turtle-doves. It produces few vegetables, but has wheat, rice, and barley, though not in sufficient quantity for the inhabitants, whose food is fish, with which they are plentifully supplied from the vicinity of the island. Here is also very fine turtle, but not eaten by the natives.

TRANQUEBAR, in *Geography*, a sea-port town of Hindoostan, in the country of Tanjore, situated on the coast of Coromandel, with a harbour, at the mouth of one of the branches of the Cauvery, defended by a fortress, erected by the Danes in the year 1621, who had obtained a grant of the town, and a fertile territory, from the rajah of Tanjore, for an annual rent of about 720*l*. In the beginning of the present century, the prince of Tanjore attempted to seize on Tranquebar, and began a regular siege; but by the assistance of the English, he was compelled to give over the attempt, and make peace. The town is between two and three miles in circumference, and surrounded with a wall and several bastions, well provided with artillery: within the walls are three Christian churches, one of which is for Roman Catholics, descendants of Portuguese in possession of the town before the Danes; a large mosque for the Mahometans, and several pagodas for the Gentoos. The territory belonging to the town is considerable, and is full of populous villages; 56 miles S. of Pondicherry. N. lat. 11° 1'. E. long. 79° 54'.

TRANQUILLITY, a town of New Jersey; 8 miles S. of Newtown.

TRANQUILLO, a cape at the fourth end of the island of Rhodes. N. lat. 36° 2'. E. long. 27° 28'.

TRANS, a town of France, in the department of the Ille and Vilaine; 6 miles S.E. of Dole.

TRANSACCO, a town of Naples, in Abruzzo Ultra; 8 miles S. of Celano.

TRANSACTION, **TRANSACTION**, in the *Civil Law*, an accommodation of some business or dispute between two parties, by a mutual and voluntary agreement or contract between them.

TRANSACTIONS, *Philosophical*, are a kind of journal of the

the principal things that come before the Royal Society of London. The Transactions contain the several discoveries and histories of nature and art, made by the members of the Society, or communicated by them from their correspondents, with the several experiments, observations, &c. made by them, or transmitted to them, &c.

They were first set on foot in 1665, by Mr. Oldenburg, secretary of the Society, and were continued by him till the year 1677. Upon his death, they were discontinued till January 1678, when Dr. Grew resumed the publication of them, and continued it for the months of December 1678, and January and February 1679, after which they were intermitted till January 1685. During this last interval, they were supplied in some measure by Dr. Hooke's Philosophical Collections. They were also interrupted for three years, from December 1687 to January 1691, beside other smaller interruptions amounting to near one year and a half more, before October 1695, since which time the Transactions have been regularly carried on.

They were for many years published in numbers, and the printing of them was always, from time to time, the single acts of the respective secretaries, till the year 1752, when the Society thought fit that a committee should be appointed to reconsider the papers read before them, and to select out of them such as they should judge most proper for publication in the future Transactions. The members of the council constitute a standing committee for this purpose. They meet on the first Thursday of every month, and no less than seven members of the committee (of which number the president, or, in his absence, a vice-president, is always to be one) are allowed to be a *quorum*, capable of acting in relation to such papers. The question, with regard to the publication of any paper, is always decided by the majority of votes taken by ballot.

They are published annually in two parts, at the expence of the Society, and each fellow is entitled to receive one copy gratis, of every volume published after his admission into the Society.

The Philosophical Transactions, to the end of the year 1700, were abridged in three volumes, by Mr. John Lowthorp; those from the year 1700 to 1720 were abridged in two volumes, by Mr. Henry Jones; those from 1719 to 1735 were abridged in two volumes, by Mr. John Eames and Mr. John Martyn. Mr. Martyn continued the abridgement of those from 1732 to 1744, in two volumes; and those from 1743 to 1750, in two volumes.

TRANSCELLENSIS Mons, in *Ancient Geography*, a mountain of Africa, near the municipium; called by Ammianus Marcellinus, Sugabarritanum. This town was situated in Mauritania Cæsariensis, south of the town of Zucchabbari, and near the river Chinalaph.

TRANSCENDENT, or TRANSCENDENTAL, something raised or elevated beyond other things; or which passes or transcends the nature and circumstances of other inferior beings, so as not to be intimately and essentially included under them.

The term is particularly applied to the object of metaphysics, which considers beings in general, or transcendental beings, as God and angels, and truths consisting in pure speculation.

Logicians and metaphysicians give the name of transcendental terms to those which are so general, and of a signification so extensive and universal, that they pass through all the categories, and agree to all kinds of things. Such are the terms *ens, unum, verum, bonum, &c.* See *ENS*, &c.

TRANSCENDENTAL Art. See *ART*.

TRANSCENDENTAL Perfection. See *PERFECTION*.

TRANSCENDENTAL Quantities, among *Schoolmen*. See *QUANTITY*.

TRANSCENDENTAL Quantities, among *Geometricians*, are indeterminate ones; or such as cannot be expressed or fixed to any constant equation. Such is a transcendental curve, or the like.

M. Leibnitz has a dissertation in the *Acta Erud. Lips.* in which he endeavours to shew the origin of such quantities; viz. why some problems are neither plain, solid, nor sur-solid, nor of any certain degree, but do transcend all algebraical equations.

He also shews how it may be demonstrated without calculus, that an algebraic quadratrix for the circle or hyperbola is impossible: for if such a quadratrix could be found, it would follow, that, by means of it, any angle, ratio, or logarithm, might be divided in a given proportion of one right line to another, and this by one universal construction; and consequently the problem of the section of an angle, or the invention of any number of mean proportionals, would be of a certain finite degree.

Whereas the different degrees of algebraical equations, and therefore the problem, understood in general of any number of parts of an angle, or mean proportionals, is of an indefinite degree, and transcends all algebraical equations.

TRANSCENDENTAL Curve, in the *Higher Geometry*, is such a one as cannot be defined by any algebraical equation; or of which, when it is expressed by an equation, one of the terms is a variable quantity. See *CURVE*.

These curves are the same with what Descartes, and, after his example, several others, call *mechanical curves*, and which they would have excluded out of geometry; but Sir Isaac Newton and M. Leibnitz are of another sentiment. For, in effect, in the construction of geometrical problems, one curve is not to be preferred to another, as it is defined by a more simple equation, but as it is more easily described than that other. See *GEOMETRICAL LINES*.

And some of these transcendental or mechanical curves are found of greater use than all the algebraical ones together, except the circle.

Add, that M. Leibnitz, in the *Acta Eruditor. Lips.* gives us a kind of transcendental equations, by which these transcendental curves are actually defined, and which are of an indefinite degree; that is, are not always the same in all the points of the curve.

Whereas algebraists use to assume some general letters or numbers of the quantities sought, in these transcendental problems; M. Leibnitz assumes general or indefinite equations for the lines sought; *i. gr.* putting x and y for the absciss and ordinate, the equation he uses for a line sought is $a + bx + cy + exy - fxx + gyy, &c. = c$. By the help of which indefinite equation, which in reality is finite, for it may always be determined how far soever it is necessary to raise it, he seeks the tangent; and comparing that which results, with the given property of tangents, he finds the value of the assumed letters a, b, c , and thus defines the equations of the line sought.

If the comparison above mentioned do not proceed, he pronounces the line sought not to be an algebraical, but a transcendental one.

This supposed, he goes on to find the species of transcendency; for some transcendentals depend on the general division or section of a ratio, or upon the logarithms, others upon the arcs of a circle, and others on more indefinite and compound inquiries.

Here, therefore, besides the symbols x and y , he assumes a third, as v , which denotes the transcendental quantity; and

and of these three forms a general equation of the line sought, from which he finds the tangent according to the differential method, which succeeds even in transcendental quantities. What he finds he compares with the given properties of the tangent, and so discovers not only the value of a , b , c , &c. but also the particular nature of the transcendental quantity.

And though it may sometimes happen that the several transcendentals are so to be made use of, and these of different natures, too, one from another; also, though there be transcendents, or transcendentals, and a progression of these in *infinitum*; yet we may be satisfied with the most easy and useful one, and for the most part may have recourse to some peculiar artifices for shortening the calculus, and reducing the problem to as simple terms as may be.

This method being applied to the business of quadratures, or to the invention of quadratrices, in which the property of the tangent is always given, it is manifest not only how it may be discovered, whether the indefinite quadrature may be algebraically impossible, but also how, when this impossibility is discovered, a transcendental quadratrix may be found; which is a thing which had not before been shewn. So that it seems that geometry is by this method carried infinitely beyond the bounds to which Vieta and Descartes brought it; since, by this means, a certain and general analysis is established, which extends to all the problems which are of no certain degree, and consequently not comprehended within algebraical equations.

Again, in order to manage transcendental problems (wherever the business of tangents or quadratures occurs) by a calculus, there is hardly any that can be imagined shorter, more advantageous or universal, than the differential calculus, or analysis of indivisibles and infinites.

By this method we may explain the nature of transcendental lines by an equation; *e. g.* Let a be the arc of

a circle, and x the versed sine; then will $a = \frac{\int dx}{\sqrt{2x - xx}}$:

and if the ordinate of the cycloid be y , then will $y = \sqrt{2x} - xx + \frac{\int dx}{\sqrt{2x - xx}}$, which equation perfectly ex-

presses the relation between the ordinate y and the absciss x ; and from it all the properties of the cycloid may be demonstrated.

Thus is the analytical calculus extended to those lines which have hitherto been excluded, for no other cause but that they were thought incapable of it.

TRANSCOLATION, in *Pharmacy*, the same with filtration, or percolation.

TRANSCRIPT, a copy of any original writing, particularly that of an act, or instrument, inserted in the body of another.

In this sense we say, *transcript of a fine, &c.* See **FINE** and **DUPLICATE**.

TRANSCRIPTO recognitionis factæ coram justitiariis itinerantibus, &c. in *Law*, is a writ for certifying a recognition into chancery, taken before the justice in eyre.

TRANSCRIPTO pedis finis levati mittendo in cancellarium, is a writ for certifying the foot of a fine levied before justices in eyre, &c. into chancery.

TRANSEAT, in the *Schools*, &c. a term purely Latin, signifying, *let it pass*, or suppose a proposition to be true, without granting it.

Hence the proverb, *transseat, Græcum est, non legitur*: the phrase is said to have taken its rise from some ancient commentators, or glossographers of the civil law, who, not

understanding Greek, passed over all the words that occurred in that language, without explaining them.

In the Roman chancery, a *nil transcat* is a kind of opposition made to the sealing of a bull, or to the delivery of some other instrument, till the parties, against whose interest it is directed, have been heard against it.

TRANSELEMENTATION, a change of the elements or principles of one body into those of another.

Such is that which Roman Catholics contend for in the eucharist, where the elements of bread and wine, they say, are changed into those of flesh and blood. See **TRANSUBSTANTIATION**.

Trans-elementation, wherever it happens, is always allowed miraculous, or an effect beyond the ordinary powers of nature.

TRANSEPT, the cross aisle, extending from north to south across the nave and main aisles of our ancient churches. In some churches, as in the cathedral of Salisbury, there is a double transept, which makes it resemble an archiepiscopal cross in its ichnography.

TRANSFER, in *Commerce*, &c. an act by which a person surrenders his right, interest, or property, in any thing moveable or immoveable, to another.

The sale or donation of an inheritance, &c. transfers the property, rights, &c. of it.

The term is principally used, in the commerce of stocks, for the assigning and making over of subscriptions or shares therein to such as purchase them of the proprietors. In the South Sea Company, the Bank, East India, &c. transfers are made by entering the stock under the name of the purchaser under his proper letter of the alphabet.

A counterfeit, in this case, is by act of parliament made a capital crime.

TRANSFIGURATION, among *Divines*, that miraculous change wrought by Jesus Christ, in presence of St. Peter, St. James, and St. John, on mount Thabor, where he appeared in his glory, in company with Moses and Elias. See the description of it in St. Matthew, chap. xvii.

The term is also applied to a feast held in the Romish church on the 6th of August, in commemoration of that miracle.

TRANSFORMATION, a metamorphosis, or change of form.

The chemists have been a long time seeking the transformation of metals, that is, their transmutation, or the manner of changing them into gold.

Among the mystics, by transformation is understood a change of the contemplative soul, by which it is in some measure deified, or converted into the substance of God, and in which it is, as it were, lost and swallowed up in the divinity, so as not to perceive its own distinction from God.

The word transformation is very liable to be abused: but many of the mystics use it innocently enough; meaning no other by it than what St. Paul did, *Vivo ego, jam non ego, vivit vero in me Christus*.

TRANSFORMATION is also sometimes used for what we more properly call *transubstantiation*.

TRANSFORMATION of Equations, in *Algebra*, is a method of changing equations into others of a different form, but of equal value. This operation is necessary in order to prepare equations for a more easy solution. We shall subjoin some examples of the most common and useful kind under this head. The affirmative roots of an equation are changed into negative roots of the same value, and *vice versa*, by only changing the signs of the terms alternately, beginning with the second.

Thus, the roots of the equation $x^3 - x^2 - 19x^2 + 49x - 30 = 0$, are $+1, +2, +3, -5$; whereas the roots of the same equation having only the signs of the second and fourth terms changed, *viz* $x^3 + x^2 - 19x^2 - 49x - 30 = 0$, are $-1, -2, -3, +5$.

If it be required to transform an equation into another that shall have its roots greater or less than the roots of the proposed equation by some given difference, the method is as follows. Let the proposed equation be the cubic $x^3 - px^2 + qx - r = 0$; and let it be required to transform it into another, whose roots shall be less than the roots of this equation by some given difference (e), *i. e.* suppose $y = x - e$, and consequently $x = y + e$; then, instead of x and its powers, substitute $y + e$ and its powers, there will arise this new equation.

$$(A) \left. \begin{aligned} y^3 + 3ey^2 + 3e^2y + e^3 \\ - py^2 - 2pey - pe^2 \\ + qy + qe \\ - r \end{aligned} \right\} = 0;$$

whose roots are less than the roots of the preceding equation by the difference (e).

To find an equation whose roots shall be greater than those of the proposed equation by the quantity (e), suppose $y = x + e$, and $x = y - e$, and the equation will have this form.

$$(B) \left. \begin{aligned} y^3 - 3ey^2 + 3e^2y - e^3 \\ - py^2 + 2pey - pe^2 \\ + qy - qe \\ - r \end{aligned} \right\} = 0.$$

If the proposed equation be in this form, $x^3 + px^2 + qx + r = 0$, then by supposing $x + e = y$, there will arise an equation agreeing in all respects with the equation (A), but that the second and fourth terms will have contrary signs.

$$(C) \left. \begin{aligned} y^3 - 3ey^2 + 3e^2y - e^3 \\ + py^2 - 2pey + pe^2 \\ + qy - qe \\ + r \end{aligned} \right\} = 0.$$

By supposing $x - e = y$, there will arise an equation agreeing with (B) in all respects, but that the second and fourth terms will have contrary signs to what they have in (B): as

$$(D) \left. \begin{aligned} y^3 + 3ey^2 + 3e^2y + e^3 \\ + py^2 + 2pey + pe^2 \\ + qy + qe \\ + r \end{aligned} \right\} = 0.$$

Hence we see how the second or other intermediate term may be taken away out of an equation; for, in the equation (A), whose second term is $3e - p \times y^2$, if we suppose $e = \frac{1}{3}p$, and consequently $3e - p = 0$, the second term will vanish. In the equation (C), whose second term is

$-3e + p \times y^2$, supposing $e = \frac{1}{3}p$, the second term also vanishes. But the equation (A) was deduced from $x^3 - px^2 + qx - r = 0$, by supposing $y = x - e$, and the equation (C) was deduced from $x^3 + px^2 + qx + r = 0$, by supposing $y = x + e$; whence may be deduced the following rule for exterminating the second term out of any cubic equation; *viz.* add to the unknown quantity of the given equation the third part of the co-efficient of the second term with its proper sign, *viz.* $\mp \frac{1}{3}p$, and suppose this aggregate equal to a new unknown quantity y . From this value of y find a value of x by transposition, and substitute the value of x and its powers in the given equa-

tion, and there will arise a new equation wanting the second term. *E. g.* Let the equation be $x^3 - 9x^2 + 26x - 34 = 0$; suppose $x - 3 = y$, or $y + 3 = x$, and substituting according to the rule, we shall have,

$$\left. \begin{aligned} y^3 + 9y^2 + 27y + 27 \\ - 9y^2 - 54y - 81 \\ + 26y + 78 \\ - 34 \end{aligned} \right\} = 0$$

$y^3 - y - 10 = 0$, an equation wanting the second term.

If the equation proposed be of any number of dimensions (n), and the co-efficient of the second term with its sign prefixed be $-p$, then supposing $x - \frac{p}{n} = y$, and $x = y + \frac{p}{n}$, and substituting this value for x in the given

equation, there will arise a new equation that shall want the second term; whence the second term may be exterminated out of any given equation by the following rule. Divide the co-efficient of the second term of the proposed equation by the number of dimensions of the equation; and assuming a new unknown quantity y , add to it the quotient having its sign changed: then suppose this aggregate equal to x , the unknown quantity in the proposed equation; and for x and its powers, substitute the aggregate and its powers, and the new equation will want its second term.

Let the proposed equation be a quadratic, as $x^2 - px + q = 0$, then suppose $y + \frac{1}{2}p = x$ according to the rule, and substituting this value for x , we shall have,

$$\left. \begin{aligned} y^2 + py + \frac{1}{4}p^2 \\ - py - \frac{1}{2}p^2 \\ + q \end{aligned} \right\} = 0$$

$$y^2 - \frac{1}{4}p^2 + q = 0$$

Having found the value of y , that of x may be had by means of $y + \frac{1}{2}p = x$: *e. gr.* since $y^2 + q - \frac{1}{4}p^2 = 0$, $y^2 = \frac{1}{4}p^2 - q$, and $y = \pm \sqrt{\frac{1}{4}p^2 - q}$, and therefore $x = y + \frac{1}{2}p = \frac{1}{2}p \pm \sqrt{\frac{1}{4}p^2 - q}$.

If the proposed equation is a biquadratic, as $x^4 - px^3 + qx^2 - rx + s = 0$, then by supposing $x - \frac{1}{4}p = y$, or $x = y + \frac{1}{4}p$, an equation shall arise having no second term. And if the proposed equation is of five dimensions, we must suppose $x = y \pm \frac{1}{5}p$, &c. It is plain, that in a quadratic equation wanting the second term, there must be one root affirmative and one negative, and these must be equal to one another. In a cubic equation wanting the second term, there must be either two affirmative roots equal, taken together, to a third root that must be positive.

Let an equation $x^3 - px^2 + qx - r = 0$ be proposed, and let it be required to exterminate the third term. By supposing $y = x - e$, the co-efficient of the third term in the equation of y is found (see equation A supra) to be $3e^2 - 2pe + q$. Suppose that co-efficient equal to nothing, and by resolving the quadratic equation $3e^2 - 2pe + q = 0$, you will find the value of e , which substituted for it in the equation $y = x - e$, will shew how to transform the proposed equation into one that shall want the third term.

The quadratic $3e^2 - 2pe + q = 0$, gives $e = \frac{p \pm \sqrt{p^2 - 3q}}{3}$;

so that the proposed cubic will be transformed into an equation

equation wanting the third term, by supposing $y = x - \frac{p - \sqrt{p^2 - 3q}}{3}$, or $y = x - \frac{p + \sqrt{p^2 - 3q}}{3}$.

If the proposed equation is of n dimensions, the value of e , by which the third term may be taken away, is had by resolving the quadratic equation $e^2 + \frac{2p}{n} \times e + \frac{2b}{n \times n - 1} = 0$, supposing $-p$ and $+q$ to be the coefficients of the second and third terms of the proposed equation. The fourth term of any equation may be taken away by solving a cubic equation, which is the co-efficient of the fourth term in the equation when transformed. The fifth term may be taken away by solving a biquadratic, &c.

There are other transmutations of equations that on some occasions are useful. An equation, as $x^3 - px^2 + qx - r = 0$, may be transformed into another that shall have its roots equal to the roots of this equation multiplied by a given quantity, as f , by supposing $y = fx$, and $x = \frac{y}{f}$; and substituting this value for x in the proposed equation, there will arise $\frac{y^3}{f^3} - \frac{py^2}{f^2} + \frac{qy}{f} - r = 0$, and multiplying all by f^3 , $y^3 - fpy^2 + f^2qy - f^3r = 0$, where the co-efficient of the second term of the proposed equation, multiplied into f , makes the co-efficient of the second term of the transformed equation; and the following co-efficients are produced by the following co-efficients of the proposed equation (as q, r , &c.) multiplied into the powers of f (f^2, f^3 , &c.) Therefore, to transform any equation into another whose roots shall be equal to the roots of the proposed equation multiplied by a given quantity f , you need only multiply the terms of the proposed equation, beginning at the second term, by f, f^2, f^3 , &c. and putting y instead of x , there will arise an equation having its roots equal to the roots of the proposed equation multiplied by f as required. Let it be required to transform an equation, the highest term of which has a co-efficient different from unity, into one that shall have the co-efficient of the highest term unit. If the equation proposed is $ax^3 - px^2 + qx - r = 0$, then transform it into one whose roots are equal to the roots of the proposed equation, multiplied by a :

i. e. suppose $y = ax$, or $x = \frac{y}{a}$, and there will arise $\frac{ay^3}{a^3} - \frac{py^2}{a^2} + \frac{qy}{a} - r = 0$; so that $y^3 - py^2 + qay - ra^2 = 0$: whence we deduce the following rule; change the unknown quantity x into another y , prefix no co-efficient to the highest term, pass the second, multiply the following terms, beginning with the third, by a, a^2, a^3 , &c. the powers of the co-efficient of the highest term of the proposed equation, respectively. Thus, the equation $3x^3 - 13x^2 + 14x + 16 = 0$, is transformed into the equation $y^3 - 13y^2 + 14 \times 3 \times y + 16 \times 9 = 0$, or $y^3 - 13y^2 + 42y + 144 = 0$. Then finding the roots of this equation, it will easily be discovered what are the roots of the proposed equation; since $3x = y$, or $x = \frac{1}{3}y$: and therefore, since one of the values of y is -2 , it follows that one of the values of x is $-\frac{2}{3}$. By this rule an equation is easily cleared of fractions.

Suppose the equation proposed is $x^3 - \frac{p}{m}x^2 + \frac{q}{m}x - \frac{r}{e} = 0$. Multiply all the terms by the product of the de-

nominator, you find $mne \times x^3 - nep \times x^2 + meb \times x - mnr = 0$. Then transforming the equation into one that shall have unit for the co-efficient of the highest term, you find $y^3 - nep \times y^2 + m^2enq \times y - m^3n^3e^3r = 0$.

Or, neglecting the denominator of the last term $\frac{r}{e}$, you need only multiply all the equation by mn , which will give $mn \times x^3 - np \times x^2 + mq \times x - \frac{mnr}{e} = 0$, and then, $y^3 - np \times y^2 + m^2nq \times y - \frac{m^3n^3r}{e} = 0$. After the va-

lues of y are found, it will be easy to discover the values of x ; since, in the first case, $x = \frac{y}{mne}$; in the second, $x = \frac{y}{mn}$.

E. g. The equation $x^3 - \frac{146}{27}x - \frac{146}{27} = 0$ is first reduced to this form $3x^3 - 4x - \frac{146}{9} = 0$, and then transformed into $y^3 - 12y - 146 = 0$.

Sometimes, by these transformations, surds are taken away. *E. g.* The equation $x^3 - p\sqrt{a} \times x^2 + qx - r\sqrt{a} = 0$, by putting $y = \sqrt{a} \times x$, or $x = \frac{y}{\sqrt{a}}$, is transform-

ed into this equation $\frac{y^3}{a\sqrt{a}} - p\sqrt{a} \times \frac{y^2}{a} + q \times \frac{y}{\sqrt{a}} - r\sqrt{a} = 0$; which, by multiplying all the terms by $a\sqrt{a}$, becomes $y^3 - pa^2y^2 + qay - ra^2 = 0$, an equation free of surds.

An equation, as $x^3 - px^2 + qx - r = 0$, may be transformed into one whose roots shall be the quantities reciprocal of x , by supposing $y = \frac{1}{x}$, and $x = \frac{z}{y}$, or by one

supposition $x = \frac{r}{z}$, become $z^3 - qz^2 + prz - r^2 = 0$. By this transformation, the greatest root in the one is transformed into the least root in the other: for since $x = \frac{1}{y}$, and $y = \frac{1}{x}$, it is plain that when the value of x is greatest,

the value of y is least, and conversely. See on this subject Maclaurin's *Algeb.* part ii. chap. iii. iv. Saunderson's *Algeb.* vol. ii. p. 687, &c. See *REDUCTION of Equations.*

TRANSFUGA, in *Antiquity*, a deserter. Among the Romans, deserters were commonly punished by cutting off their hands, it being thought that living in such a miserable truncated condition would strike more terror than death itself. We find, however, that deserters were likewise crucified, burnt alive, thrown from the Tarpeian rock, or exposed to wild beasts at public shows.

TRANSFUSION, **TRANSFUSIO**, compounded of the preposition *trans*, beyond, farther, and *fundo*, I pour, the act of pouring a liquor out of one vessel into another.

In the preparations of chemistry and pharmacy there are frequent transfusions of liquors, syrups, &c.

TRANSFUSION of the Blood, in Physiology, the transfer of the blood of one animal into the vascular system of another, by means of a tube connected with a vein of the receiving animal, and an artery of the other. A vein is first opened, to allow the efflux of the animal's own blood, and thus to make room for the fresh supply. This preliminary evacuation produces syncope: the animal ceases to move, and appears dead: but when the end of the tube connected with the artery of the other animal is introduced into the vein, and the stop-cock is turned, the current of arterial blood produces reanimation; the power of motion and the former strength are restored.

The experiments on this subject were first tried in England, where T. Clarke failed in his attempts in the year 1657; Phil. Transf. N^o 35. Lower succeeded in 1665, and communicated his success to the Royal Society; Phil. Transf. N^o 30. This was on dogs: Th. Coxe did it on pigeons; Birch, vol. ii. p. 50. Coxe and King exhibited the experiment on dogs before the Society, transfusing the blood from vein to vein; *ibid.* p. 123: Phil. Transf. N^o 19. 20. 25. 27. It was again performed from a sheep to a dog; Birch, p. 133; and the experiment was afterwards frequently repeated; Birch, vol. ii. pp. 162. 179. 190, 191. It was also performed in France and other countries.

The first proceedings in this matter seem to have been investigated merely by curiosity, or at least by a disposition to inquire into the powers of the animal economy. But higher views soon opened themselves: it was conceived that inveterate diseases, such as epilepsy, gout, and others, supposed to reside in the blood, might be expelled with that fluid, while, with the blood of a sheep or calf, the health and strength of the animal might be transferred to the patient. The most sanguine anticipations were indulged on the occasion, and the new process was almost expected to realize the alchemical reveries of an elixir of life and immortality. The experiment was first tried in France, where the blood of a sheep was transfused into the veins of a stupid youth, with the effect, as was asserted, of sharpening his wits. (Phil. Transf. 27. 32.) And a similar experiment was made without injury in a healthy man. (*Ibid.*) Lower and King transferred blood from a sheep into the system of a literary man, who had offered himself for the experiment, at first without inconvenience, but afterwards with a less favourable result; the Royal Society still recommending perseverance in the trials. Birch, vol. ii. pp. 216. 225. 227. 312. Phil. Transf. N^o 30.

These events were not calculated to keep up the expectations that had been raised, of brilliant results; and other occurrences produced still more severe disappointment. The French youth first mentioned died lethargic soon after the second transfusion: the physicians incurred great disgrace, and were judicially prosecuted by the relations. (Phil. Transf. 28. 32. 36, 37. 54.) Not however discouraged by this unlucky case, they soon after transfused the blood of a calf into a youth related to the royal family, who died soon after with the intestines inflamed. (Phil. Transf. 28. 30.) The parliament of Paris now interfered, and proscribed the practice. (Du Hamel, Hist. Acad. Reg. Societ. p. 21, 22.) Two persons having died after transfusion at Rome, the pope also issued a prohibitory edict. (Eph. Nat. Cur. Dec. I., ann. 1, obs. 149. Merclin de Transfus. Sanguinis, p. 25. 85.) From this time the practice has not been repeated in the human subject; although it has been repeatedly done, as a matter of philosophical curiosity, on animals who have suffered no interruption of their health and strength. Haller, Elementa Physiologiae, lib. iii. sect. 3. § 15—29.

TRANSGRESSION, TRANSGRESSIO, compounded of *trans, beyond, and gradire, to go,* an offence against some law, or a breach or violation of it.

The term is chiefly used in respect of the laws of God. In the doctrine of original sin, all mankind are supposed to share with Adam in the guilt of his first transgression. See *Original Sin*.

Moses threatens the transgressors of his law with a variety of temporal punishments.

TRANSGRESSIONE, in our *Law,* a writ, usually called a *writ,* or *action of trespass.*

Of this Fitzherbert has two sorts; one *vicountiel,* thus called because directed to the sheriff, and not returnable, but to be determined in the country. Its form differs from that of the other, as wanting the words *quare vi et armis,* &c. See *VICOUNTIEL*.

The other is termed a *writ of trespass,* and to be sued in the common pleas and king's bench. See *TRESPASS*.

TRANSIENT ACTION. See *ACTION*.

TRANSIENT Air. See *AIR*.

TRANSIRE, in stat. 14 Car. II. c. 11. is used for a custom-house warrant, or let pass; from the verb *transire, I pass forth.*

TRANSIT, TRANSITUS, from *transire, to pass over,* formed of *trans* and *eo, I go beyond,* in *Astronomy,* signifies the passage of any heavenly body over the meridian, or of one body over another having the same apparent declination. When the smaller body is behind the larger, it is said to suffer an *occultation*; but when it passes before, it is said to transit the other. Thus a *star* behind the moon suffers an occultation, but a planet passing over the sun's disc is said to transit him.

Mercury and Venus, &c. in their transits over the sun, appear like dark specks. See *MERIDIAN* and *PARRALLAX*.

TRANSIT-Instrument, or Transis-Telescope, is an *astronomical instrument,* by which the *transits* or meridian passages of the heavenly bodies are taken. Before telescopic sights were introduced into the practice of astronomy, the instruments for finding a meridian line, and for observing meridian passages, were very different from what they are at the present day. So early as about the year 1700, Sir Christopher Wren, Mr. Gray, and Dr. Derham (see Phil. Transf.) had contrived instruments for this purpose; the last and best of which we shall briefly notice, by way of contrast with the modern transit-instrument, to shew the improvements that have taken place within the last century. In *fig. 11. Plate XXXII. of Astronomical Instruments,* A B is a horizontal bar of hard wood or metal, turning stiffly on the central stem of a tripod, and carrying two upright bars, C D and E F, which are bent a little near the lower extremity, and turned to a right angle at top; where there is a horizontal joint, as seen in the figure. From each of these upright bars are suspended a plumb-line, so as to come close to the ends of the horizontal bar A B respectively. At the ends A and B are two vanes, or sight-holes, from the former of which the sun, S, may be seen through a smoked glass, and from the latter the pole-star, P, with the plumb-line interposed. The portions of the horizontal bar A C and B E are moveable round the joints at C and E, and the plumb-lines are long enough to be tangents to the angles of elevation required to the radius A B, which therefore will be proportional in any given latitude, whatever the dimensions may be. The use of this meridian instrument may be thus explained: when P is the pole-star, the whole instrument must be turned round till the eye at A sees the pole-star very

TRANSIT-INSTRUMENT.

very nearly in contact with the suspended line; and the contact or bifurcation may then more conveniently be effected by turning the vane a little round the joint E: in this situation, if the star be at the moment on the true meridian by calculation, the direction of light will be in the meridian line, and bodies passing to the north, may be seen passing the plumb-line BF at any altitude below the pole. Suspend now the plumb-line AD from D, and turn the horizontal part on its joint, till this line bisects the vane at A, and move the vane at B gently round its joint E, till it is also intersected by the other plumb-line DA, and the two lines will be both suspended in the meridian line; consequently, an eye looking through the vane at B, will see any body to the south transit the line DA, provided it be below the ecliptic.

The condition to be attended to in the construction of a modern transit-instrument is, that while the telescope, through which the object is viewed, undergoes a change of elevation, its line of collimation shall move exactly in the plane of the meridian circle of the place of observation, after it has been once adjusted accurately into a line that lies truly parallel with the north and south line. To effect this purpose, it was found necessary that the axis of motion should lie exactly horizontal, in the direction of a line that joins the east and west points; that it should not bend by the superincumbent weight in any position whatever; and that the line of collimation should always cut the line of the axis at right angles, without the least perceptible deviation; for it is only while these conditions are fulfilled, that the line of collimation will ascend from the horizon in a truly vertical line, during an increase of altitude; and that this vertical line will continue also in the meridian. The first person, we believe, who used an astronomical instrument possessing the essential properties which we have described, was Dr. Halley at Greenwich Observatory, soon after the year 1719, which was the year in which he succeeded Flamsteed as astronomer-royal. According to Dr. Smith, the tube of Halley's telescope was five feet and a half long, and its axis of motion about an ell: it had also cross-hairs with the requisite adjustments in the eye-piece, with Y supports for the pivots of the axis, likewise adjustable, and the axis was levelled by a spirit-level, so that but little room remained for subsequent improvement, except in what relates to the achromatic object-glass, and the method of illuminating the hairs, and of limiting the quantity of light necessary for particular observations. In the older instruments, the reflected light of a lamp or candle was received at the aperture of the telescope, as shewn in *fig. 15. Plate XXIX. of Astronomical Instruments*; but this mode of illuminating the hairs was found inconvenient, on account of the change of elevation of the telescope in successive observations, which required as many new adjustments of the lamp; and it was not till about the year 1787, that Dr. Usher of Dublin contrived the new method of transmitting light through one end of the horizontal axis to a diagonal perforated reflector, in the body of the tube, which brings it to the hairs after reflection, whatever the altitude may be to which the telescope is pointed. In our description of the different transit-instruments, it will not be necessary to repeat what we have already said of the theory and construction of either object-glasses or eye-pieces, under our article TELESCOPE, to which therefore our readers are referred on these essential points.

Transit-instruments, as they are now constructed, may be considered either as they are *stationary* or *portable*; the former of which was the original construction, and continues to be used in fixed observatories, for the purpose of

determining, in conjunction with a good astronomical clock, the right ascensions of the heavenly bodies; but the latter may be used in any place, for ascertaining the rate of a clock or chronometer, and when nicely brought into the meridian, for determining also the right ascensions with considerable accuracy.

Fig. 1. Plate XXXII. of Astronomical Instruments, represents a transit-instrument of the most approved stationary construction, which may be made of any dimensions that the aperture and focal length of the object-glass will allow; but is usually made with a tube of from 30 to 120 inches long, and of proportional thickness, according to the degree of accuracy that is required. A and B are either a pair of solid stones firmly fixed in the ground, or a pair of pillars of firm masonry, sufficiently high to allow the eye of the observer to reach the eye-piece when the angle of elevation is about 45° . *Fig. 2.* exhibits a lateral view of the same, except that only one of the pillars is seen, in the direction of its breadth; while *fig. 3.* is an enlarged representation of the eye-end of the telescope; and *figs. 4. and 5.* are appendages attached to the superior end of the pillars; all which we shall describe in due succession. The tube of the telescope *ab* is usually of brass, of which the eye-end is at *a*, and the object-end at *b*: in the instrument before us it is five feet long; *c* and *d*, which appear to be two cones, are united to the central part of the tube, and form the axis of motion about three feet long; they are of brass also, and hollow, but are rendered very strong by circular pieces of metal, of different diameters, that are forced into the hollow space one after another at equal intervals; so that this axis has all the strength without the weight of solid metal. The pivots at the extreme ends of the axis are of bell-metal, and turned in the lathe to precisely the same dimensions, so that they may at any time have their positions reversed without affecting the horizontal line. The pieces, shewn by *figs. 4* and *5*, are made fast to the upper extremities of the pillars, and receive the pivots of the axis, each having an angular notch, called a Y, which are adjustable by proper screws, one in a vertical, and the other in a horizontal direction. The situation of each of these screws is seen by the handle inserted on the axis of the screw to which it belongs; and the manner in which the moving parts are made to slide by the action of the screws, between the parallel cheeks of the small frames, requires no particular description. When the weight of the telescope and of its axis is considerable, some part of this weight is supported by a loaded lever, as seen in *fig. 1*, which, by acting on the ponderous matter at some distance from the pivots, relieves them from a portion of the stress that would otherwise be laid on them by the whole weight. Hence the pivots have their friction diminished; and consequently their dimensions, as well as those of the Ys, remain unaltered. When the weight is small, such appendage may be dispensed with, provided the Ys and pivots be rectified occasionally, when they are a little altered by attrition. At a small distance from one end of the axis a graduated circle is made fast, which moving with the axis, shews the degree and minute of elevation, that the telescope has in any position, on two opposite adjustable verniers, which carry a spirit-level, and are clamped in a horizontal position, as seen in *fig. 2*. The extreme end of the axis, which is remote from the graduated circle, has a lens screwed into it, through which the light of a lamp is made to pass in its way to the diagonal reflector, contained between the two conical portions of the axis, within the tube; and by the light thus transmitted and reflected, the spider's lines, substituted for hairs or wires, are illuminated; without which illumination they would be invisible by night, except when the Moon or Venus

Venus is observed. The spirit-level, which hangs on two vertical rods over the axis, is capable of being reversed in position, and is used, in the first place, for placing the axis of the telescope perfectly horizontal, and in the next, for watching the permanence of such position by the situation of its bubble. As the ends of the brass tube that contains the level revolve on two opposite pins, projecting from the rods of suspension respectively, the bubble will always occupy the upper part of the glass tube in every state of the telescope's elevation; but in the reversed position of the axis $c d$, the level will be underneath it, though the bubble will retain its place. The inside of the tube is ground to such a long radius, that *single seconds* of deviation from a true horizontal position may be read on an ivory scale by the end of the bubble. When, however, the telescope is large, and the axis consequently bulky, a spirit-level cannot be so well applied, as with telescopes of ordinary size; and when this is the case, a basin of pure mercury may be substituted with great advantage; for when the pole-star is on the meridian, and shines brightly, its reflected image, and also the star itself, will both pass together over the central vertical spider's line, at corresponding degrees of elevation and depression of the telescope, provided the axis be truly horizontal, and as little time as possible be suffered to elapse between the superior and inferior observations: but to render this operation easy, stops may be clamped to the graduated circle, to limit the space that is necessary to be described by the object-end of the telescope. There is in the instrument before us, moreover, a plumb-line apparatus for levelling the axis, which is seen in *fig. 2*, and partially on a larger scale in *fig. 3*. At a is a pin, from which a fine silver wire may be suspended; and at c is a horizontal screw, between two threads of which the wire rests, so as to be capable of adjustment in a lateral direction: the long narrow tube, which lies parallel with the main tube of the telescope, then receives the wire, and is put into a perpendicular direction, so that the suspended plummet may be immersed in a vessel of water; the microscope at f , next the eye-piece, now uppermost, views the image of a transparent dot, as a point to which the wire is referred, and to cover which it is now brought by the screw c : at the opposite end of the main tube, near b , is a similar microscope with a point of suspension and adjusting screw; so that when the object-end of the telescope is placed uppermost, the same adjustment is required to bring the stretched wire over its luminous image; and when this is done, the wire will bisect the lower luminous image also, if the axis be perfectly level, but not otherwise. To produce this coincidence, it will usually be necessary to adjust partly by the vertical screw of the proper Y, and partly by the screws of the plumb-line apparatus after each inversion of the tube.

When the achromatic object-glass does not produce a round and well-defined point, as the image of a *large* star, in any observation, it will be advantageous to diminish the aperture till this appearance takes place, which will generally be the case when the central part of the object-glass only transmits the light of such a star; but for small stars, it will always be better to allow the whole aperture to be open; not only because more light is thus admitted, but also because the image of a *small* star is always a point free from luminous irradiations, even in inferior achromatic telescopes. In the ten-foot telescope which Mr. Troughton has lately converted into a magnificent transit-instrument at Greenwich (*viz.* in 1816), he has ingeniously contrived a species of *iris*, that will contract or enlarge the effective part of the aperture by the simple turning of a milled nut, within reach of the hand, while the eye is at its place for making

the observation; so that the proper quantity of light can at any time be proportioned to what the nature of the observation may require. There are lastly screws of adjustment of the spider's lines in the eye-piece both for horizontal and vertical motion, and, in the best instruments, the eye-piece itself has a sliding horizontal motion, which enables the observer to keep the celestial body, though in motion, at the centre of the field of view during the whole passage over the five lines.

The best construction of a *portable* transit-instrument which we have yet seen, is that represented by *figs. 6* and *7*, which exhibit all the parts that are necessary for description, and which was one of the numerous inventions which we have had occasion to notice as the offspring of Troughton's ingenuity. The telescope of this instrument is 20 inches long, and magnifies from 20 to 35 times, according to the eye-pieces that are used; two of which are usually of the prismatic or diagonal kind, to be used in high altitudes; the aperture is 1.75 inch, and the power is competent to see the pole-star by clear day-light. The construction of the tube and axis is similar to that of the stationary instrument, except that the graduated circle and double vernier, with the level, lie beyond the Y of the support, and the iris is wanting: otherwise it has all the adjustments for levelling the axis, and bringing the line of collimation to a meridian mark that the larger instrument possesses, as well as those that rectify the position of the spider's lines in the focus of the negative eye-piece. The base of the stand is a thick ring or rim of brass, that receives three equidistant screws for feet, besides the four screws that fix the two vertical frames thereto, which constitute the supports of the axis; one of which is seen entire in *fig. 7*. These supports are kept perpendicular by the interior bracing-bars, of which two are discoverable in *fig. 6*, attached by thumb-screws at both ends to the ring and upright frames respectively. The circular figure of the base is not only firm, but preserves its shape in all degrees of temperature; and when the parts are detached by loosening the thumb-screws, they will all pack into a box that is of a convenient size for carriage. The diameter of the circular base, and the consequent length of the axis, is a foot within, and the height of the supports thirteen inches. The graduated circle being of six inches diameter, admits of readings by each of the two opposite verniers to the accuracy of one minute, which is sufficient for finding the meridian altitude of any celestial body, of which the declination is known when the latitude is given; or for determining the latitude, when unknown, to the accuracy of one minute. If the circle were made a little larger, and three verniers substituted for two, a longer level might be used, and the readings might be accurate to 20" or 25"; but as the instrument was never meant to be used as an altitude-instrument, the inventor considered only what dimensions are requisite for constituting an useful transit-instrument in a portable form. The level of this instrument is entirely detached, and equal in length to the axis itself; its shape is delineated in the upper part of *fig. 9*, and the notches of its end-pieces stand upon the pivots of the axis, so that the reversion of the ends is performed without the least impediment. It is however necessary to remove the level from the axis, when the horizontal adjustment is finished, to avoid its being displaced and broken by an alteration in the elevation of the telescope. There are usually three studs of brass included, with the darkening-glasses, lanterns, and other appendages; two of which studs have conical holes, to receive the points of the screws, or feet of the circular base: and for this purpose, all the studs must be made fast to the slab or pillar which supports the instrument, by plaster of Paris or putty inserted into as many holes in the plane of the marble or stone,

stone, care being taken that the line which joins the two conical points be in the direction of the meridian, or so nearly so, that the adjusting screw of one of the Ys will bring it into that situation.

Mr. Thomas Jones, of Charing-Cross, has made several 30 and 42-inch transit-instruments of the portable sort, supported by oblong frames of cast-iron, which look very neat, and answer the purpose very well, a drawing of which construction we should have introduced into our plate, if it would have admitted of such addition. These instruments have all the properties of the instrument we last described, and have of course greater powers in their telescopes, and are also cheaper in proportion to their size. He has also made some of them with telescopes of only twenty inches, for the sake of greater portability.

Before any useful observation can be made with a transit-instrument of either the stationary or portable construction, it is necessary that all the adjustments be nicely made, and also that they be examined occasionally after a few observations are finished, in order to prevent errors that cannot be detected, or at least appreciated, at a subsequent period. These adjustments are nearly the same for all the common transit-instruments, and may be explained under eight heads, as follow; *viz.*

1. *To adjust the Spirit-Level.*—When the level hangs on, or is made fast to the axis, put the telescope in its place, and see to which end of the level the bubble runs, which will always be the more elevated end; bring it back to the middle by the Y screw for vertical motion, or by the foot-screw under the end of the axis, if it be a portable instrument, and then invert the axis, end for end; then, if the bubble is again found in the middle, the level is already parallel to the axis; but if not, adjust one half of the error by the adjusting-screw of the level, and the other half by the Y screw, or foot of the support, as the case may be; and let the operation of reversing and adjusting by halves be repeated, until the bubble will remain stationary in either position of the axis, in which case the level will be right. When the detached level is used, that notch must be made a little deeper, by scraping with a penknife, which has the bubble resting over it, instead of using an adjusting-screw, with which it is not usually provided; and when the notches that rest on the pivots are once made right, they will seldom require a second rectification. In the hanging level there are side-screws also, which adjust for parallelism of the level, as it regards a line joining the pivots of the telescope's axis; and this adjustment is known to be truly made, when the bubble does not run to one end, when the level is moved some degrees by a rotatory motion round its pivots, or central pins of suspension.

2. *To place the Axis of the Telescope truly horizontal.*—If the *spirit-level* is made use of, which is generally the case in instruments of ordinary dimensions, the same operation which we have just described will put the axis level, at the same time that it puts the level parallel to the axis; for unless both these conditions are fulfilled, the adjustment of the level will be deranged by reversion, and when this is not the case, it is a proof that both the level and the axis are truly horizontal. Hence, when the level is previously adjusted, it will be sufficient to bring the bubble to the middle of the level by the Y screw, or foot-screw alone, as the construction may require.

This adjustment may also be made, in the larger instruments particularly, by means of a *plumb-line*, either applied to a frame, suspended by the pivots of the axis, that will reverse in position according to Ramsden's method; or hang-

ing on the tube of the telescope parallel to the line of collimation, as we have described Troughton's in *figs. 2 and 3*: in either case, a dot is bisected by the plumb-line near the point of suspension, and another near the lower end of the line, in both the reversed positions of the axis, when the adjustment is truly made by the proper screws, as above directed.

But the most accurate, as well as probably the most convenient method of levelling the axis of a large instrument, is by *reflection*, by the aid of a basin of pure quicksilver, as we have already intimated; and the pole-star, being slow in its apparent motion, particularly at the time of its greatest elongation, is the most proper object by which to make the adjustment in question; for when the axis is level, and the star is made to cover any one of the spider's lines, its image reflected from the surface of the mercury will cover the same line, provided the depression of the telescope is effected instantaneously; and if this is not the case, the proper screws must be used for effecting this purpose without any reversion of the axis; for by this experiment, the line of sight of the telescope is proved to have a motion truly vertical, which is what the horizontal position of the axis is intended to produce. Hence, if the exact coincidence of the places of the star and of its reflected image takes place in an instrument both before and after the reversion of its axis, this is a proof that both the pivots and Ys are respectively similar. This method of adjusting the axis of the large transit-instrument at Greenwich has been lately adopted, after a trial had been made by the astronomer-royal, of the application of a plumb-line, suspended in a detached state from a point of considerable elevation.

3. *To produce distinct Vision.*—Before the subsequent adjustments can be made, it is necessary that the telescope should be put into a state of perfect vision; *viz.* that the object fixed upon should be seen well defined. This may be accomplished by sliding either the object-glass or the eye-piece within the tube, till the desired effect is produced; but when wires, hairs, or lines of any kind are made fast in the common focus of these glasses, a motion given to the eye-piece will make those lines disappear, and a motion given to the object-glass is in danger of deranging its best position: therefore, when a *meridian mark* is necessarily at so short a distance, that the same adjustment of the eye-piece will not suit it that has been made for a celestial object, by which the parallel lines have been fixed in the focus, an auxiliary object-glass, or glass of long focus to be added to the proper object-glass, is provided to remedy these inconveniences, whenever the meridian mark is the object viewed. The method of determining the focus of such additional glass, as shall shorten the compound focus of the object-glass agreeably to what is requisite for a given distance, is explained under our article TELESCOPE.

4. *To put the Wires, Hairs, or Spider's Lines perpendicular to the Axis.*—The parallel lines in the eye-piece of the telescope are usually attached to a circular piece of brass that turns tight within the interior end of the tube, and if, when the telescope changes its elevation, a point in the meridian, or other mark, travels along one of these lines, so as to be bisected by it through the whole field of view, the said line will be perpendicular to the axis of motion; or if a long plumb-line be suspended at a distance, and a vertical line in the eye-piece is found to coincide with it while the telescope alters its angle of elevation, this will not only be a proof of the same thing, but will moreover shew that the axis is level; and when this is not the case, the piece holding the lines must be turned till they are found by trial to be truly vertical. The similarity of the intervals between the lines, and

also the angle measured by each, may be ascertained by a graduated staff, and the tables which we published under TELESCOPE.

5. *To make the Line of Collimation perpendicular to the Axis.*—After having adjusted for distinct vision to some distant known object, make the middle line in the eye-piece bisect some well-defined point in it, and, having reversed the ends of the axis, observe if the same line again bisects the same point exactly; if it does, the line of collimation is right; but if not, the error may arise either from the situation of the point observed, or of the centre of the object-glass, as they respectively regard the vertical line in the eye-piece; that is, one or other of those lines may deviate a little from a true perpendicular to the line of the axis of motion, or both may be erroneous in their respective degrees: therefore, when reversion has taken place, bring the vertical line one half way towards coincidence with the observed point, by the horizontal screw at the end of the axis, which alters the azimuth, and the other half by the side-screws of the eye-piece, which move the plate of the parallel lines, releasing one screw and tightening the other, so as to leave the said plate fast; then reverse again, and repeat the operation, till the same point is bisected in both positions of the axis.

6. *To illuminate the Wires, Hairs, or Spider's Lines.*—Before an observation of a star or planet can be taken, the parallel lines must be rendered visible to the eye of the observer, and the quantity of light to be admitted will depend on the magnitude of the body to be observed. A lantern containing a lamp must be fixed opposite that end of the axis which has its aperture closed by a lens, and so much of the light must be excluded as is superfluous for the observation; for when a small star is the object, much light will render it invisible, and yet it is necessary to have light enough to render the parallel lines visible; hence observations on very small stars require management of the quantity, and sometimes of the quality too of the extraneous light; on which account prisms of different coloured glass have been interposed between the lamp and the end of the axis, with sliding motions, to produce various modifications in the illumination, according to the exigencies of the moment.

7. *To adjust the horizontal Wire or Hair for taking Altitudes.*—When the altitude of an object is to be accurately taken, bring the bubble of the double vernier to the middle of the level, and turn the telescope on its axis of motion, till vernier 1 has its zero at 0 in the circle, or at 90° , if the circle is graduated for zenith distances, as is mostly the case; then notice what distant point is cut by the horizontal wire; reverse then the axis, and bisect the same point again, and in this situation see what quantity is read by the same vernier; or, which will be still better, half the sum of the readings of both verniers-1 and 2 may be taken at both times, and the difference of the two average readings may be considerable; then one half of this difference, + or -, is the real error of each observation, accordingly as the axis is situated in position; and if this error is not obviated by a proper adjustment, it must be allowed for in the reading of every observation. But this error may be owing partly to the unadjusted state of the vernier level, and partly to the situation which the horizontal wire occupies in the eye-piece; therefore the screws which elevate and depress the horizontal wire, which, however, are not in all instruments, may correct one half of the error, and the screws of the vernier level the other, in each reversed position till the error disappears; *i. e.* till there is no difference perceived in altitudes of the same object taken in reversed positions of the axis of the telescope's motion. But it is usual with astronomers,

who take altitudes in reversed positions of a circle, to ascertain the error arising from want of true collimation in altitude, from a repetition of observations, and to apply it to each observation as a correction, rather than attempt an exact adjustment in this respect, when the error is inconsiderable.

8. *To make the Line of Collimation move in the Plane of the Meridian.*—In order to fix a transit-instrument well in the meridian of any given place, it is necessary that the pole-star be exposed to its view; for as the polar point is situated in the centre of its diurnal circle, this circle must be bisected by the middle wire, or spider's line, that passes through the zenith, before it will move in the plane of the true meridian. Formerly it was usual to place the instrument, by double altitudes of the sun, or by a knowledge of the solar time gained by observation of his altitude on a given day, nearly in the meridian of the place, and then to observe which of the two semicircles, to the right and left of the approximate meridian line, were passed through in the shorter time, by means of taking both the upper and lower transits of the pole-star successively; after which an allowance was made for the deviation from the meridian, and the observations were repeated till both semicircles were performed in the same time. But by this method of finding the centre of the circle surrounding the pole, the accuracy of the result depended on the rate of the clock that was used, during the whole time that the successive observations were employed; consequently some uncertainty remained as to the comparative times intervening between the successive transits, and the true polar point was, therefore, not easily ascertained: but this difficulty has recently been obviated, by fixing on two stars nearly at opposite sides of the circle, so that their difference of right ascension may be very nearly 12^h ; for, when the two semicircles are alike, the time that elapses between the superior transit of one, and the inferior one of the other, will not be altered by a change of situation; the difference of the times will remain the same, whichever of the two stars makes the upper transit; but if the semicircles are unequal, the intervals of time will differ accordingly; so that if one star precede the other two minutes at its upper transit, and only one at its lower, half of this quantity will be the time corresponding to the deviation in position from the true meridian, which may be rectified by repeated observations of the short intervals, according to which the two stars follow one another, in transiting first above and then below the pole respectively; and all that the clock has to do, according to this method, is to count the seconds in each of those short intervals. When an instrument that is adjusted to have its line of collimation pass through the zenith by means of the horizontal position of its axis of motion, is thus made to bisect a polar circle, it will also pass through the pole, and will consequently move in the plane of the true meridian of the place. Various other methods of placing a common transit-instrument truly in the meridian have been recommended, but this is not only the easiest, but the best; and if the right ascensions of Dr. Maskelyne's or Mr. Pond's stars come right, when observed after the final verification, it may safely be concluded that the position of the instrument is in the true meridian.

When a transit-instrument is well constructed, and properly adjusted in all respects, it is one of the most useful instruments in astronomy, for without it the right ascensions of the heavenly bodies would not be accurately taken by direct observation, neither could the time, either solar or sidereal, be ascertained with that degree of precision which

TRANSIT-INSTRUMENT.

may be done by its aid. Indeed a perfect transit-instrument and a good sidereal clock are the indispensable furniture of every fixed observatory, and as companions, that mutually assist each other, they ought never to be separated.

We might now proceed to illustrate the use of the transit-instrument by real examples in practice, if we had not anticipated this part of our article under the heads ASCENSION and CHRONOMETER; in one or other of which articles we have explained both the method of determining the *right ascension* of any body, and also of ascertaining, without much calculation, the *rate of a chronometer or astronomical clock*. See the respective *problems* under CHRONOMETER.

The transit-instruments which we have above described are necessarily expensive, even in the portable form; and encouragement has been held out, by the Adelphi Society, for further improvements in the portable kind, so that they may become more common. And the frequent enquiries that have been made for a cheap portable instrument, induced sir H. C. Englefield, bart. to contrive a very simple one, which was first made by Mr. Thomas Jones, mathematical instrument-maker in London, and is now sold at his house at Charing-Cross. A description of this instrument, called a *side transit-instrument*, written by the contriver, is sold along with it, from which it appears, that it is not to be considered an original instrument, but an improvement on an old transit-instrument formerly belonging to Mr. Aubert, and purchased at his sale by the late Mr. W. Walker. We propose to copy the description nearly as it has been published. "It is well known," says the ingenious author, "that the transit-instrument, in its usual form, is liable to great injuries from blows, or other violence affecting the perpendicularity of the telescope to the axis; that it necessarily takes up much room in package; that, unless of a very small size, it is not easily fixed in a window or other opening in a common dwelling-house; and that it is quite impossible, except in fixed observations, to make it sweep the entire arc between the southern and northern points of the horizon. In windy weather its use is also very difficult and inconvenient. In the instrument now offered, all these inconveniences are avoided. It may be fixed almost any where; in many places it may be made to describe the entire semicircle of the meridian; the observer is put to no difficulties by change of place, as he always looks directly along the axis; it is packed in one-eighth of the space requisite to pack a common transit-instrument of the same real size; its weight is not more than a sixth of the other; from its simplicity it will be afforded at half the price; and its verifications and adjustments are easy and simple. It has also another advantage, that the mark by which it is placed in the meridian may be either in the meridian or at right angles to it; or, if convenient, two marks may be erected, one to the south or north, the other east or west; and if so used, it will be always seen, by inspection only, whether the mirror needs adjustment or not. In many confined situations, such as occur in cities, the power of having a mark at right angles to the meridian may be eminently useful. The general description of the instrument is as follows: The telescope is included in a brass cylinder, having a small cylinder at each end, turned true in the usual manner, and resting in Ys of the usual construction. These smaller cylinders are both pierced. In one is the eye-piece of the telescope, with its wires, &c. The other is open, for the purpose of seeing through it, if necessary, the eastern or western mark; and for adjusting by direct vision the line of collimation of the instrument. It also serves for the illumination of the wires. The object-glass of the telescope is placed so near this cylinder, as only to allow room for an

unsilvered plane glass mirror to be placed before it at an angle of 45° . It is obvious, that as the telescope revolves on its axis in the Ys, every celestial object at right angles to it may successively be seen by reflection from the mirror; and of course, if the axis be placed due east and west, the transits of all celestial bodies over the meridian will be observed with the utmost accuracy and convenience. The aperture in the axis beyond the object-glass is not only of use for the adjustment of the instrument to an eastern or western mark, or for the illumination of the wires, but affords a means of seeing the mark at the same time with the body whose meridian passage is to be observed, and of thereby being certain of the true adjustments of the instrument at the very moment of observation; which is impossible in any other construction of the transit-instrument, and seems to be a very material advantage. I am convinced that transit-instruments of the largest size might, with very great advantage, be constructed on this principle. It is true, that where very much light is wanted, as in observations of stars in the day-time, the loss by reflection will be some disadvantage; but the loss of light from an unsilvered mirror is very small: and the convenient and simple form of the instrument; by its lightness less subject to flexure; by its position much less liable to errors from unequal change of temperature; and so extremely commodious in its use; present advantages of a very important nature, and such as might introduce it into the most extensive observatories with profit. The advantages may perhaps be even greater than in small transit-instruments. When in the present construction the telescope is long, as its whole weight rests on the most disadvantageous point of the axis, this is of necessity made very large towards its centre, to avoid flexure; and the whole instrument is so heavy, that an additional apparatus of counterpoise must be added to the pivots, lest they should wear away the Ys, and the reversing the instrument becomes a work of some difficulty and danger: whereas in the construction proposed, the small comparative weight of the object-glasses and eye-glasses lies very near the pivots, and the middle of the tube is the lightest part of it. The operation of reversing is performed with great ease, both from the form and lightness of the instrument; and it may be added, that the comparative facility of observations is of greater advantage the larger the instrument. Having so far explained the general principles of this transit-telescope, which was executed very much to my satisfaction by Mr. Thomas Jones, it will be proper to describe more particularly its construction. The transit-stand is represented by either the upper or lower part of *fig. 10*.

"The first is constructed for being placed or fixed on a vertical surface; the second for a horizontal one, A B; in both are the Ys, or supports for receiving the axis of the telescope. The end A, intended to be always next the eye, is furnished with both the horizontal and vertical adjustments, such as are usual to transit-instruments. The telescope's axis is represented by the lower part of *fig. 9*. The eye-end being at C, the object-end at D turns round in the Ys; A B upon its cylinders *n, n*: the screw-head *r*, at the object-end D, is for the purpose of adjusting the parallel glass. The telescope is adjusted to distinct vision by means of the head or knob at P. The wires of the telescope are adjusted by means of the four capstan head-screws at the eye-end *t t*. The circle R is divided on the surface next to the eye. The eye-tube has a sliding motion for viewing the wires distinctly: the short piece of tube at the object-end turns round on the telescope's tube, and serves as a cover for the object-glass. The upper part of *fig. 9*. is the riding level, and is placed upon the axis in the Ys, and ad-

justed by means of the screw S. *Fig. 8.* represents the stand, telescope, and level, displaying the position in which they are used; *fig. 12.* for placing the transit in the meridian. Of the verifications of this instrument, two are common to every construction; one only is peculiar to this. The line of collimation is adjusted by looking direct at some distant small point (the cover being turned over the lateral aperture), and turning the telescope gradually round on its axis, and moving the screw of the wires, if necessary, till the spot is in every position covered by the intersection of the wires. The axis is brought to a horizontal position, and the level is in the same mode adjusted by reversing the telescope or level, and correcting half the error by the level-screw, and half by the vertical screw of the Y, in the usual mode. The verification peculiar to this instrument is that of the mirror, and perhaps the best mode of doing this is by the pole-star, when nearly in an eastern or western position from the pole; its motion in azimuth is then so slow as to give ample time for the adjustment. Bring the pole-star to the vertical wire (the line of collimation having been previously adjusted); then reverse the telescope in its Ys; and if the star is still on the wire, the mirror is in adjustment: if not, correct half the difference by the mirror-screw, and half by the horizontal of the Y, till the error vanishes. This adjustment may also be performed, by setting up a board with two parallel perpendicular lines drawn on it, distant from each other exactly the space between the positions of the mirror when the telescope is reversed in its Ys. If the vertical wire be brought to cover one of the marks, and on being reversed, the wire covers the other mark, it is right: if not, the error must be made to vanish by correcting it half and half, as before directed, for the adjustment by the pole-star. The following method of placing the instrument correctly in the meridian, is equal if not superior to any that has yet been devised. Let Z (*fig. 12.*) be the zenith; P, the pole; H O, the horizon; Z P I, the meridian circle; Z K, a circle of altitude, distant from the meridian by a small quantity I K (suppose a degree); 1, 2, 3, 4, the diurnal circle of the pole-star, whose radius is $1^{\circ} 45'$ nearly; and let the altitude of the pole be $51^{\circ} 30'$. Then when the pole-star is on the northern meridian, its altitude 3 I will be $49^{\circ} 45'$, and its zenith distance Z 3 = $40^{\circ} 15'$; and A C D be a part of the diurnal arc of a star whose polar distance is $46^{\circ} 30'$, and N. meridian altitude 5° . Now suppose the transit-instrument, whose axis is accurately levelled, and of course in the meridian at Z, to point at the horizon to K (it is obvious from its construction the telescope's axis will be at right angles to the meridian line) instead of I, the true meridian; then at 3 (the altitude of the pole-star under the pole) it will point at B, and the arc 3 B will be to I K, as the cosine of the altitude 3 I to radius; but 3 B, measured on the diurnal circle of the pole-star, will be the sine of its distance from the meridian to the radius P 3 or P B: and, as in small arcs, the arc of a great circle, or of a small circle, or their sines, are nearly coincident, we shall have very nearly, as Z 3 (the zenith distance) is to P 3 (the polar distance), so is the value of 3 B, in degrees of the pole-star circle, to its value in degrees of a circle whose radius is Z 3. And as the radius Z 3 is to P 3 very nearly as 23 to 1, the error of the transit-telescope at the altitude 3 I, will be measured by a scale (if it may be so called) 23 times as great as itself. Now, let there be another star A, whose northern meridian altitude is as small as it conveniently can be, for example 5° , whose polar distance is, therefore, $46^{\circ} 30'$, and whose right ascension is the same as that of the polar star; then, if the transit-telescope be in the meridian, both these stars

will pass through it at the same time; but if it be out of the meridian by the quantity I K, the star A will pass through it when it comes to C, but the polar star not till it comes to B, when the star A has got to D, in its diurnal circle. The value of A C being therefore found, by multiplying I K by the cosine of its altitude A I, that value, being reduced to the angular value from the radius P A, will give the time of the star A passing through the transit-telescope, after the time of its passing the meridian; and the same operation being performed for the pole-star as before directed, the difference of these times will be the error in time of the transits, answering to the given deviation I K of the transit-telescope. And tables having been previously constructed for such stars as shall be thought convenient, the transit-telescope may, in a very short space of time, be set to the meridian, with a degree of precision unattainable by any other method. If the star A precedes the pole-star in its passage under the pole, no tables are requisite, nor any thing necessary to be known but the exact difference of the right ascension between the two stars; for having observed the transit of the star A, (the instrument being previously brought near the meridian, suppose half a degree,) then elevate the telescope to the pole-star, by moving the horizontal adjustment of the axis; keep the pole-star on the middle wire, till the due interval of time between their transit is elapsed; the instrument will then be extremely near its true position; and, by repeating the observation once more, will be brought to a perfect exactness. Or, if another star, following the pole-star in its passage, be observed on the same evening, if the times elapsed between their transits are equal to the tabular difference or their right ascensions, which will probably be the case, the accuracy of the first placing the instrument will be immediately ascertained. Other stars near the pole may be made use of in the same manner as is here described for the pole-star, but with proportionally less advantage as the polar distance is increased. It is also obvious from the figure, that the transit of the pole-star above the pole may be also used, and that with nearly, though not quite, the same advantage as the transit below the pole. The same method may also be applied with equal ease, if the second star A pass the southern meridian instead of the northern.

"The slowness of the pole-star's motion, though it renders its transit uncertain to a few seconds, cannot materially affect the accuracy of this method, as an error of ten seconds in time, in the estimation of its passage, which is certainly more than can be committed, would not cause an error of a third of a second of time in the passage of stars near the equator.

"Example of the computation with the numbers given above.

	Star A.		Pole-star.
Sin. I K	8.241855	Sin. I K	8.241855
Sin. Z A	9.998844	Sin. A C	8.240199
Sin. Z 3	9.810316	Sin. 3 B	8.052171
Sin. P A	9.860562	Sin. P 3	8.484848
Sin. A P C	8.379663	Sin. 3 P B	9.567328
In time	$5^m 29^s$	3 P B	$21^{\circ} 40' 10''$
		In time	$1^h 26^m 40^s$

"The error of a degree, therefore, in the position of the transit-telescope at the horizon, causes the star A to pass through it $5^m 29^s$ in time later than it ought; whereas the same error causes the transit of the pole-star to be $1^h 26^m 40^s$ later than it ought; and the difference between the

these two times, viz. $1^h 21^m 11^s$, will be the difference of the observed time of their transits, owing to the error of the position of the transit-telescope, their real right ascension being supposed the same." After having thus given Sir H. Englefield's own words, we shall only add on this subject, that on enquiry of Mr. Thomas Jones, we learn that several of these instruments have been made and sold, and one on an enlarged scale; but that stars smaller than those of the third magnitude cannot be seen by a telescope in which the reflection precedes the refraction.

TRANSIT-Circle, is an astronomical instrument, by which, with the aid of an astronomical clock, both the right ascension and declination of a heavenly body are determined at the same time. This instrument is of modern date, and differs from a transit-instrument of the best construction, only as it has a graduated circle of larger dimensions than the latter, and, by means of microscopes, reads the angle observed to the accuracy of a *single second*; whoever, therefore, has a good transit-circle, and a superior astronomical clock, has an observatory for determining the exact place of any heavenly body. Under our article CIRCLE, we have described the *mural transit-circle* by Troughton, which has been usefully employed by Mr. S. Groombridge at Blackheath, and which has proved itself to be an instrument of the first class; and we there stated a report, that a large one was in contemplation for Greenwich, which we said we might possibly have occasion to describe. That instrument has been finished by Troughton in his best manner, and though the plan of the construction is unique, and the mode of using it novel, its application to the purposes for which it was intended answers the most sanguine expectation of the maker, and in the hands of the present astronomer-royal, affords the means of making more accurate and at the same time more numerous observations in a given time, than ever were effected by any other instrument. Though this instrument has a long axis passing through a solid pier of masonry, and is capable of being used for transits, it has hitherto been principally used for determining polar distances, by actual measurement from the polar point; according to which mode, the uncertainty in the results, which commonly arises from variable refraction in ordinary measurements, is almost entirely obviated, and a repetition of any series of observations may be made on any part of the circle *ad libitum*, and with any number of readings to the number of six at the same time; so that a single observation is made with as much accuracy, as can be obtained from an average of several successive observations taken with a repeating-circle of the same dimensions; and yet there is the power of repeating any observation in various positions. Mr. Pond has already published one volume of observations taken with this instrument, which completely verifies our assertions, and in this first volume he has given a plan and section of this instrument, the circle of which is six feet two inches in diameter; but as Mr. Troughton intends to give a complete description thereof himself, as a paper suitable for the Philosophical Transactions, which, to be published therein, must be an original communication, Mr. Pond was not at liberty to describe the drawing which he has given as a frontispiece to his first volume; and as the description in question is not yet finished, we are in the same predicament with the astronomer-royal, and must consequently for the present forego the pleasure we had promised ourselves, of introducing this magnificent instrument to the notice of the public.

TRANSITION, in *Music*, is nearly synonymous with modulation; it implies little more, in its technical use, than a *change*; and, in general, a change of key, from major to

minor, or the contrary; or, indeed, from any one genus or key to another. Luckily no laws were laid down by our forefathers for transition, as for modulation, which we so long feared to violate.

TRANSITION, in *Rhetoric*, a kind of connection in discourse, by which the several different parts and members of it are joined, so as to constitute one regular whole: or, as Vossius defines it, it is a form of speech, by which the speaker, in a few words, tells his hearers both what he has said already, and what he next designs to say. Sometimes, however, in passing from one thing to another, a general hint of it is thought sufficient to prepare the hearers, without particularly specifying what has been said, or is next to follow.

Some place transition in the number of figures; others, with Quintilian, exclude it from that rank.

F. de Colonia makes two kinds of transitions, the one *perfect*, and the other *imperfect*.

TRANSITION, *Perfect*, is that in which we briefly intimate what is said, and what remains to be said. As, *Now that we have spoken of war, there remains something to be said of peace. Satis multa de turpitudine: dicam deinceps, quod proposui, de periculo. Uni epistola respondi: venio ad alteram. Sed hæc vetera; illud recens: Casarem meo consilio interfecitum.*

TRANSITION, *Imperfect*, is that in which only one of these is expressed. As, *Let us now consider the consequences of, &c. Postularet hic locus, ut dicerem de — sed finis sit; neque enim præ lacrymis jam loqui possum; et hic se lacrymis defendi negat.*

TRANSITION *Rocks*, in *Geology*, a name introduced by Werner to designate those rocks which, on account of their containing few organic remains, and lying immediately over other rocks which contain none, are supposed by him to have been formed when the world was passing from an uninhabitable to a habitable state. According to the same geologist, transition rocks are of more recent formation than the lower or primary rocks, and older than the *flætz* or stratified rocks, and are intermediate between both, being partly of mechanical and partly of chemical formation. The rocks which are enumerated in this class by Werner, are transition lime-stone, transition trap, greywacke, and slinty slate. It is now, however, admitted, that the distinction made between transition rocks and the lower stratified or *flætz* rocks, has little or no foundation in nature, as these rocks are not unfrequently observed to alternate with each other. (See ROCKS.) Nor is the absence of organic remains in the lower rocks, called *primary*, a decisive proof that they were formed previously to the existence of organic life upon our planet; for in a series of stratified rocks containing organic remains, we frequently meet with other beds interposed, in which no vestige whatever of such remains can be traced. Hence we may infer, that the process by which the latter was consolidated, has destroyed the organic matter which they may have once contained. The absence of organic remains in siliceous beds that have a crystalline granitic structure, is, we conceive, owing to the peculiar mode by which they were crystallized, as such beds sometimes repose on other beds abounding in marine shells. Nor can we be certain, that the lowest rocks of granite were formed before the existence of animal life on our planet. The more extensively modern geologists have carried their observations, the more numerous are the instances found of marine shells or vegetables occurring in alpine districts formerly regarded as primary; and if granitic rocks, wherever they occur, are invariably destitute of extraneous fossils, we must attribute it to the peculiar mode of their formation, rather than to their priority of age.

The only circumstance which makes it probable, that the rocks classed as transition rocks, are the lowest in which the remains of organic substances have ever been imbedded, is, that the fossils found in such rocks belong almost exclusively to different species of zoophytes and shell-fish, which may be regarded as the first or lowest links in the chain of animated beings. It is only in the upper strata that we meet with remains of animals possessing the faculties of vision and locomotion, and a more complex organization. See ROCK, STRATA, and SYSTEMS of *Geology*.

TRANSITIVE, in *Grammar*, an epithet given to such verbs as signify an action which passes from the subject that does it, to, or upon, another subject which receives it. Under the head of verbs transitive, come what we usually call verbs active and passive: other verbs, whose action does not pass out of themselves, are called *neuters*, and by some grammarians *intransitives*.

In the Hebrew, the verb *הָיָה*, *hajah*, in the Greek *εἶναι*, and in the Latin *esse*, are verbs purely neuter, or intransitive; or, as the Latin and Greek grammarians more usually express it, verbs substantive, signifying the mere existence of the thing, without the active or transitive conjugations.

TRANSITORY, in *Common Law*, stands opposite to local. See ACTION.

TRANSITORY *Chose*. See CHOSE.

TRANSITORY *Trespas*. See TRESPASS.

TRANSLATION, formed of *trans*, beyond, and *latio*, of *ferre*, to carry; the act of transferring or removing a thing from one place to another.

We say, the translation of a bishop's see, a council, a seat of justice, a parliament; the translation of the relics of a saint, the translation of the empire, &c.

The translations of bishops from one see to another are prohibited by the council of Nice, which declares them null, and appoints the translated bishop to return to his former church. The council of Sardica excludes translated bishops from communion. It has been observed, that no bishop was ever removed from a greater church to a lesser; and that those who thus quitted their churches, only did it out of ambition or avarice.

This discipline was generally observed for nine hundred years; and the first instance of any translation of note, was that of pope Formosus, who was bishop of Porto. One of his successors took hold of this pretence to have him dug out of his grave; and a council, held soon after, forbade this translation to be made a precedent.

However, the same church allowed of some legitimate causes of translations; as the apparent advantage of the church; under which pretence, translations soon became so frequent, that for 500 or 600 years last past, they have been esteemed a kind of common law.

The translation of a religious from one order to another cannot be effected without the consent of the pope; it is added, that it is not allowed to translate from a severer rule to a laxer one.

TRANSLATION is also used for the version of a book or writing out of one language into another. See VERSION.

TRANSMARINE, TRANSMARINUS, something that comes from, or belongs to, the parts beyond sea.

TRANSMARISCA, in *Antient Geography*, a town of Lower or Second Mælia, upon the route from Viminacium to Nicomedia; between Appiaria and Candidiana. Anton. Itin.

TRANSMIGRATION, the removal or translation of a whole people into another country, by the power of a conqueror. See MIGRATION.

TRANSMIGRATION is particularly used for the passage of a soul out of one body into another; the same with what we otherwise call *metempsychosis*; which see.

The Siamese, F. Tachard informs us, from a belief of the transmigration of souls into other bodies, forbear killing any beasts; lest, by that means, they should dispossess the souls of their deceased relations.

TRANSMIGRATION, *Ionic*. See IONIC.

TRANSMISSION, in *Optics*, &c. denotes the property of a transparent body, by which it suffers the rays of light to pass through its substance; in which sense, the word stands opposed to reflection.

Transmission is also frequently used in the same sense with refraction, because most bodies, in transmitting the rays, do also refract them.

For the cause of transmission, or the reason why some bodies transmit, and others reflect, the rays, see TRANSPARENCY and OPACITY.

The rays of light, sir Isaac Newton observes, are subject to fits of easy transmission and reflection. See LIGHT and REFLECTION.

TRANSMUTATION, the act of transforming or changing one nature into another.

The term is chiefly used in chemistry and medicine. It has been greatly questioned, whether the transmutation of silver into gold, and of tin into silver, so much sought by the chemists, be possible or not.

The purest and subtlest parts of the food are transmuted or assimilated into the proper substance of the body. See NUTRITION.

Nature, sir Isaac Newton observes, seems delighted with transmutations: he goes on to enumerate several kinds of natural transmutations; gross bodies and light, he suspects, may be mutually transmuted into each other; and adds, that all bodies receive their active force from the particles of light which enter their composition.

For all fixed bodies, when well heated, emit light as long as they continue so; and, again, light intermingles itself and inheres in bodies as often as its rays fall on the solid particles of those bodies.

Again, water, which is a fluid, volatile, tasteless salt, is by heat transmuted into vapour, which is a kind of air; and by cold into ice, which is a cold, transparent, brittle stone, easily dissolvable; and this stone is convertible again into water by heat, as vapour is by cold.

Earth by heat becomes fire, and by cold is turned into earth again: dense bodies are rarefied into various kinds of air, and that air reverts into gross bodies.

Quicksilver sometimes puts on the form of a fluid metal; sometimes it appears in the shape of a pellucid, fragile salt, called *sublimatis*; sometimes of a pellucid, volatile, white, tasteless earth, called *mercurius dulcis*: by distillation, it becomes vapour; and by agitation *in vacuo*, it shines like fire, &c.

All bodies, beasts, fishes, insects, plants, &c. with all their various parts, grow and increase out of water, and aqueous and saline tinctures; and, by putrefaction, all of them revert into water, or an aqueous liquor, again.

Farther, water exposed awhile to the open air, puts on a tincture, which, in process of time, has a sediment and a spirit; and, before putrefaction, yields nourishment both for animals and vegetables.

TRANSMUTATION, in *Alchemy*, denotes the act of changing or exalting imperfect metals into gold or silver.

This is also called the *grand operation*; and, they say, it is to be effected with the philosopher's stone.

The trick of transmuted cinnabar into silver is thus:
the

the cinnabar, being bruised grossly, is stratified in a crucible with granulated silver, and the crucible placed in a great fire; and, after a due time for calcination, taken off; then the matter being poured out, is found to be cinnabar turned into real silver, though the silver grains appear in the same number and form as when they were put into the crucible; but the mischief is, coming to handle the grains of silver, you find them nothing but light friable bladders, which will crumble to pieces between the fingers.

Mr. Boyle, in his *Sceptical Chemist*, tells us, that two friends of his did, by urging mercury in a skillfully managed fire, turn it, almost weight for weight, into water; but he does not say what was the specific gravity of the produced water, nor of the remaining untransmuted mass of mercury. He likewise assures us, that rain-water, being distilled and re-distilled, by a friend of his, nearly two hundred times, did, after distillation, leave at the bottom of the glass body, a considerable quantity of a white earth; and that more plentifully in the latter distillations, than the former.

This he believed to be a certain quantity of water actually transmuted into earth, adding, that it was above twice as heavy specifically as common water, and of so fixed a nature, that it lay a considerable time, in a red-hot crucible, without losing any thing of its weight, or even emitting any smoke.

For the transmutation of iron into copper, see **COPPER** and **VITRIOL**.

TRANSMUTATION, in *Geometry*, denotes the reduction or change of one figure or body into another of the same area or solidity, but of a different form; as a triangle into a square, a pyramid into a parallelepiped, &c.

TRANSMUTATION, in the *Higher Geometry*, is used for the converting of a figure into another of the same kind and order, whose respective parts rise to the same dimensions in an equation, admit the same tangents, &c.

If a rectilinear figure be to be transmuted into another, it is sufficient that the intersections of the lines which compose it be transferred, and lines drawn through the same in the new figure.

If the figure to be transmuted be curvilinear, the points, tangents, and other right lines, by means of which the curved line is to be defined, must be transferred.

TRANSMUTATION of Colours. The change of colour of a decoction of the nephritic wood, according to the different lights it was viewed in, long perplexed those who attempted to account for it; but Wolfius has carried the experiments on this decoction much farther, and found a way of giving it its colours again, after taking them wholly away. If this decoction be held between the eye and the light; it appears of a blue colour; but if the eye be placed between it and the light, it appears then of a yellowish or a red colour. If a few drops of oil of vitriol be dropped into it, it will appear of a gold yellow in whatever light it is viewed; but if too much of this oil be added, the whole becomes foul and obscure; and if a few drops do not produce the effect, it is a sign that the decoction is too strong, and that it must be diluted with water. See **COLOURS**.

Oil of vitriol has the same effect upon many other decoctions of the woods, particularly on that of Brazil wood, which is of a fine red, but immediately becomes yellow on dropping a small quantity of this acid into it. And as in the other instance, so in this, it is necessary to the success of the experiment, that the tincture be not over strong. A few drops of oil of tartar added to this yellow liquor turn it red again as at first; and if more oil of tartar be added, the colour becomes blueish, with a tinge of red, much stronger than the colour of the nephritic wood at first, when held

between the eye and the light. In all experiments of this kind, the weakness of the tincture produces the greatest beauty; and therefore it is best, instead of making a decoction, to make only a cold infusion, by putting a small quantity of the chips of the wood into water, and letting this stand cold for some time.

A tincture of red roses, made with common water and oil of vitriol, is well known to be of a very beautiful red colour, yet when the water has stood ever so long on the roses alone, it has scarcely any colour; if it be strained off in this colourless state, and the oil of vitriol then added, the red colour is produced as strongly as if this acid had been dropped into the water, while the roses were yet in it. When the liquor is of this fine red colour, a small quantity of oil of tartar makes it immediately green; and if more oil of vitriol be added to this green liquor, it becomes red again, but is muddy, and not so well coloured as before. If a few drops of a solution of corrosive sublimate be added to this, it does not at all change colour; and on adding more water, with salt of tartar dissolved in it, the liquor became red again, but of a very different red from what it was before in its muddy state, being now clear and deeper. When the tincture of roses has scarcely any colour, a small quantity of salt of tartar makes it green, but a large quantity makes it yellow. A few drops of oil of vitriol added to this yellow liquor, turned it to a pale red, and this could never be made green again by oil of tartar. Alum-water, added to a solution of salt of tartar, makes a white and opaque fluid, though they are both separately pellucid.

What is most observable in these experiments on the infusion of woods is, that oil of tartar, and a solution of salt of tartar in water, have a very different effect. Thus an infusion of Brazil wood is red, and on dropping into it a few drops of oil of vitriol, it becomes yellow. If oil of tartar be added to this liquor, it only makes it yet more yellow; but if a solution of salt of tartar in water be added to this, it makes it red again. *Act. Erudit. ann. 1718. p. 322.*

The solution of verdigris, which is green, becomes colourless by the affusion of spirit of nitre or spirit of vitriol, and by the affusion of the oil of tartar it becomes green again. The spirit of sal ammoniac gives it a purple colour, and oil of vitriol makes it pellucid. The solution of galls with vitriol gives black, the affusion of oil of vitriol destroys the blackness, and it becomes pellucid as before.

M. Muschenbroeck thought it to be universally true, that yellow vegetables, dissolved in spirit of wine, gave yellow tinctures, which are either not at all, or very little changed by acid, alkaline, or any other salts; but he thought there were some exceptions, and says, that when oil of vitriol is put to yellow paint, called *orleon*, it becomes of a beautiful blue, which is destroyed by water or any salt. A small quantity of an astringent substance, with iron, gives a black colour; a greater quantity of the astringent produces blue, more of it makes a violet, and more still produces purple.

There are some tinctures, the colours of which depend upon the external air: such is the red tincture made of Canarian lichen, called *orseille*, and water, a diluted spirit of wine, with lime and an urinous salt. For, if this tincture be put into a glass tube, hermetically sealed, in a few days it becomes colourless; and when the tube is opened the colour returns. The abbé Nollet made a variety of experiments with this tincture. To the same class may be referred the sympathetic inks.

Colours may be produced in liquors which originally have no colour: thus, spirit of wine with red roses, upon which, whilst it is yet white, any saline acid spirit is poured, in so small a quantity that the acid can hardly be perceived, produces

duces a florid red. Many other red flowers hardly give any colour to spirit of wine in a short time, yet give a red colour by the addition of any of the acids. A solution of mercury and oil of tartar gives orange; a solution of sublimate and lime-water produces yellow. The tincture of red roses with oil of tartar per deliquium, or with spirit of sal ammoniac, gives green. In like manner, the tincture of many red flowers it changes into green by an alkali. The tincture of red roses and spirit of wine gives blue. The solution of copper and spirit of sal ammoniac gives purple. The solution of sublimate and spirit of sal ammoniac gives white. The solution of saccharum saturni and that of vitriol, also the tincture of red roses, or many other red flowers, and the solution of copperas in water, and likewise the solution of galls and copperas, produce black. The following table exhibits the colours arising from different mixtures.

		Produce
1.	{ Yellow } Tincture of red roses	} green.
	{ Red } Tincture of crocus	
2.	{ Green } Tincture of violets	} carmine.
	{ Brown } Spirit of sulphur	
3.	{ Red } Tincture of red roses	} blue.
	{ Brown } Spirit of hartshorn	
4.	{ Blue } Tincture of violets	} violet.
	{ Blue } Solution of copper	
5.	{ Blue } Tincture of violets	} purple.
	{ Blue } Solution of Hungarian vitriol	
6.	{ Blue } Tincture of cyanus	} green.
	{ White } Spirit of sal ammoniac	
7.	{ Blue } Solution of Hungarian vitriol	} yellow.
	{ Brown } Lixivium	
8.	{ Blue } Solution of Hungarian vitriol	} black.
	{ Red } Tincture of red roses	
9.	{ Blue } Tincture of cyanus	} red.
	{ Green } Solution of copper	
10.	{ Violet } Tincture of dipfacum, or iris, or	} blue.
	{ Trans- } any other flowers that give a parent. } violet colour in water	
	{ } Alum dissolved in water.	

Muschenbroeck's *Introd. ad Phil. Nat.* tom. ii. p. 735, &c. The result of a variety of mixtures to produce colours, was recited before the Royal Society by Dr. Goddard in 1661, and may be seen in *Birch's History*, vol. i. p. 111.

Mr. Melville has made many observations on the transmutation of colours by means of the light of different burning bodies. Bodies of all the principal colours, *viz.* red, yellow, green, and blue, are very little altered, he observes, when they are seen by the light of burning spirits; but if salts be continually mixed with them, during the burning, different changes ensue. When sal ammoniac, potash, or alum, are infused, the colour of red bodies appears somewhat faded and dirty. Green and blue appear much the same as in candle-light, both being faint, and hardly distinguishable. White and yellow are hardly at all affected.

When nitre, or sea-salt, is plentifully mixed with the burning spirits, and the whole is stirred about briskly, the brightest red bodies, seen by the light then emitted, are reduced to a dirty tawny brown, which seems to have nothing of redness in it. Green is transformed into another sort of brown, only distinguishable from the former by a certain inclination to a livid olive colour. When nitre is mixed with the spirits, one may still see some remains of greenish colour, unless it be poured in very plentifully. Dark blue is hardly to be known from black, except that it appears the deeper black of the two. Light blue is changed into a very light

brown, of a peculiar kind. White assumes a livid yellowish cast; and yellow alone appears unaltered, and extremely luminous.

These experiments he made with different sorts of richly coloured bodies, as silks, cloths, and paints. Polished copper, which had contracted from the air a high flaming colour, was reduced, by the same light, to the appearance of yellow brass. The faces and hands of the spectators appeared like those of a dead corpse; and other mixed colours, which had red or green in their composition, underwent the like changes.

Having placed a pasteboard, with a circular hole in it, between his eye and the flame of the spirits, in order to diminish and circumscribe this object, he examined the constitution of those different lights with a prism, holding the refracting angle upwards; and found that, in the first case, *viz.* when sal ammoniac, alum, or potash fell into the spirits, rays of all kinds were emitted, but not in equal quantities, the yellow being much more copious than all the rest put together, and the red being more faint than the green and blue.

In the light of spirits mixed with nitre, or sea-salt, he could observe some blue, though exceedingly weak and diluted. With the latter the green was equally faint, but with the former pretty copious. But when either of these salts was used, he could hardly perceive any trace of red, especially when they were mixed in great plenty, and the spirits constantly agitated. At every little intermission, indeed, the red rays would shew themselves very manifestly below the hole, and red bodies seen by that light resumed somewhat of their ordinary colour; and it was entertaining to observe how both would vanish again at once, when the salting and stirring were renewed.

The proportion in which the bright yellow exceeded the other colours in this light, was still more extraordinary than in the former: in so much that the hole, seen through the prism, appeared uniformly of that yellow, and as distinctly terminated as through a plane glass; except that there was adjoining to it, on the upper side, a very faint streak of green and blue. White bodies illuminated with it, appeared also through the prism perfectly well defined, both which, he says, are very surprising phenomena to those who have been accustomed to the use of the prism in heterogeneous lights, where it never fails to throw confusion on the extremities of all visible objects.

Upon examining bubbles of soap and water in the same light, he could only observe luminous streaks, separated by dark ones, the green and blue being too weak to affect his eye. *Edeb. Essays*, vol. ii. p. 32.

TRANSMUTATION of Plants. See SEEDS and DEGENERATION.

TRANSOM, among *Builders*, the piece that is framed across a double light window.

TRANSOM, among *Mathematicians*, denotes the vane of a cross-staff; or a wooden member fixed across it, with a square whereon it slides, &c.

TRANSOMS, in a *Ship*, are beams and timbers extended across the stern-post of a ship, to fortify her after-part, and give it the figure most suitable to the service for which she is calculated. See SHIP-BUILDING.

The general figure or curve given to the ship by the disposition of the arms of the transoms, which are gradually closer in proportion to their distance from the wing-transom downwards, in consequence of which it becomes extremely narrow from the counter towards the keel, is called the *pitch* of the transoms. Although these pieces are extremely different in their figures, according to the extent of the angles formed

formed by their branches or horns, each of them has nevertheless a double curve, which is partly vertical, and partly horizontal, with regard to its situation in the ship. The former of these is called, by the artificers, the *round-up*, and the latter the *round-ast*.

As the transoms fill up the whole space comprehended between the head of the stern-post above, and the aft-most floor-timbers below, it is necessary to distinguish them by particular names. Thus, the highest is called the *wing-transom*; the next, the *deck-transom*; and afterwards follow the first, second, and third transoms, together with the intermediate ones.

The highest transoms are connected to the ship's quarter by knees, which are bolted to those pieces, and to the after-timbers. See SLEEPERS. Falconer.

TRANSPARENCY, DIAPHANEITY, in *Physics*, a quality in certain bodies, by which they give passage to the rays of light.

The transparency of natural bodies, as glass, water, air, &c. some have imputed to the great number and size of the pores or interstices between the particles of those bodies: but this account is exceedingly defective; for the most solid and opaque body in nature, we know, contains a great deal more pores than it does matter; a great deal more, surely, than is necessary for the passage of so infinitely fine and subtle a body as light.

Aristotle, Descartes, &c. place transparency in the rectitude or straightness of the pores; by means of which, say they, the rays are enabled to make their way through without striking against the solid parts, and being reflected back again: but this account, sir Isaac Newton shews, is imperfect; the quantity of pores, in all bodies, being sufficient to transmit all the rays that fall on them, however those pores be situated with respect to each other.

The cause, then, why all bodies are not transparent, must not be ascribed to their wanting rectilinear pores; but either to the unequal density of the parts, or to the pores being filled with some foreign matters, or to their being quite empty, by means of which the rays, in passing through, undergoing a great variety of reflections and refractions, are perpetually diverted this way and that, till, at length, falling on some of the solid parts of the body, they are extinguished and absorbed.

Thus cork, paper, wood, &c. are opaque; whereas glass, diamonds, &c. are transparent: the reason is, that in the neighbourhood of parts equal in density, such as those of glass, water, diamonds, &c. are with respect to each other, the attraction being equal on every side, no reflection or refraction ensues: but the rays, which entered the first surface of the bodies, proceed, without interruption, quite through the body, those few only excepted which chance to meet with the solid parts: but in the neighbourhood of parts that differ much in density, such as the parts of wood and paper are, both in respect of themselves, and of the air, or the empty space in their pores; as the attraction will be very unequal, the reflections and refractions must be very great; and therefore the rays will not be able to make their way through such bodies, but will be properly deflected, and at last quite stopped. See OPACITY.

TRANSPARENT, we think, would be as useful a term in music, as in painting. We know that visibility and audibility are objects of two different senses; but clearness, *chiarezza*, is a favourite excellence with musicians, in speaking of counterpoint: and in compositions of many different parts carrying on different designs, that clearness in their texture and arrangement, which enables the hearer to dis-

entangle them, and to distinguish the several parts through each other, but particularly in vocal music, and to hear the principal melody through all the accompaniments, we think might with some degree of propriety be termed *transparency*.

TRANSPARENT Column. See COLUMN.

TRANSPIRATION, in *Physiology*, an expression derived from the French, for the cutaneous exhalation. See INTEGUMENTS.

TRANSPLANTATION, in *Natural Magic*, was used for a ridiculous supposed method of curing diseases by transferring them from one subject to another; and was much in vogue among certain chemical, or rather sympathetic physicians, some ages ago.

This transplantation was effected, either by the use of a certain medium, called on that account a *magnet*; or, without that, only by simple contact.

Transplantation, by means of the magnet, was of five kinds, *viz.* *infemination*, *implantation*, *imposition*, *irrotation*, and *insecation*; but the whole practice is now deservedly exploded.

TRANSPLANTATION, or *Transplanting*, in *Agriculture* and *Gardening*, the operation of removing plants and trees of various kinds from the situations and places in which they were originally sown, set, or raised, and replanting them in others which are more convenient and suitable. It is practised with a great number of each of these different sorts of vegetable productions.

With the former, for field crops, it is had recourse to with many of the cabbage tribe, and some other such sorts of plants, for wheat, and lately for potatoes. The transplanting of all the different sorts of plants of the first of these kinds, should always be performed, as much as possible, when the weather is in rather a moist state, the ground having previously been put into a suitable state of preparation, by proper ploughing and other means. The plants are placed out, in such cases, at different distances, as from two to three feet or more, as the nature of the land and circumstances may direct.

In transplanting wheat plants, which is sometimes the case, it has been noticed to be a practice which is not likely to become general for whole fields, but that circumstances may not unfrequently occur where it may be attended with much benefit when employed in a partial manner; as in those cases where some accidental failures may have happened to the parts of fields, which on a careful examination may be found to have wholly missed, or to be thinner than the others. In all such instances, whatever may have been the cause of the deficiency,—whether from the wheat plants having been destroyed by wetness during the winter, or any other cause,—some parts of the same fields will mostly be found, from which plants may be drawn for this purpose, without injury; and if attention be paid to good and neat cultivation, the vacancies may be usefully filled up by transplanting from such spots, where it may sometimes happen that the plants are so thick as to do harm to each other, and, of course, service be done to the crops in such parts, while the vacant land is filling with them in other places, and by such means the whole be rendered more perfect, uniform, and regular, improving the appearance as well as the abundance of the crops.

The practice of transplanting wheat in the early spring months, in these and other cases, has long been advised by different writers, and lately had recourse to, with great success, in the parish of Bocking in Essex, to some considerable extent. It was there performed with the common dibble at the distance of twelve inches, but nine would have been preferred,

ferred, had it not been apprehended that the plants which could be collected would be insufficient.

It is thought capable of being more generally introduced with great advantage not only in the abundance of the crops and the saving of seed, but in the vast increase of employment which it furnishes for the labouring poor of different descriptions, as well as in some other respects, as may be seen in the first volume of the Corrected Agricultural Survey of the above county.

In regard to the transplanting of potatoes, it has been shewn by the trials of the Rev. Mr. Cartwright, which are described in a paper in the fifth volume of Communications to the Board of Agriculture, that there is no plant which admits of being transplanted with more complete success. It is suggested as a practice which, besides affording hints to the farmer for the improvement of the field-crops of this sort, may throw in the way of the cottager some useful information, as it may teach him, that after he has had crops of spring and early summer vegetables in his garden, he may procure from it, by being provided with a small bed of the nursery kind for potatoe plants, a valuable supply of useful food for his winter consumption and advantage.

The crops in these transplantings were after tares of the winter kind, and only top-dressed for, which is a considerable saving of manure.

In garden culture, transplanting is essentially necessary for a great variety of different plants of the esculent and other kinds, as has been seen under their different heads. And it has lately been found to be a considerable improvement in the culture of the onion, both in the garden and the field. When transplanted in moist weather into small shallow drills, eight or nine inches apart on beds, having the whole roots first well dipped in a thick puddle liquid, composed of one part foot, and three parts earth, with a sufficient quantity of water to form the mixture, they are said to succeed perfectly. It is a method too which has the advantage of being less expensive, and of course more profitable, than the common one, as the work can be cheaply done by boys or girls; it admits of clearing the plants of weeds better, which is highly beneficial to their growth; a few small beds thickly sown will furnish plants for as many acres; the ground which is to be planted may be under winter or spring crops, it being sufficient to clear it of them by the end of April, or the beginning of the following month, when the transplanting of the onions is to take place, and those contained in the feed-beds will, in the mean time, afford the necessary supplies for family use or the market. It has besides the benefit of having the onions better in quality and larger in size, and the crops wholly free from worms and the rot. See a paper on this subject in the first volume of the Memoirs of the Caledonian Horticultural Society.

With the latter, or plants of the tree-kind, transplanting is performed both for those of the forest and fruit sorts in a great number of cases. It is a practice which is much had recourse to in nursery-grounds for raising the different kinds while in their early growths, as the first two or three years. But for providing timber-wood, especially with some sorts of trees, as the oak and a few others, it is probably better not to transplant at all, as the produce is said to be firmer, more durable, and better for many uses, where it is not done. See **TIMBER**.

Though the work of transplanting be mostly practised while the trees are in this young state, it is capable of being effected, by proper management and attention, with perfect success, when they are of considerably larger growth. Mr.

Amos, in his work on "Agriculture and Planting," has observed that, as in forming various sorts of ornamental undertakings with trees, as those of extensive lawns and fields interspersedly filled with large collections of such as are of the forest kind, and flowering shrubs placed out in the wilderness manner, with serpentine walks and paths running through the whole, the designs often become defective and unsatisfactory, from the want of various sorts of proper large-sized trees: to supply the defect in such cases, plenty of different proper-sized trees should always be at command, for the purpose of transplanting into bare fields, parks, and about naked new buildings, or into other situations where they may be most capable of imitating that charming tasteful negligence of nature which is so ravishingly pleasing to the senses. And that, in order to prepare the young trees for being thus transplanted when large, they should, it is said, be continued in the *feed-beds* for the space of two years and a half, and then be set out at greater distances, reducing the tap-roots considerably, but those of the lateral kind only sparingly. That as in such young trees the root grows faster than the stem, (as an oak-plant a foot and a half in height has sometimes a root four feet in length,) the necessity of mutilating the root, especially the tap one, in such cases, is clearly shewn, the plants then emitting radicles in every direction, grow faster than if the roots had remained perfect. And that if a plant, or tree, be transplanted in this state, it succeeds with greater certainty the more absorbent radicles are preserved to the root. When such trees have remained two years in the *nursery-beds*, they should be again removed, dressing their roots as before, and increasing the distance between them, when they may continue three or four years more. After which they may be put out in collections, where they are to remain for good, or until wanted for transplanting. That as in transplanting large trees, some large fibres of the roots are unavoidably broken and mutilated, and consequently the absorption of nutriment in the plant diminished, it is necessary that boughs answering to the destroyed roots should be cut away, in order to lessen the transpiration in proportion to the quantity of food that may be taken up.

The most proper and desirable sorts of trees for transplanting in this large state, are, it is conceived, the different sorts of elms, of which the English is the best, as it is most aspiring, and soonest recovers its wounds. The lime, too, will bear to be removed at a great size, as its wounds soon heal, and it may be formed into any shape desired. The oak, the beech, and the ash, will likewise bear to be removed when rather large, but they require more care in the work than the former: on the whole, those trees, the bark of which is the thinnest and smoothest, will be the most proper for this purpose. The hornbeam, the sycamore, the large-leaved maple, the sweet and horse-chestnut, and the laburnum, will all bear transplanting and removing, if they do not exceed fifteen or sixteen years' growth, and from twenty to twenty-five feet in height: if they are older and larger when this is done, they do not recover their wounds so perfectly as to become handsome trees. The larch and mountain-ash also bear transplanting and removing when large, but they should not exceed twelve years' growth. The balsam poplar of Canada, too, is a fine plant of the tree-kind, which is raised with much ease, is hardy, quick in its growth, and will bear to be transplanted and removed at a great size. And the crab-tree and white-thorn will suffer themselves to be transplanted at a large growth, when in a healthy and growing state; and that as few trees exceed them in beauty or fragrance in the spring season, or their rich

TRANSPLANTATION.

rich glow of fruit in the autumn, they may be transplanted out singly into lawns, fields, and parks, where, when judiciously interperfed with other trees, they may highly decorate fuch fituations. The elevation of ftately trees in clumps, parks, lawns, or fields, is confidered, on the whole, as having a moft agreeable effect, but that in new defigns they cannot often be had without waiting many years, and incurring much labour, difficulty, and expence. However, by means of the directions which have been given above, and the ufe of the tranfplanter for large trees, it is thought the difficulty may be greatly removed, and a figure befoon made, even in bare fields, parks, and about new-built houfes, without fuffering fuch inconveniences, which muft be a great inducement to fuch perfons as are advanced in life to have recourfe to the practice. See *TRANSPLANTER, Tree.*

In the work of preparing for the removal and tranfplanting of large tall foreft-trees, it is recommended as proper to dig a circular trench all round them two or three feet deep, as early as poffible in the fpring; by which many new roots will fhoot from thofe which have their ends cut off, and by which the balls of earth will be better held together, when the trees are removed in the fucceeding autumn; and, by their having previously produced fo many more fine radicles of the abforbent kind, be more certain of growing in their new fituations. After which, the firft ftep to be taken in the following autumn, is to mark out the places where the trees are to be removed and tranfplanted to, and there to dig pits three, four, five, or fix feet wide, having the depth of from twenty-four to thirty-fix inches, as the fize of the roots and balls of earth which hang about them may be. The top-foil in thefe diggings is to be thrown to the fides of the pits where the trees are to come, and the bottom or poor foil to the other fides. It this ftate the pits are to remain until the trees are nearly ready for removal, which is to be effected in this manner, and is the next ftep in the bufinefs. It is carefully to raife the trees which are to be the moft healthy, and fuch as are of the pyramidical form, with as many roots, herby fibres, and as much earth about them as poffible. This is to be accomplished by digging trenches round about them, two, three, or four feet from the bodies of the trees, as their fizes may be, and about three or four feet deep, floping them on the fides where the tranfplanter is to receive the trees. Then to bend the trees fo far to one fide, by the affiftance of ropes, that the bottom roots may be eafily got at, when they may be cut acrofs with a fharp hatchet, and the extremities smoothed, which have been fcattered, by a fharp hedging-bill, when rearing them upright again, bend them to the contrary fide, and drefs the roots in the fame way, then raife them up a fecond time, when they will be ready for tranfplanting. In which cafe, if it is directed that one fet of hands, as one, two, or three men, fhould fill the pits half full of water, the top-foil and other fresh mould being mixed with it to the confiftence of a thin puddle. That another fet of men, as two, four, fix, or eight hands, as the fizes of the trees may be, fhould rear up the tranfplanter of the trees againft them by means of the rope for the purpofe, balancing them properly by the machine, and leaving the fore-carriage part of it upon the ground, taking care to furround the places well with ftraw, where they reft upon the bars and bolts, in order to prevent the bark from being galled and rubbed off, which would greatly injure the trees. The whole fhould then be pulled and brought down together, in a gentle manner, by the rope for the purpofe; three or four men and a horfe being employed in the bufinefs, where neceffary, fteadying well the motion downwards, and at the

fame time a man or two are to guide the bolt of the machine into the fore-carriage, into which the horfes are then to be put, and the trees conveyed to the pits, which by this time will be ready for their reception. The carriage is then to be drawn up along that fide of the pits on which the top-foil was laid, backing it until it gets into fuch a poffition, that by rearing the machine and trees upright, as in loading, the root parts with the balls of earth about them, may be dropped exactly into the centres of the pits, amidft the puddle, which will fo run among and into the cavities of the balls hanging to the roots, as to furround and cover every fibre. The pits are then to be filled completely up, and a mound of earth raifed about a foot higher than the furface all round each of the trees to two or three feet diftant from the centres, hollowing it towards the trees, for the better reception and retention of moifture. After this, it is fuppofed the trees will be able to brave and defy the rudeft affaults of the winds, without any fupports, even at the firft tranfplanting out. In this manner, the whole bufinefs of tranfplanting large foreft-trees is to be proceeded in, and which has been found very fucefsful in a variety of trials.

In garden management, too, large old fruit-trees of both the wall, efpalier, and ftandard kinds have lately been found capable of being tranfplanted with great fucefs and advantage, when performed fomewhat in this fimple manner. When for large wall-trees, it is to be done by forming a half-circle for each in extent equal to the fize of the trees, as feven or eight feet for fuch as cover a large fpace, meafuring from the trunks of them; digging a trench round that three feet in width, and fix inches below the roots, carefully preferving the whole, and working out the earth from among them with a blunt tool, and cafting out the loofe mould by the fpade. Proceeding thus until got fully under the trees to be raifed. The roots are then to be tied loofely together, and the branches freed from the walls, and put in parcels to prevent their being injured. The trees are now to be conveyed to the places into which they are to be tranfplanted; where proper-fized pits, for allowing the roots to be fpread out and extended, are to be provided, placing them upright in them, ufig fresh earth alone or mixed with dung, and difpofing them, fo as that the furface roots may be equal with the top of the border in which they are put; then packing in the well-broken earth underneath, and for about a foot round the bottoms of the trunks, to fill all vacancies where the roots proceed from. After which, the whole of the perfect roots are to be attentively fpread out at full length, cutting off any dead, bruifed, or knotty parts; the ends of the remaining ones being smoothed and preferved at different lengths, keeping fome at full length, others at five, four, and three feet, and a few even at one foot long, taking care to fave as many of the fmall fibres attached to the leading roots as poffible; beginning by laying the whole out in fets or layers from the bottom at the wall-fide of the half-circle, in the fan manner, until the top be reached, arranging the fmall fibres in regular order, and covering the different layers of roots with two or three inches in thicknefs of mould, packing it in well by the hand, and never fetting the foot on the roots which have been covered. Proceeding in this way with each fide of the half-circle, until they meet in the middle part of it, raifing the whole with earth to the height of two inches above the level of the border; and above all applying three inches thick of good rotten dung. A full watering is then to be given, to fettle the earth about the roots. Boards are to be laid to prevent the roots being trodden upon in nail-

ing up the trees, the principal branches being only first secured, the whole being completed when the ground has fully settled.

The transplanting of espalier and standard trees only differs in this, that a full circle is to be dug round them.

The most proper seasons for transplanting large fruit-trees, are either in the beginning of the autumn, or just before the spring, in mild weather.

A great number of such large trees has been transplanted in this manner with complete success, some of which have borne half crops the first year afterwards, and others more, the fruit in most cases being greatly improved, as may be fully seen by consulting different papers on the subject in the volume of Horticultural Transactions already noticed.

For fruit-grounds, the young stocks for apple-tree plants are mostly in a proper state for transplanting out the second or third year of their growth. See STOCKS, APPLE, &c.

The transplantation of the blossom-buds of fruit and other trees has lately also been tried, by transferring the abundant buds of this sort, of one tree to the barren branches of others, which is said to be capable of being performed with facility, and perhaps considerable advantage, in some cases. Such buds of pear-trees, when inserted into the strong young shoots of old ones, may afford abundant crops of very fine pears, and be gained with little trouble. The buds of those pear-trees are the best which have been formed upon the bases of the abortive bunches of blossoms of the preceding year; and that, instead of taking out the wood of the bud wholly, as is usual, it is most advantageous to let it remain in small quantities, only paring it very thin. See a Paper in the London Horticultural Transactions, vol. ii.

TRANSPLANTATION of *Flower-Plants*, among *Florists*, the means of putting out and managing the different sorts of young plants of this kind. Work of this sort should always be performed according to the particular nature and habits of growth of the several kinds of these plants. In the auricula, the polyanthus, and different other similar kinds, the transplanting is often done early in the spring season by some; while others perform it annually about the beginning of the autumnal season, especially for the first of these sorts; but probably the most suitable period is that about the beginning of the first of the above seasons, when the weather is rather showery, though it may often be performed later with good success. Those plants designed for very strong blooming, should, however, never be transplanted, either early in the spring or too late in the summer, as they always require to get well-rooted before the winter season sets in. But notwithstanding the young offsets and other plants are to be transplanted in the above manner into their small pots, the large strong-blowing roots are not to be transplanted or removed more frequently than once in every two or three years, as the risk of having fine strong flowers is otherwise very great, as plants of this sort never thrive in a right manner, until their roots have reached the sides of the pots, which rarely happens in so short a time as twelve months; but a difference is to be made, in performing this sort of work, between the plants which throw out suckers or offsets in great abundance, and such as do not; as the former require more frequent transplanting, all or most of such parts being carefully pared off and removed at the time; while in the latter it need not be so often. Where plants of strong superior bloom for increase are wanted, it is of material consequence to keep all such suckers and offsets from growing on the stocks of the old plants *without* fibres, they being kept constantly well rubbed off while of very small

sizes, but those that rise from below the surface of the earth need not be so much regarded.

It is thought by some, that the large healthy strong blooming plants of this sort need not be removed or transplanted, and have the earth shaken wholly from their roots every year, as is the usual practice; as they have been found to do better without, by having occasional fresh earthings without removing them from the pots in some late trials. They should not, however, remain longer in this way than the third year. Florists in general have, it is supposed, been too fond of frequently transplanting or removing the large blooming plants of this sort, as once in two, or not more than three years, will be found sufficient, and more beneficial. The plants of this large blooming kind are not by any means to be transplanted or removed in dry hot times, as by shaking the mould cleanly from the roots of the plants, fresh fibres will not be freely drawn, unless the season be inclined to be showery, and there be what is termed a cool moist state of the air. Fine young maiden plants may, however, sometimes be transplanted into small pots in such dry weather, being slipped out of the pots with the whole balls of earth about them, and then immediately replanted in full-sized blooming pots for the ensuing season. In short, in transplanting these as well as many other sorts of flower-plants, much must always depend upon the state and condition in which the plants are found.

Where the plants of this kind have not been transplanted for some length of time, as two or three years, the small roots having filled the pots, the large, the tap, or the carrot root, as it is often termed, may have become so long as to stand in need of shortening by taking it out of the pot, shaking the earth away from it, and doing what is necessary, as by remaining too long it either gets rotten at the end, and constantly keeps the plant weak, or becomes too long for a common pot; besides, it wants shifting or transplanting every year, and never produces fine strong flowers. The small roots are to be reduced to about a dozen, those nearest the leaves being left for supporting the plants. Where there is any canker or rotteness in the root, it is to be cut to the quick or quite sound parts, and the wounded part secured by the use of a composition made of bees-wax, turpentine, and white resin, and be made to crust over by exposure to the sun. Where large blooming or other plants of this sort to be removed have been in the pots only one year since the last transplanting, they are to be slipped out of the pots, with all the earth about them; and as the roots will be small and but little matted, it need not be shaken from them, only cutting it and the fibres of the roots down to a small ball in each plant, according to their ages and sizes. Some, however, do not like this method, but remove all the earth in transplanting them.

Different other fine flower-plants are to be managed somewhat in the manner which has been thus laid down in transplanting them, as the differences of their nature and habits may direct, only they will, for the most part, seldom require so many transplantations; indeed once or twice will almost always be as many as are necessary for them.

TRANSPLANTED or *Ground Onion*, in *Gardening*, a new sort of root of this kind lately brought from Egypt, and introduced into the northern parts of this island by Mr. J. Burn, captain in the royal navy, whence it is sometimes called by that name.

The manner of its cultivation, uses, and advantages, are thus described in a paper in the Scotch Horticultural Memoirs. The roots, being separated from the branches in which they grow, should be put out or transplanted into any

any ground that is considered suitable for the common root of this sort, the soil being first well prepared and enriched by the use of horse-dung in a reduced state; the plants or roots are then to be covered with only about one inch in depth of earth. The best and most proper time for the putting them out or transplanting them is during the month of April. They should be put about a foot or eighteen inches asunder. They grow and are produced in clusters, somewhat in the manner of the bunches of grapes or currants; some growing in a round, others in a conical form or shape; those on the surface being the largest, while those in the centre are usually the soonest ripe. It is necessary that they should be taken up as they ripen, and when they are intended for keeping, they may be taken up rather before they are completely ripe.

It was found that two roots, the tops of which had begun to decay in the beginning of August, and which had been raised from the ground in the beginning of the following month, produced, in one case, nine onions, and in the other twelve. The onions in these cases were of very different sizes, but the whole, when taken together, weighed more than a pound. Twenty-three onions of this sort, when planted out, are however said, in another instance, to have produced upwards of six hundred fine plants at the same time.

The circumstance in which this sort chiefly differs from the common Deptford and Strasburgh seed-kinds is, that it is larger, as in taste the quality is much the same. But it has, it is said, a material advantage over the seed-onion in this particular, that if planted about the middle of April, it will be fully ripe about the same time in the following September. Besides, it is not liable to accidents from any badness, imperfection, or too moist or too dry seasons, as is often the case in the common seed-onion. Another great advantage the transplanted or ground onion has over the seed sort is, that no instance has yet occurred where it has been injured by vermin or insects, which is frequently the case with the seed-kind.

This sort of onion would seem on several accounts to deserve further attention to its cultivation and growth in this very uncertain climate for the common crops of such roots.

TRANSPLANTER, TREE, in *Agriculture and Gardening*, a machine or contrivance constructed for the purpose of assisting and facilitating the means of transplanting and removing trees of large growths and sizes.

A very simple and useful contrivance or machine of this kind has been given by Mr. Amos in his practical work on "Agriculture and Planting," with a correct representation of the same. It is simply composed of the two hind and the two fore-wheels and carriage part of a farm-waggon, with a platform, and diagonal frame raised and erected upon them so as to be capable of receiving the tree, and of retaining it in a firm, steady position, until it be conveyed to the place where it is wanted to be replanted, when it can be let down with great ease and readiness into the hole where it is to be set and grow.

Much facility and dispatch are given in replanting large trees by machinery of this kind for ornament or other uses. See **TRANSPORTATION**.

TRANSPORT-SHIP, is a vessel used to convey provisions, warlike stores, soldiers, &c. from one place to another; also convicts over the seas.

TRANSPORTATION, the act of conveying or carrying a thing from one place or country to another.

In matters of commerce, transportation is of equal import with re-exportation, *viz.* the taking up of commodities in

one foreign state or kingdom, bringing them hither, and paying duties for them; and then conveying them into some other foreign state: by which it is distinguished from importation and exportation; where the commodities are either carried originally out of, or brought finally into, our own kingdom.

TRANSPORTATION, in *Law*, is also a kind of punishment, or, more properly, an alleviation or commutation of punishment, for criminals convicted of felony; who, for the first offence, unless it be an extraordinary one, are ordinarily transported to some foreign country for a term of years, or for life; within which, if they return, they are executed without farther trial than ascertaining their identity.

This is made felony without benefit of clergy by statutes 4 Geo. I. cap. 11. 6 Geo. I. cap. 23. 16 Geo. II. cap. 15. and 8 Geo. III. cap. 15; as is also the assisting transports to escape from such as are conveying them to the port of transportation.

Exile and transportation are punishments at present unknown to the common law; and whenever the latter is now inflicted, it is either by the choice of the criminal himself, to escape a capital punishment, or else by the express direction of some modern act of parliament. Accordingly, it was enacted by the statutes 4 Geo. I. cap. 11, and 6 Geo. I. cap. 23, that when any persons shall be convicted of any larceny or felony, who by the law shall be entitled to the benefit of clergy, and liable only to the penalties of burning in the hand or whipping, the court in their discretion, instead of such burning in the hand or whipping, may direct such offenders to be transported to America (or, by statute 19 Geo. III. cap. 74, to any other parts beyond the seas) for seven years. And by the subsequent statutes 16 Geo. II. cap. 15, and 8 Geo. III. cap. 15, many wise provisions are made for the more speedy and effectual execution of the laws relating to transportation, and the conviction of such as transgress them. But now, by the statute 19 Geo. III. cap. 74, all offenders liable to transportation may, in lieu thereof, at the discretion of the judges, be employed, if males (except in the case of petty larceny) in hard labour for the benefit of some public navigation; or, whether males or females, may, in all cases, be confined to hard labour in certain penitentiary houses, to be erected by virtue of the said act, for the several terms therein specified, but in no case exceeding seven years; with a power of subsequent mitigation, and even of reward, in case of their good behaviour: but if they escape and are retaken, for the first time an addition of three years is made to the term of their confinement; and a second escape is felony without benefit of clergy.

Transportation is said to have been first inflicted as a punishment by 39 Eliz. cap. 4. Blackst. Com. vol. iv.

TRANSPORTATION of Plants, is the removal of them from one country to another: with respect to which great caution is necessary. The plants sent from a hotter country to a colder should be transported in the spring of the year, that the heat of the season may be advancing as they approach the colder climates; and, on the contrary, those which are sent from a colder country to a hotter should be sent in the beginning of winter.

The best way of packing up plants for a voyage, if they be such as will not bear keeping out of the earth, is to have boxes with handles, and holes bored in their bottoms to let out the moisture, filling them with earth, and planting the roots as close together as may be; the plants should be set in these boxes a fortnight or three weeks before they are to be put on board, and in good weather they

they should be set upon the deck, and in bad removed or covered with a tarpaulin.

If they are going from a hotter country to a colder one, they must have very little moisture; if, on the contrary, they are going from a colder to a warmer, they may be allowed water more largely, and being shaded from the heat of the sun, they will come safe.

Very many plants, however, will live out of the earth a great while; as the sedums, euphorbiums, ficoides, and other succulent ones. These need no other care than the packing them up with moss in a close box; and there should be a little hay put between them, to prevent them from wounding or bruising one another, and holes bored in the boxes, to keep them from heating and putrefying. In this manner they will come safe from a voyage of two or three, or even four or five months.

Several trees also will come safely in the same manner, taking them up at a season when they have done growing, and packing them up with moss. Of this sort are oranges, olives, capers, jasmines, and pomegranate-trees. These, and many others, are annually brought over thus from Italy; and though they are three or four months in the passage, seldom miscarry. And the best way of sending over seeds, is in their natural husks, in a bag, or packed up in a gourd-shell, keeping them dry, and out of the way of vermin. Miller. See SEED.

Those who are desirous of particular instructions with regard to the best means of collecting both seeds and plants in distant countries, and of preserving them during a voyage hither in a vegetating state, may consult Mr. Ellis's Directions for bringing over Seeds and Plants from the East Indies, and other distant Countries, in a State of Vegetation, &c. 4to. 1770.

TRANSPORTING, in *Sea Language*, the act of removing a ship from one place to another, by the help of anchors and ropes. See WARP.

TRANSPPOSITION, in *Algebra*, the bringing any term of an equation over to the other side.

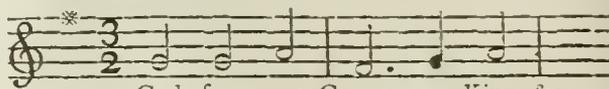
Thus, if $a + b = c$, and you may make $a = c - b$; b is said to be transposed. See REDUCTION of Equations.

TRANSPPOSITION, in *Grammar*, a disturbing or dislocating of the words in a discourse; or a changing of their natural order of construction, to please the ear, by rendering the contexture more easy, smooth, and harmonious. A transposition, which renders the sense perplexed, is vicious. The construction of the ancient languages, being much more artful than that of the modern ones, allowed of much greater, and more frequent transpositions. The English, French, &c. scarcely ever allow of them but in oratory and poetry; in which cases, they serve to give a force and energy to the discourse, or the verse, and to prevent their languishing.

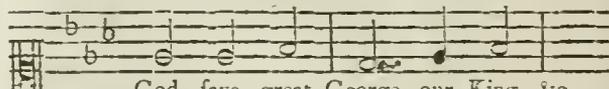
TRANSPPOSITION, in *Music*. We will venture to say, from long experience, that no musician can transpose at sight, with certainty and firmness, but by a perfect knowledge of all the clefs necessary to change any one of the seven notes in music to any other we please. (See CLEFS.) This was Dr. Pepusch's method of teaching transposition, though not very clearly explained in his treatise; and Mr. Galliard's method, which he has made perfectly intelligible by a plate, in his translation of Tosi. Cerone, in 1614, seems to have been the inventor of this method. See CERONE.

The transposer, besides changing the notes higher or lower by imaginary clefs, without changing their original places on the staff, must likewise know what sharps and flats belong to every key. If, for instance, we wanted to transpose our national supplication of "God save great George

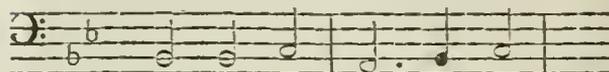
our King!" from G natural to Eb, a major third lower, we have only to imagine a clef that will make the second line E, which is the soprano, or tenor clef, on the first line. If, again, a singer wished to have this favourite air a third higher than G, which is Bb, the base clef with two flats will render all the notes, which with the treble clef were in G, a minor third higher.



God save great George our King, &c.



God save great George our King, &c.



God save great George our King, &c.

Now to render G on the fourth space in the base Eb, we have only to suppose the treble clef in the accompaniment instead of the base. And to render the fourth space Bb instead of G natural, we have only to imagine the base clef on the third line with two flats, instead of the fourth with one sharp.

TRANS-RART, in *Geography*, a town of Algiers, near the coast of the Mediterranean, on a gulf called the Immisea; 30 miles S.W. of Oran.

TRANSTRAND, a town of Sweden, in Dalecarlia; 80 miles N.W. of Fahlun.

TRANSTRUM, in the *Naval Architecture of the Ancients*, a term used to express a sort of cross or transverse seats that were placed in the polycrote galleys of those times, and served for the places of several of the rows of men, who could move and work their oars under the seats of the other or lateral rowers of the next tire.

Meibomius, who has written expressly on the naval architecture of the ancients, has better understood the places and use of these transtra, than any other author of late times; by a proper arrangement of these seats, and the lateral ones above and below each, he has taken off greatly from the height allowed by Scaliger, and others, to the polycrote vessels.

TRANSUBSTANTIATION, TRANSUBSTANTIATIO, in the *Roman Theology*, the supposed conversion or change of the substance of the bread and wine, in the eucharist, into the body and blood of Jesus Christ.

Transubstantiation, taken in its general and literal sense, implies any change of one substance into another. Thus, the change of Moses's rod into a serpent; of the waters of the Nile into blood; of Lot's wife into a pillar of salt; were preternatural transubstantiations: and the change of the food we eat into the substance of our bodies, is a natural transubstantiation.

But the word, in its proper and technical sense, is restrained to the miraculous change which the Romish church holds is wrought in the sacrament, by the consecration of the priest.

One of the great articles of that church, rejected by the reformed, is that of transubstantiation; the latter maintaining the transubstantiation to be only figurative, and the former affirming it to be real.

The reformed interpret *est, is*, in the text *Hoc est corpus meum, This is my body*, by *significat, q. d. This signifies my body*.

body: but the council of Trent stand up strenuously for the literal sense of the verb. Thus, in can. 1. sess. 13. of that council, it is expressly decreed, that, in transubstantiation, the body and blood of our Lord Jesus Christ are truly, really, and substantially, under the species of bread and wine.

It is added, that by *truly*, we mean *properly*; and not only by signification, as if the eucharist were no more than a sign of the body and blood of Jesus Christ: that by *really*, we mean *in fact*, and not only in figure, as if the eucharist were only a figure and representation of the body and blood of the Saviour of the world; and that by *substantially*, we mean *in substance*, and not only in virtue and energy. Thus is *truly* opposed to a simple sign, *really* to a figure, and *substantially* to energy or virtue.

This doctrine was established in the fourth general Lateran council, under pope Innocent III., in 1215, who is said to have introduced and established the use of the term transubstantiation, which was hitherto absolutely unknown; though some say that Stephen, bishop of Autun, first used this term. Burnet on the Articles, p. 312.

It was principally owing to the authority of Lanfranc, the principal champion of this new doctrine against Berengarius, supported by Rome, that so strange a tenet was established in the eleventh century, both in England and France. At the beginning of this century it was unknown to the church of England, as is incontestably proved by the epistles and canons of Ælfric, archbishop of Canterbury, and by the prayers and homilies used at that time.

It seems difficult, at first sight, to account for the zeal of the see of Rome in advancing and propagating a doctrine so full of absurdity as that of transubstantiation. What use, it may be said, could there be in understanding a figurative expression (with which manner of speaking the Scripture so much abounds) according to the letter, which makes it nonsense; when that nonsense does not appear to be productive either of power or profit to the church? The supremacy and infallibility of the bishops of Rome; the doctrine of purgatory, masses, and prayers for the dead; the worship of saints and images; the celibacy of the clergy; the merit of monastic vows; the necessity of confession to, and absolution by a priest, for the remission of sins; the power of the pope to grant indulgences, and apply to the benefit of other men the works of supererogation done by saints, and therefore belonging to the treasury of the church: all these opinions have a clear and evident tendency to raise and support the dominion and wealth of the Roman see and the clergy: whereas the multiplied contradictions and impossibilities contained in the notion of transubstantiation, seem to serve no purpose, but to expose the Christian faith to the ridicule and contempt of the Jews and Mahometans, or other unbelievers. Nevertheless, the solution of this difficulty may be found in the words of pope Paschal II. *viz.* "That it was a most execrable thing, that those hands, which had received such eminent power above what had been granted to the angels themselves, as, by their ministry to create God the creator of all, and offer up the same God, before the face of God the Father, for the redemption and salvation of the whole world, should descend to such ignominy, as to be put, in sign of subjection, in the hands of princes, &c."

The same words were also used by pope Urban II. at the council of Bari. And certainly nothing could so raise the idea of the priesthood, or produce such veneration for them in the minds of the people, as their being supposed to possess this more than angelical power. Lyttelton's Hist. of King Henry II., vol. i.

TRANSUBSTANTIATION, *Declaration against*. See DECLARATION.

TRANSVERSALIS COLLIS, *transversaire grêle*, in *Anatomy*, a small narrow muscle, placed at the lower and lateral part of the neck, and upper part of the back, where it extends from the transverse processes of the five or six lower cervical vertebræ, to the corresponding processes of four or five dorsal vertebræ after the second. The splenius, levator scapulæ, sacrolumbalis, and longissimus dorsi, cover it behind, where it is inseparably connected to the two latter: it lies upon the trachelo-mastoideus, to which it is also intimately connected, the complexus, and multifidus spinæ. The front edge of the muscle is attached to the cervical transverse processes already mentioned: it passes over those of the two first dorsal vertebræ, and is then attached to the transverse processes of the four or five following ones. These attachments are effected by slender tendons, connected with those of the splenius, levator scapulæ, and multifidus spinæ. It will extend the neck on the back; or, if the muscle of one side acts separately, it will incline the neck to its own side.

TRANSVERSE, something that goes across another from corner to corner.

Thus bends and bars, in heraldry, are transverse pieces, or bearings: the diagonals of a parallelogram, or a square, are transverse lines.

Lines which make intersections with perpendiculars, are also called oblique or transverse lines.

TRANSVERSE Axis, or *Diameter*, called also the *first* or *principal axis*. See AXIS, DIAMETER, and LATUS-*Transversum*.

The transverse axis of an ellipsis is the longer axis, or that which transverses it lengthwise, in contradistinction from the conjugate one. See CONIC Sections, and ELLIPSE.

For the transverse axis of the hyperbola, see CONIC Sections, and HYPERBOLA.

TRANSVERSO-SPINALIS, in *Anatomy*, a name sometimes given to the multifidus spinæ. See MULTIFIDUS.

TRANSVERSUS ABDOMINIS, a broad muscle of the abdomen. See OBLIQUUS.

TRANSVERSUS *Nasii*, a synonyme of the constrictor narium. See NOSE.

TRANSVERSUS *Pedis*, *transversal des orteils*, a small muscle lying across the foot, immediately under the heads of the metatarsal bones, and extending from the four last of these bones to the first phalanx of the great toe. It is thin and fleshy; covered above by the metatarsal bones and interossei muscles, and covering below the flexor tendons, arteries and nerves of the toes. It arises from the heads of the four last metatarsal bones, and is inserted, together with the tendon of the adductor pollicis pedis, in the outside of the basis of the first phalanx of the great toe. It will approximate the great toe to the others; and by drawing the toes together, from side to side, will render the foot concave.

TRANSVERSUS *Perinei*, } two muscles of the pe-
TRANSVERSUS *Perinei Alter*, } rineum, of which the
former is connected to the end of the large intestine. See
INTESTINE.

TRANSUM, in *Gunnery*, is a piece of wood which goes across the checks of a gun-carriage, or of a gun, to keep them fixed together: each transum in a carriage is strengthened by a bolt of iron. See CARRIAGE.

TRANSUMPTION, TRANSUMPTIO, in the *Schools*, a syllogism by concession or agreement, used where a question proposed is transferred to another, with this condition, that the proof of this latter shall be admitted for a proof of the former.

Thus Aristotle, in his book *De Cælo*, undertaking to shew, that all the stars are round, transfers the question to the moon, and proves her rotundity from her increasing and waning; supposing it a thing admitted by his opponents, that the stars are all alike.

TRANSYLVANIA, *Principality of*, in *Geography*, a country of Europe, bounded on the N. by Hungary, Poland, and Moldavia; on the E. by Moldavia; on the S. by Walachia and the bannat of Temeswar; and on the W. by Hungary. The form is nearly oval, about 400 miles in circumference. It is surrounded on all sides by lofty mountains, and is itself mountainous and woody; the mountains run from N. to S., and branch off likewise E. and W., and terminate at the centre, in hills covered with vineyards, and abundant in minerals. The air is generally warm, but more wholesome than that of Hungary; the soil is fertile, abounding in corn; flax of a very good quality, which is manufactured into linen; wine, cattle, and rich pastures: among the minerals are gold, silver, copper, iron, quicksilver, cinabar, antimony, sulphur, vitriol, rock-salt, salt-petre, ochre, &c. The principal quadrupeds are buffaloes, horses, wild asses, elks, bears, wild boars, linxes, chamois, martens, ermines, and beavers. The inhabitants are composed of different nations: Hungarians, Sikli or Scythian Huns, Saxons, Walachians, Armenians, Rascians, Bulgarians, and Greeks; to which may be added Jews and Cingars, who live in tents, and lead a vagabond life like gypsies. This country is by the Germans called Siebenbergen, and by the Hungarians Erdely. It was anciently a part of Dacia; and, conquered by Trajan, it became a Roman province. It afterwards fell into the hands of the Goths, Huns, and afterwards the Hungarians. In the year 1004, it was first made a province of Hungary, and continued under the government of a waiwode to the year 1526, when two rival princes contended for this principality; one of them was supported by the German emperor, and the other by the Turks; whereupon this country became the seat of war for many years. The princes of the house of Ragotski were at the head of the Protestant faction, and supported by the Turks, but being at length obliged to quit Transylvania by the Austrians, Ragotski fled for refuge into Turkey; and at the treaty of Carlowitz in 1699, this country was confirmed to the house of Austria by the Turks. The government of Transylvania is wholly different from that of Hungary; and, by the joint consent of prince and people, formed into an aristocratical government; and, since the year 1722, rendered hereditary to the princes and princesses of the house of Austria. Formerly the prince of Transylvania succeeded to the government by free election, but since the year 1722 by inheritance; and though his power is connected with that of the king of Hungary, and archduke of Austria, yet his government and privileges differ from both. The states of Transylvania, with respect to the number of its nations, are divided into Hungarians, Siculi, and Saxons; with respect to its different religions, into Catholics, Calvinists, and Lutherans; and formerly, also, into Unitarians: but, politically, after the example of Hungary, into prelates, nobility, gentry, and royal towns. The magnates consist of the great officers of state, the counts and barons. The gentry are Hungarians and Siculi, but the royal towns Saxons only. The nobility are generally very proud, and keep their peasantry in a state of slavery; four out of six days in the week the peasant is obliged to labour for his master, having only the remaining two days for himself. The principality of Transylvania is governed in the name of the prince and nobility, by the diet,

the office of state, the royal government, the exchequer, the assembly of Hungarian counts, the tribunals of justice, and the magistrates of the Siculi and Saxons. The diets meet by summons from the prince at Hermanstadt. The revenue arises from the contributions, customs, metals, minerals, rock-salt, royal demesnes, escheats, and confiscations; and are levied by the treasury. This province pays to the emperor in taxes of all kinds 1,500,000 florins annually, which is chiefly imposed upon the land, for the payment of the citizens is very trifling. Transylvania formerly could bring from 80,000 to 90,000 soldiers into the field; but at present the whole force of that principality consists of six regiments, under a commander-in-chief, for the defence of the country.

TRANTERY, in some *Customs*, denotes the money arising by amerciements of ale-sellers and victuallers for breaking the assize of bread and ale; particularly at Luston, and other manors in Herefordshire.

TRAP, in *Geography*, a town of Maryland; 7 miles S.E. of Oxford.—Also, a town of Maryland; 7 miles S.W. of Salisbury.

TRAP, in *Geology*, a class or family of rocks, characterized by the tendency to assume a columnar shape, or to divide into steps forming natural terraces. The name is originally derived from the Swedish word *trappa*, a step. It was called by Wallerius *cornæus trapezius*.

Rocks of the trap family are very extensively spread over the globe, and no question in geology has excited greater attention than that respecting the mode of their formation. The near resemblance which many of these rocks bear to compact lava, the remarkable position in which they frequently occur, the regularity of their structure, and the changes which the rocks in their vicinity have evidently undergone, induce many geologists to ascribe to them an igneous origin; other geologists strenuously contend, that all trap-rocks have been originally formed by depositions from an aqueous fluid. Before detailing the facts in favour of these different hypotheses, it will be proper to describe the rocks which are comprised in the trap-formation. The earlier geologists have frequently applied the term trap indefinitely to a great variety of rocks, and the distinction made between trap and the rocks which the French mineralogists have denominated *cornéene*, is extremely vague.

The *roche de corne*, so frequently mentioned by Saussure, according to Brongniart is a trap-rock in the Wernerian acceptation of the term. Werner, according to Mr. Jamefon, restricts the term trap to rocks principally characterized by the presence of hornblende and black iron-clay; yet the same author informs us, in the following paragraph, that in the oldest or primitive trap, no iron-clay whatever occurs. Jamefon's *Mineralogy*, vol. ii. p. 129.

The presence of hornblende and felspar, or augite and felspar, would have formed a more accurate and comprehensive definition of the constituents of trap-rocks, or of those rocks which are comprised by Werner in the trap-formation.

M. le Cordier, in an interesting memoir presented to the National Institute in 1815, asserts, that in the trap-rocks which are supposed to be of igneous origin, and in volcanic rocks, hornblende is extremely rare, but its place is supplied by augite, which has been mistaken for hornblende. The constituent parts of these two minerals are the same, and the proportions in which they combine do not greatly vary, so that considerable doubt has existed whether they should not be classed as the same species, notwith-

notwithstanding the difference of their crystallization. Be this as it may, we consider it to be a question yet undecided, whether augite (*pyroxene* of Haüy) is confined to rocks of undoubted igneous origin, though Cordier, in the memoir before alluded to, has proved that this mineral is a constituent part of a considerable number of lavas, and of many rocks denominated trap; and we know that this opinion is further confirmed by the extensive observations of that eminent geologist Von Buch.

The classification of trap-rocks adopted by Werner having been extensively admitted, we shall endeavour to state it as concisely as is consistent with perspicuity. He divides trap-rocks into three formations: primitive trap, transition trap, and the newest flötz trap.

Primitive trap is almost always distinguished by a great predominance of hornblende, so that some of these rocks are entirely composed of this mineral, or nearly so. There are three principal species of primitive trap; common hornblende-rock, hornblende mixed with felspar, and hornblende mixed with mica.

Common hornblende-rock is principally composed of hornblende: it contains two subordinate kinds, granular hornblende-rock and hornblende-slate; the latter differs from the first in having a slaty structure. Hornblende-slate passes sometimes into gneiss, and sometimes into talcous slate. (See GNEISS, and TALCOUS SLATE.) These two kinds of hornblende-rock occur in gneiss and mica-slate, forming beds which are but few in number, and of inconsiderable magnitude; but in clay-slate they occur frequently, and in very thick beds.

Hornblende mixed with felspar. This species Werner divides into two subordinate kinds; greenstone and greenstone-slate. The term greenstone (*grunstein*, German) is used by Werner to denote a rock composed of crystals of felspar and hornblende, and nearly resembling sienite (see SIENITE); but in greenstone the hornblende generally predominates, and the felspar is commonly white, whereas in sienite it is red. When the greenstone includes large crystals of felspar, it is denominated porphyritic greenstone. When the granular basis is very fine, it is called greenstone porphyry. According to Mr. Jameſon, this is the black porphyry of the ancients. When the granular nature of the base is no longer visible to the naked eye, it has a blackish green colour, and includes crystals of compact felspar. It is the *porphyre verte*, or antique green porphyry of sculptors.

Greenstone-slate is composed of hornblende and compact felspar, and has a distinct slaty structure. The felspar is generally more abundant than the hornblende, and it sometimes contains scales of mica. It occurs in great beds and masses in clay-slate.

Hornblende mixed with mica is the third species of primitive trap: it is composed of an intimate intermixture of hornblende and felspar, and includes scales of mica. It occurs in beds in gneiss and mica-slate. Jameſon's Mineral. vol. iii.

Transition trap is divided into transition greenstone and transition amygdaloid; but it does not appear that these rocks have any very distinct character to distinguish them from the greenstone and amygdaloid of the other trap-formations. According to Mr. Jameſon, transition greenstone is a fine granular mixture of hornblende and felspar; but some of the primitive and flötz greenstones are also described by the same geologist as being finely granular. Transition amygdaloid is stated to have a base of wacke, (see WACKE,) and approaches more or less to the nature of greenstone, sometimes inclining to basalt, and sometimes to iron-clay.

The vesicles are filled with clay, or with chalcedony and agate: it alternates with transition lime-stone.

The newest flötz trap-rocks of Werner comprise greenstone, basalt, wacke, porphyry-slate or clink-stone porphyry, trap-tuff, greystone, amygdaloid, with compact felspar and clay-stone. He also includes pearl-stone, pitch-stone, obsidian, and pumice in this formation of trap. (See the various articles here enumerated.) It is these rocks, which Werner calls the newest flötz trap, that present the strongest indications of their igneous origin; and some of the substances here enumerated, such as obsidian and pumice, are now generally classed with volcanic products.

Some geologists are of opinion, that there is no foundation in nature for the division of trap-rocks into three distinct formations, introduced by Werner.

There are, however, certain peculiarities of position, which seem to indicate a difference in the mode of formation between the trap-rocks that occur imbedded in other rocks, and those which cover the secondary strata. To form a more distinct idea of this, we must refer to the general structure of the surface of the globe. The beds of rock which form the crust of the globe, are commonly arranged over each other in what is denominated a conformable position, as represented *Plate II. Geology, fig. 6.* where G is the foundation, or lowest rock, on which the different beds *a, b, c,* and *d* are laid, and may be supposed to cover the mountain with a general conformity to the shape of the lower rock. This is more distinctly seen in the same plate (*fig. 3.*), where the upper beds have the same elevations, depressions, and undulations as those of the lower. The other position in which rocks occur, is called unconformable. "If a thick stream of lava, as frequently happens, were to flow over a range of conformable rocks, filling up the cavities and inequalities of the surface, when it hardens by cooling, it would form a bed of *superincumbent unconformable rock.* Such instances are common in volcanic countries. Very extensive ranges of rocks occur in this position in various parts of the world, covering not only the primary, but the secondary rocks. These unconformable rocks, composed of different kinds of trap, porphyry, and sienite, frequently assume the columnar structure, and form vast ranges of natural pillars, as at Staffa and many of the Hebrides, on the northern coast of Ireland, and in Iceland, Sicily, and various volcanic countries. Now whatever theory we adopt respecting the formation of unconformable rocks in this position, we must admit that they are of more recent origin than the rocks which they cover; the lower rocks must have been hard and unyielding, when the upper were thrown upon them." Bakewell's Introduction to Geology.

The unconformable position of basaltic rocks, or rocks of the trap-formation, is represented *Plate IV. Geology, fig. 2.* *a, a, a,* being a series of regularly stratified rocks, covered by a mass of unconformable basalt, *b b.* The trap in this position is often divided into distinct beds, some of which are columnar, as represented at *c c,* and these columnar beds are frequently separated by beds of compact trap.

Masses of trap also occur, forming perpendicular walls (called *dykes* in the northern part of England): these intersect the strata and frequently change their position, as represented *Plate II. Geology, fig. 8.* where a series of strata *a, b, c, d, e, f, g,* which were once continuous, are broken by a dyke of basalt. The similar letters on each side of the dyke represent the same stratum, as *d d, e e,* broken by the intervention of the basalt. In such instances, the strata in the immediate vicinity of the basalt have undergone a considerable degree of change; and where the stratum *e e* is coal, it is frequently found converted into

coak, or charred for some distance on each side of the basalt. These walls or dykes of trap are sometimes twenty, thirty, or even a hundred yards or more in thickness, and sometimes range along through very extensive districts: indeed there is reason to believe that many mountains of trap which are arranged in one line along a country, have been originally dykes of enormous magnitude, through which vallies have been excavated by diluvial currents, by partial subsidence, and by other agents which have in former ages changed the surface of our present continents. See VEINS, *Mineral*.

Independently of theoretical opinions respecting the formation of trap-rocks, it is obvious that the masses of unconformable overlying trap, and also the trap or whin-stone in dykes, must be of posterior date to the rocks which they cover or intersect; whereas the hornblende-rock or primitive trap which is imbedded in gneiss, mica-slate, or clay-slate, must be coeval with the rocks in which it occurs; and the same is equally obvious with respect to trap-rocks alternating with secondary strata. Trap or basalt sometimes occurs in globular masses composed of concentric spheres, or of prisms of basalt in a radiated diverging form. The spheroidal basalt with concentric layers, frequently incloses in its centre a mass of basalt similar to that which envelopes it; but sometimes the central mass is of a harder kind, or is a fragment of some other stone, as of shelly lime-stone. Many trap-rocks, in decomposing, present a spheroidal structure which was not before visible in the mass; and it is observed, that the balls of basalt which fall out or remain when the rock is decomposed, are harder than the main body of the rock. This is the case with the basalt at Rowley in Staffordshire, called Rowley Rag. See ROWLEY RAG.

The spheroidal structure is however not peculiar to basaltic rocks. Rocks of granite, in decomposing, sometimes present globular masses of harder granite imbedded in the mass.

In columnar trap we find the columns of all sizes, from a few inches to two hundred and fifty feet in length. The form of the prism or column is also various, and more or less regular, having generally three, four, or five sides: the latter or pentagonal form is the most common. The diameter of the larger columns is frequently four or five feet, or more, and sometimes is nearly equal to the height.

Rocks of the trap-formation are also frequently observed to form conical mountains, or to occur as detached masses on caps on the summits of other hills, and to occur at nearly the same level as represented *Plate IV. Geology, fig. 3. c, d, and e*. In such instances, it seems probable that the different caps have originally formed parts of one continuous bed, which has been broken either by the excavation of currents, by subsidence of the intermediate parts, or by the elevation of the hills from their primeval position.

The columnar structure and the overlying position so remarkable in trap-rocks, are also common to some kinds of porphyry, and to sienite, which are not included by geologists among trap-rocks, but to which they bear a near affinity. To take a just and enlarged view of this class of rocks, we must leave the minute subdivisions and classifications of cabinet philosophers, and contemplate the natural relations which these rocks have to each other, and the gradations which may be traced between mountain masses possessing great difference in their external appearance. Hornblende or augite forms an essential part of almost all trap-rocks, as well as rocks of undoubted volcanic origin. Now these minerals, though classed by mineralogists as two distinct species, are so nearly alike in their constituent parts, that we may consider them as identical, when they existed in

a fluid state in the matter of the rocks of which they form a part. Circumstances of minor import may easily be conceived to have changed the form of their crystals, as we know by experiment the slight causes which occasion varieties of form in the crystallization of the same constituent ingredients in our laboratories. The constituents of hornblende and of augite, are silica, alumina, lime, magnesia, iron, manganese, and a trace of potash: the proportions of each, which exist in the two minerals, do not vary more than the proportions which exist in substances classed by Haüy with hornblende, or between varieties of the same species in many other minerals.

We may regard then, in a geological view, the constituents of hornblende and augite as forming the same mineral, under whatever crystalline forms they may present themselves in rocks. It is this substance which forms the connecting link between granite, trap-rocks, and lava. Hornblende enters as a constituent part into many rocks of granite. According to Patrin, masses and veins of granite occur in hornblende-rocks, and masses and veins of hornblende in granite-rocks, in the Altaian mountains. Hornblende is found in some of the granites of the Higher Alps: it exists abundantly in most rocks of gneiss, which is only a laminated granite. When the hornblende in granite increases in quantity, so as to form a considerable part of the mass, the rock is denominated sienite. When the hornblende gives its colour to the rock, it forms greenstone. When the parts are more intimately mixed, it becomes a compact trap or basalt; and basalt and compact lava bear in many instances so near a resemblance, as not to be distinguished. According to the account of sir George Mackenzie, beds and even columns of basalt frequently occur in Iceland, the lower parts of which are a porous and vitreous lava or slag. The close resemblance between the compact lavas, and the columnar basalt in the vicinity of Etna, and other active volcanoes, is so great, that we believe it is extremely difficult, if not impossible, to distinguish them from each other by any well-defined characters. The currents of lava which have recently flowed, differ indeed from beds of basalt or trap by their porosity; but Cordier has well observed, in the memoir before alluded to, that it is only the superficial part of modern currents of lava that are exposed to our observation; and to judge of their real nature from the external scoriæ, would be like judging of the contents of a vat of wine, from the froth floating on its surface. The ancient currents of lava are some of them of immense size, and have frequently been excavated or broken, by which the internal parts are discovered, and these, as before remarked, bear a near resemblance to many of the regular rock-formations, and particularly to varieties of trap-rock.

Such being the leading characters in the composition, structure, and position of trap-rocks, we need not be surprised that the earlier geologists were disposed to class them all with volcanic products, and to assert that they had been formed by eruptions from ancient volcanoes, in a manner similar to the formation of modern currents of lava. This hypothesis, advanced before many phenomena attending volcanic eruptions were known, and when the effects of heat combined with pressure had not been investigated, was exposed to many weighty objections. Another theory, which ascribed the formation of trap-rocks to aqueous depositions, was warmly supported by many geologists on the continent, and particularly by M. Werner. He supposes, that after all the primitive and conformable rocks had been deposited, the primeval waters which covered the highest mountains sunk slowly to their present level.

From some unknown cause, a sudden rising of the water took place in a turbid and agitated state, and covered the whole globe: it then became calm, and during the period of its settling, deposited the different rocks of overlying trap, and again retired to its former level with considerable rapidity. The broken stratification, so characteristic of this formation, was caused partly by the rapid retiring of the water. The heaps of trees, the beds of clay, sand, and gravel, and their constant occurrence in the lower part of this formation, are evident proofs (says Mr. Jameſon) of the rapid and tumultuous rising of the water. The ſubſequent calmneſs of the water is proved by the fineneſs of the mechanical and the increaſing fineneſs of the chemical ſolutions, as we approach the upper part of the formation. Jameſon's *Mineralogy*, vol. iii. p. 85.

According to this theory, the regular ranges of columns ſo frequent in trap-rocks, were produced by the ſhrinking in or drying of the maſs. As the inundation was general, the rocks of this family muſt be ſpread univerſally over the globe. Indeed the ſame geologiſt ſuppoſes there were two inundations, the firſt, which deposited the overlying porphyry and ſienite, the ſecond, which deposited the baſaltic or ſtetz trap-rocks. On this theory, Mr. Bakewell remarks in his *Introduction to Geology*, "it is ſcarcely poſſible for the human mind to invent a ſyſtem more repugnant to exiſting facts. Were baſaltic rocks, as Werner ſuppoſes, deposited from an aqueous fluid, that covered the whole globe after the formation of the ſecondary ſtrata, every part of the dry land and every valley muſt have been incruſted or filled with baſalt; it would be the prevailing rock of every diſtrict: on the contrary, overlying trap or baſalt exiſts only in detached maſſes, in particular ſituations, nor do fragments of baſalt occur in any quantity ſufficient to warrant the belief that it was ever formed univerſally over the globe."

Though the mode of aqueous formation, ſuggeſted by Werner, is utterly inadmiſſible, we do not think it improbable that many baſaltic rocks may have been formed in the humid way, by eruptions of mud of limited extent, like thoſe which iſſue at preſent from the volcanoes in South America. The opinion that all baſalt or trap-rocks have originally flowed in the form of lavas, we do not ſeem authorized, from exiſting facts, to maintain; and the great latitude given to this mode of formation, has induced other geologiſts to reject it altogether. But it has been well obſerved, that there is a wide difference between aſcertaining the agency by which a rock has been formed, and the manner in which that agent has been applied. Numerous obſervations, which have been recently made on trap-rocks in volcanic countries, have led to the opinion that many of theſe rocks have been ſoftened, and even fuſed, in their original poſition, without ever having flowed as currents of lava.

The principal objections againſt the agency of fire in the formation of theſe rocks are enumerated by Brochant. (*Min. tom. ii.*) Many of theſe objections, we think, can be ſatisfactorily answered.

1. "Baſalts are extremely rare among the products of burning volcanoes, and modern eruptions have not produced any."—This objection is founded on an aſſumption of facts, which are not admitted by other geologiſts. The obſervations of Daubuiſſon in Auvergne, of ſir George Mackenzie in Iceland and the Ferroe iſlands, and of Humboldt in South America, prove that trap-rocks are extenſively ſpread among volcanic products; though, in many inſtances, they appear to have been formed by the agency of ſubterranean heat acting on beds of ſchiſt, which have been melted or ſoftened in their original poſition, and been ſubſequentially

elevated, without ever having flowed as lava. If modern eruptions have produced no baſalt, we may recollect that it is only the external parts or ſcoriæ that are expoſed to our view; and we have no opportunity of examining the currents of ſubmarine lavas, formed at great depths under the ocean, in circumſtances ſimilar to thoſe which may have attended the formation of baſalts. That many baſaltic rocks were formed under the ſea, is evident from their alternating with beds of lime-ſtone containing marine ſhells.

2. "Whatever origin may be attributed to the columnar or tabular ſtructure of baſalt, it is not peculiar to trap-rocks: there are gypſums, marles, and ſand-ſtones, which frequently preſent this ſtructure."—The columnar and globular ſtructure may be formed by the ſlow refrigeration of a melted maſs of baſalt, as was proved in the experiments of Mr. Gregory Watt. (See *ROWLEY Rag.*) The columnar ſtructure has been obſerved by colonel Imrie in a current of lava which had flowed from a volcano in Felicuda, one of the Lipari iſlands. This current could be traced from the mouth of the volcano to the ſea. That the columnar ſtructure may alſo exiſt in ſome rocks of aqueous origin, cannot invalidate the above facts. The particular forms which the columns of baſalt ſometimes preſent, which will be ſubſequentially noticed, appear to be the effects of partial fuſion.

3. "Baſalts often reſeſt immediately on coal, as at Meiſner, near Caſſel. Now, if this baſalt were volcanic, it muſt neceſſarily have produced the combuſtion of theſe beds of coal."—To this objection it will be ſufficient to reply, that numerous inſtances may be cited of baſaltic dykes and beds of baſalt having charred the coal in their vicinity, and reduced it to a ſtate of coke or cinder. (See *VEINS, Mineral.*) And from the experiments of Dr. Maccullock on powdered jet and wood-coal, incloſed in gun-barrels under preſſure, ſo as to confine a conſiderable part of the volatile products, it appears that they were converted into true mineral coal by a red heat; and had the conſiſtence, fracture, and every property of pit-coal. Where baſalt in contact with coal has reduced it to a coke, it appears highly probable that the volatile parts have been driven off by heat; and where the coal preſerves its true character, the volatile parts have been retained by compreſſion.

4. "The remains of animals and vegetables which are found in ſome trap-rocks, could not have reſiſted the action of volcanic heat without being deſtroyed. It is the ſame with many very fuſible minerals. Some ſuch fuſible minerals are alſo found in volcanic rocks; but theſe inſtances are rare, and cannot ſerve as a baſis for a general rule."—In the experiments of ſir James Hall on lime-ſtone expoſed to heat under compreſſion, it was found that chalk, which contained ſhells, might be melted and reduced to a cryſtalline ſtate by cooling, without deſtroying the organic ſtructure of the ſhells. Moſt of the organic remains in baſaltic rocks are in a ſofter amygdaloid, or in wacke, which may probably have been formed from eruptions of volcanic mud, like that called *moya*, from the South American volcanoes. The fuſible minerals found in baſalt and ſome volcanic products, there is every reaſon to believe, aſſumed a diſtinct cryſtalline form when the maſs was conſolidating.

5. "Cavities filled with water in ſecondary trap-mountains, oppoſe the ſuppoſition of their igneous origin."—That theſe cavities have been filled by infiltration is rendered almoſt certain, from the circumſtance that the water may be expelled by a gentle heat; and if the water can find a paſſage through the ſtone from the cavity to the ſurface, it may alſo find a paſſage from the ſurface to the centre of the maſs.

6. "There are not observed in trap-rocks either that black colour, or those indications of vitrification, that are apparent at least in certain portions of the products of burning volcanoes: real craters have never been observed. All those which have been cited were hollows, chasms filled with water, so common in some mountains."—This is an assumption of facts which recent observations disprove. The basalts in the Ferroe islands, and in Iceland, have, in some instances, the black appearance which is here denied: the columns and beds of basalt contain also in their lower, and sometimes in their upper parts, scorix, and those indications of vitrification that are apparent in burning volcanoes; and the sides of the basaltic dykes are generally vitrified. That many of the hollows, supposed to have been craters, were hollows formed by depression, is probable; but what other appearance could the crater of an ancient volcano be expected to present, than a hollow or chasm which might be filled with water?

7. "Mandelstein (or porous amygdaloid) has certainly some resemblance to porous lava; but there are mandelsteins evidently not volcanic. Besides, the cavities in the mandelsteins of trap-mountains contain very different minerals, and such as could not have undergone the action of fire, without being changed."—The remarks made previously on very fusible minerals inclosed in basalts, and some lava, apply equally to this objection. It is also probable that soft and amygdaloidal basalts may have been formed from eruptions of mud, as before stated.

8. "Although from experiments made on basalts and lava, and from observations made on burning volcanoes, it is known that stony substances may, after perfect fusion, resume their stony character; but when this takes place in burning volcanoes, there are always found in the vicinity substances which are scorified or vitrified, and denote the action of fire."—It has before been remarked, that scorix and vitrified substances occur in the basalts of Iceland and Ferroe: they accompany the basalts in Auvergne, and the vicinity of Etna. In almost all basaltic countries, some of the rocks present so striking a similarity to volcanic products, that the resemblance has often struck the most common observer. If other basaltic rocks do not present the same appearances, it may be owing to their having been formed by submarine eruptions, under circumstances very different from those which take place on land; and it is not contended that all basalts have originally flowed as lava.

9. "In various countries, beds of basalt are observed to alternate with sand-stone and stratified lime-stone."—It is observed in many parts of England and Scotland, and is probably general, that where beds of trap are interspersed between sand-stone or lime-stone, they are generally very irregular both with respect to thickness and extent, and have seldom the same uniform arrangement as the stratified rocks with which they alternate. That the lime-stone was formed under the sea, is proved by its containing marine shells: and there is no improbability in the supposition, that currents of submarine lava may have flowed at different periods over beds of shells or sand, and converted the one into lime-stone and the other into sand-stone.

10. "In many basaltic districts, basalt is only found on the summits of hills; and it is evidently perceptible, by the correspondence of the beds, that all these summits were parts of one and the same bed, which spread over all the district. This is not the form of volcanic deposits: they take a certain direction, and no similar instances of such vast volcanic deposits are known."—The frequent occurrence of detached caps of basalt forming the summits of hills, in an extensive district at nearly the same level, constitutes one

of the most remarkable peculiarities of the trap or basaltic formation, and deserves particular attention, as marking some of the latest revolutions that have changed the surface of the globe. To form a more distinct idea of the situation of these caps, we refer to *Plate IV. Geology, fig. 3*, where a mass of unconformable trap, *a*, lies upon the stratified rocks *b*, and may be seen on the summits of other stratified hills at *c*, *d*, and *e*. In some instances, as in the Isle of Skye, as described by Dr. Macculloch (*Geological Transactions, vol. iii.*), the mass at *a* appears to be connected with the lower rock *e*, and to form a part of it, as if it had broken through the strata, and been thrown over the surface in a state of fusion. The strata consist of grey lime-stone containing shells; but where the lime-stone is in the vicinity of the trap, it is converted into white crystalline statuary marble. A similar change is produced on chalk, or earthy lime-stone, when subjected to heat under pressure, as was proved in a series of experiments made by sir James Hall; and as we are unacquainted with any other cause which could produce this change, it appears probable that the lime-stone has been converted into marble by subterranean heat, and that the trap has flowed over the surface like lava, but under the pressure of the ocean; the existence of marine shells in the lime-stone proving that such must have been its original situation. The causes which have changed the relative level of the lime-stone, with respect to the sea, may have broken the continuity of the strata, and of the basalt which lies upon them. The basaltic mountains of Auvergne, in the departments of Puy-de-Dôme and Cantal, in France, have excited much attention from the existence of ancient volcanic craters in their vicinity. According to Daubuisson, the fundamental rock of that district is granite, covered in some places with a marley lime-stone. Nearly all the soil is covered with volcanic or igneous productions: they are of three kinds, and appear to have been formed at three distinct epochs. The most recent are currents of lava, which lead to craters still existing, though dormant. The second formation consists of masses or tables of basalt, separated by openings or vallies. The third consists of mountains composed of a kind of volcanic porphyry. The currents of lava are observed to have run from the bottom of a number of conical hills, from two hundred to four hundred yards in height. These hills, of which there are about one hundred, are formed of heaps of scorix, fragments of lava, and rapillo or tufa. Their summit often presents a hollow in the form of a crater: they rest immediately upon granite. The lava at the bottom is of a basaltic nature; it is of a greyish-black colour, with a fine compact grain; it contains grains of augite, olivine, and feldspar. The superficies is blistered and studded with asperities, which sometimes exceed a yard in height. The interior is more compact. The currents are spread in the adjacent plain; they have sometimes reached the bottom of certain vallies, and have followed their course for three or four leagues. In advancing progressively, they always descend to lower elevations; they follow the inequalities of the soil; and separate on meeting with any obstructing eminences in their passage. The history of these currents of lava, says M. Daubuisson, is complete, and there is nothing left for the imagination to supply. We behold the orifice from whence they issued, the course they pursued, and the country they occupy. As for the period when these lavas flowed, though anterior to the history of man, it is nevertheless recent, compared with those vast changes which the surface of the globe presents, and was posterior to the excavation of the vallies, since it flowed through them, and occupied their bottoms.

The igneous productions of the second kind are basalts, which in the form of beds, tabular masses, or peaks, cover the elevated parts of the ancient surface of the country, or occur on the summits of some mountains and isolated eminences. They are also observed on the skirting round the sides of Mont Dor and Cantal. They are, says M. Daubuisson, evidently only the remains and patches of different currents which have spread over the country: they present the same mineralogical characters as the basalts of Saxony, and other districts; they contain the same substances, and have the same tendency to form regular prisms or columns; they cover, without distinction, all kinds of rocks, and are never covered by them. An igneous origin cannot be denied to these basalts; the perfect resemblance between their paste and that of some of the currents of lava in their vicinity, which can be traced to existing craters, affords a strong presumption of this; but they present other infallible marks of their origin. In following step by step certain masses of basalt, which are near Mont Dor and Cantal, and supplying by imagination what has been taken away, where their continuity is broken, you arrive at the sides of these two enormous volcanic mountains, and we come to masses of scoria or of blistered rocks, where beyond doubt we are near the current: all the basalts which have been traced upwards made part of that current. A great number of these large basaltic platforms, which cover isolated mountains, display on their surface blisters, spongy scoria or droffes, like those which cover the best preserved lavas; nor can we refuse them a similar origin. Some of these platforms repose on volcanic ashes. It is true, some isolated eminences have summits of compact prismatic basalt of a black colour, and destitute of those unequivocal signs of the action of fire which are seen elsewhere; but these eminences of compact basalt most frequently stand by the side of those platforms with scoriated surfaces, before described: they once formed with them a continued whole, and have evidently been divided from them by the excavation of the ravines and vallies which now separate them. They cannot have had a different origin. The convulsive action of time and the elements must have destroyed the scoriated crust: only the compact nucleus remains, deprived of the marks of the action of fire, like the interior parts of most currents of lava, which are equally destitute of such marks. Thus, says M. Daubuisson, all the basalts of Auvergne present proofs either direct or indirect of an igneous origin; though the disintegration of the surface, and the derangement that the currents have suffered, prevent us from retracing them to the crater from whence they flowed, and from seeing the number, form, and extent of the different currents; but we are certain that their existence was anterior to the excavation of the vallies.

The porphyroidal trap is the third kind of igneous rock-formation in Auvergne. It forms eight or ten distinct mountains: the most considerable are Mont Dor, Cantal, and Puy-de-Dôme. The substance of these mountains, from the account of Daubuisson, appears to be a kind of feldspar or clinkstone porphyry: their passage, direct or indirect, into basalt, and, above all, the volcanic scoria imbedded in their mass, prove that they owe their existence to fire. These porphyries are the most ancient of the igneous productions of Auvergne; they are covered with basalt, and contain veins of that substance.

In the opinion of some geologists, these mountains and masses of porphyry have never flowed as lava, but have been fused in their native beds, and subsequently elevated. The homogeneity of their paste shews how complete the fusion has been. The crystals of feldspar were, in all probability,

formed during the igneous fluidity of the mass. However different the currents of lava, the basalt, and the porphyritic trap may be, and however various the periods of their formation, they appear, says M. Daubuisson, to be united in a certain degree. Cantal, Mont Dor, Puy-de-Dôme, and the other porphyry mountains, are ranged in a direct line running nearly from north to south. Almost all the basalts of these regions, that can be, in some manner, retraced to their origin, seem to have taken their direction in the same line. It is also in this direction, and among the ancient products, that the greater part of the craters have been opened whose vestiges are still visible. When, at two leagues to the westward of Clermont, we see near sixty volcanic mountains ranged in a straight line, it can scarcely be believed to be the effect of chance. A cause has certainly existed, which has produced this effect. Perhaps, says Daubuisson, there was in this direction a vein of matter that contained the germ of volcanic fire, which burst forth and was renewed at different periods.

Perhaps this range of mountains may be regarded as an enormous basaltic dyke, which has broken through the crust of the globe along the line where they are now ranged, their continuity having been broken by partial subsidence, and by diluvial currents. Daubuisson's account of the trap-rocks or basalt of Auvergne is particularly interesting, as establishing the intimate connection between trap-rocks and those of undoubted igneous origin. It is further remarkable, as M. Daubuisson had previously published an account of the basalts of Saxony, in which he endeavoured to prove the aqueous formation of basaltic rocks.

The most remarkable trap-formation in Europe, and perhaps in the world, extends from the county of Antrim, in Ireland, through part of the Scotch Hebrides, and is probably the same which occurs in the Ferroe islands, and the island of Iceland. An account of the columnar basalt of this formation will be found under the articles *GIANT'S CAUSEWAY*, and *STAFFA*. The geological relations of the trap-rocks of Antrim with the regular strata in that country, have been recently traced by the Rev. J. Conybeare and Dr. Berger. The basalt of this district generally covers chalk, similar to the chalk on the eastern side of England, and like it resting upon beds of sand, and the grey stratified lime-stone called *lias*. In England we have no instance of basalt occurring above the chalk, or any of the strata over the *lias*, or in the *lias* itself, though it occurs in the coal-formation under the *lias*. A fine section of the beds of basalt with the chalk, sand-stone, *lias*, and coal-strata, may be seen for many miles along the coast, presenting numerous dykes and fractures of the strata, which have sometimes brought the basalt to the same level with the chalk, and in other situations with the coal-strata. The basalt in the interior, and in some parts of the coast, forms isolated caps on the summits of detached conical hills. The existence of these isolated caps has been attributed to diluvial currents, which have cut through the once continuous beds of basalt. Though such currents have doubtless existed in various situations, and have excavated vallies, another agent has obviously been employed in the formation of the vallies of Antrim. We have only to examine the coast to convince ourselves of this fact, where we may see the strata suddenly thrown down or elevated several hundred feet, by mineral veins or dykes filled with basalt. If we trace in imagination the same displacement into the interior, where it obviously extends, we shall see a sufficient cause for the existence of isolated caps or beds of basalt, separated from each other by vallies, or lower grounds, that have been formed by subsidence. Through these veins or dykes the basalt itself was probably

probably thrown up, and spread over the surface in a fluid state. Wherever these dykes pass through the chalk, they have converted it into crystalline lime-stone to a certain distance on each side, and produced various appearances, which tend further to prove that the matter of the basalt has been in a state of igneous fusion. See VEINS, *Mineral*.

That the basalt has been forced through the chalk and the other strata on which it now rests, is rendered almost certain, by the occurrence of broken strata of chalk enveloped in the basalt, and contorted in a manner which proves the violence of the disrapture, the upheaving of the basalt, and the lateral pressure to which the chalk-strata have been subjected. See Plate IV. *Geology*, fig. 4.

One remarkable feature in the arrangement of the basaltic columns in Antrim must not be overlooked. The great ranges of columns are nearly vertical, but the columns of basalt in the mineral dykes are arranged horizontally. This difference of position may admit of a probable solution, if we allow that the basalt, in both instances, had been in a state of igneous fusion. The beds of columnar basalt being thrown over the surface of the ground that formed the bed of the ocean, would begin to refrigerate at the upper and under side in a vertical direction. On the contrary, in mineral dykes intersecting rocks already formed, the basalt would suffer refrigeration most rapidly where it was in contact with them, which would be on the sides, and this refrigeration would gradually extend to the interior, in a horizontal direction: and to this difference in the mode of their consolidation, we may ascribe the horizontal or vertical position of the columns in the beds and dykes of basalt. For an account of the experiments of M. G. Watt and Sir James Hall on the fusion of basalt and lava, see ROWLEY RAG, and VOLCANO.

TRAP-HOLE, in *Rural Economy*, a term applied to a round hole, which is cut out and prepared in the floors of the stowage-rooms, where hops are deposited after being dried, for the purpose and convenience of bagging them. It is formed exactly equal in size to the mouth or opening of the bag, around which a wooden frame is securely placed and fixed, to the edge of which, the border of the mouth of the bag is firmly attached all round. By this means the hops are readily forced into the bags in a close compact manner.

The term is also occasionally applied to other holes cut and formed in the floors of farm-buildings.

TRAPS, *Garden*, such as are contrived for the purpose of destroying mice and other vermin; which are often conveyed into such places with the straw, litter, and other matters that are made use of in them; and which are extremely hurtful and troublesome in the spring season, in destroying peas and beans, as well as lettuces, melons, and cucumbers in frames.

Traps for this purpose are contrived in a great many ways; but as field vermin are very shy, and will rarely enter traps which are close, the following simple cheap form has been advised by Mr. Forsyth, though it has nothing of novelty in it. These traps may be made by stringing garden-beans on a piece of fine pack-thread, in the manner of beads, and then driving two small stake-like pieces of wood into the ground at the breadth of a brick from each other, and setting up a brick, flat stone, or board with a weight on it, inclining to an angle of about forty-five degrees; tying the string, with the beans on it, round the brick or other substances and stakes, to support them in their inclining position, being careful to place all the beans on the under sides of the bricks or other matters. The mice in eating the beans, in such cases, will also destroy the pack-thread, and

by such means disengage the brick or other weighty body, which by falling on them readily destroys them.

Mice are always the best got rid of by some sort of simple open traps of this nature.

TRAPA, in *Botany*, a Linnæan name, whose idea is certainly taken from the warlike instrument called Caltrop, the *Tribulus* of the ancients, which consisted of four iron radiating spikes, so placed that one of them must always stand upwards, in order to wound the feet of passengers. Such is the figure of the singular fruit of this genus, hence named by Tournefort *Tribuloides*. *Calcitrapa*, an old botanical word of similar meaning to *Tribulus*, is compounded perhaps of *calco*, to tread, or kick, and *τετρα*, to turn, because the Caltrops are continually kicked over if they fail of their intended mischief. Here we have the immediate origin of *Trapa*.—Linn. Gen. 62. Schreb. 84. Willd. Sp. Pl. v. 1. 681. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 1. 267. Sm. Prodr. Fl. Græc. Sibth. v. 1. 104. Juss. 68. Lamarck Illustr. t. 75. Gært. t. 26. and t. 95. (*Tribuloides*; Tourn. t. 431.)—Class and order, *Tetrandria Monogynia*. Nat. Ord. *Inundate*, Linn.? *Hydrocharitides*, Juss. or rather, as that author himself indicates, his *Onagra*.

Gen. Ch. *Cal.* Perianth superior, of four acute, equal, permanent leaves, firmly united to the sides of the germen. *Cor.* Petals four, obovate, larger than the calyx. *Stam.* Filaments four, the length of the calyx; anthers simple. *Pist.* Germen turbinate, crowned by the calyx, of two cells; style simple, as long as the calyx; stigma capitate, emarginate. *Peric.* none. *Seed.* Nut turbinate, more or less compressed, of one cell, armed with two or four horn-like protuberances, originating in the permanent calyx, thickened, either spinous or blunt. Kernel solitary.

Eff. Ch. Corolla of four petals. Calyx of four leaves. Nut armed with two or four opposite horns, originating in the leaves of the calyx.

1. *T. natans*. European Water-caltrops. Linn. Sp. Pl. 175. Suppl. 128. Willd. n. 1. Ait. n. 1. Prodr. Fl. Græc. n. 1. Gært. t. 26. (*T. aquaticus*; Camer. Epit. 715. Matth. Valgr. v. 2. 324. Ger. Em. 824.)—Nuts with four spinous ascending horns.—Native of ponds and muddy ditches in the south of Europe, flowering in summer. The plant is annual, and has several times been brought into England; but whether its seeds are not perfected here, or from any other cause, it has never yet been naturalized. The ponds at Versailles abound with this *Trapa*. The solitary fibrous root sends up a long, cylindrical, floating stem, varying in length according to the depth of the water, furnished with numerous, opposite, pectinated tufts of fibrous radicles, gradually diminishing to simple fibres, and at the top of the stem, which is thickened, these fibres are replaced by alternate stalked leaves, which are crowded at the summit into a large spreading star, floating on the surface of the pool, and often ten or twelve inches in diameter. Each leaf is rhomboid, succulent, an inch or more in breadth, veiny; strongly toothed in front; entire at the base; the veins rather hairy underneath. *Footstalks* three or four times as long as the leaves, smooth, swelling beyond the middle into an elliptical cellular body, rendering the plant more buoyant. *Flowers* small, white, on short, club-shaped, axillary, simple, partly hairy stalks, scarcely half an inch long. *Nuts* turbinate, about an inch in diameter, angular, smooth, with four, by accident only two or three, prominent ascending pointed horns, becoming lateral by the increase of the summit of the germen, two of them situated at the angles of the nut, two lower down at the sides. The kernel is eatable, somewhat like a chestnut. This plant is doubtless the *τετραβολος ενυδρος* of Dioscorides, found by Dr. Sibthorp in countries bordering

on the north of Greece, though not in that country itself, nor the neighbouring islands. The wooden cut of Camera-rius, executed, we believe, under Conrad Gefner's inspection, is one of the best representations of any known plant.—Lin-næus mistook the radicles for submerged foliage, like that of *Myriophyllum*.

2. *T. bicornis*. Chinese Water-caltrops. Linn. Suppl. 128. Willd. n. 2. Ait. n. 2. Gært. t. 95. Osbeck's Voyage, Engl. ed. v. 1. 305. (Bucephalon; Burm. in Plum. Ic. 56. t. 67. at the bottom. Linkoa, Ling-kamm, or Leng-ka, of the Chinese.)—Nuts compressed, with two opposite deflexed horns.—Native of ponds in China. Some of its nuts were procured by sir Joseph Banks, in bottles of water, from China. These being immersed in mud at the bottom of some tubs of water at Kew, as well as in Mr. Lodiges' stove at Hackney, vegetated, and produced plants hardly distinguishable, in any respect, from the foregoing, of which we obtained specimens, from the cisterns at Kew, in October 1790. These had the shell of the parent nut at their root, so that no deception could take place. This nut is very different from the former, being twice as large, much compressed, with two large, divaricated, recurved, opposite horns, more or less pointed, which could hardly be supposed to have originated from the calyx. We know nothing of the flowers of this species, nor are we persuaded of its existence at present in the English gardens. Mr. Aiton indeed marks it as a perennial greenhouse plant, but not as having flowered; and we presume, with deference to his well-known accuracy, that it perished as an annual, without flowering, we having never heard of it since the first season. One of our specimens has several stems from a single root, which may possibly be the case with *T. natans* occasionally. Gærtner's figure is different from Burmann's, and from our Kew specimen, in the bluntness of its horns. We have a specimen like it, from China or the East Indies, and are not without a suspicion that it may belong to a third species, whose herbage is, as yet, unknown to botanists.

TRAPANI, in *Geography*, a sea-port town of Sicily, in the valley of Mazara, situated on a peninsula, with a good harbour, defended by a fort, which stands on a small island, called Colombara. This town was anciently called Drepanum, from the similitude its haven is thought to have borne to a sickle. It is ancient, and, according to Virgil, existed in the time of Æneas. According to Diodorus, it was fortified in the first Punic war by Hamilcar, the father of Hannibal. The Carthaginians were always desirous of possessing this city on account of its harbour. Here is a good pearl-fishery on the coast, and in the neighbourhood a considerable salt-work. The number of inhabitants is about 20,000; 43 miles W.S.W. of Palermo. N. lat. 38° 5'. E. long. 12° 30'.

TRAPESO, in *Commerce*, a weight in Malta, Sicily, and Naples. At Malta, gold and silver are weighed by the libra or pound of 12 ounces. The ounce is divided into 16 parts, or into 32 trapezi, and the trapezo into 18 grani. This pound weighs 4888 English grains: and thus 720 lbs. or ounces of Malta = 611 lbs. or ounces troy. At Naples, gold and silver are weighed by the libra of 12 ounces, the ounce being subdivided into 30 trapezi, and the trapezo into 20 acini. The pound of Naples weighs 4950 troy grains: hence 64 lbs. or ounces = 55 lbs. or ounces troy weight.

TRAPEZA, in *Ancient Geography*, a promontory of Asia Minor, in the Troade, at the entrance of the Hellespont, and 18 miles from the small town of Dardanium. Pliny.

TRAPEZIOIDES, } in *Anatomy*, bones of the carpus.
TRAPEZIUM, }

See EXTREMITIES.

TRAPEZIUM, in *Geometry*, a plane figure contained under four unequal right lines.

TRAPEZIUS, in *Anatomy*, (cucularis, dorso-fus-acromien,) a broad and flattened muscle, of triangular shape, describing with that of the opposite side the lozenge figure, whence its name is derived, situated on the posterior surface of the neck and back, and reaching from the head and vertebral column to the scapula and clavicle. Its line of origin is very long. It arises, by a thin aponeurosis, from the occipital tuberosity, and the external transverse ridge of the bone; from the ligamentum nuchæ in its whole length; from the spinous process of the last cervical vertebra; from the spines of all the dorsal vertebræ, and the intervening interspinal ligaments, by means of short aponeurotic fibres, except from the sixth cervical to the third dorsal vertebra inclusively, where these fibres are much longer, and form a broad femioval aponeurosis. At the lower part too, the origin of the trapezius presents an aponeurosis of some breadth. The muscular fibres pursue various directions: the superior, which are the thinnest, descend; the middle ones pass horizontally; and the inferior ones ascend: the two latter portions are much thicker than the upper. The middle fibres are the shortest, the upper and lower considerably longer. The fibres converge towards the shoulder, and form a flat aponeurosis, which, having passed over the smooth triangular space at the root of the spine of the scapula, is fixed to the superior margin of that process in its whole length, to the superior margin of the acromion, to the ligaments of the scapulo-clavicular joint, and to one third of the posterior edge of the clavicle. Numerous fleshy fibres are inserted, with aponeurotic ones, in the acromion and clavicle.

The posterior flat surface of the trapezius is every where subcutaneous; the cellular substance between it and the skin does not contain much fat, particularly about the neck. Its anterior surface covers the complexus, splenii, levator scapulae, serratus superior posticus, supraspinatus, rhomboideus, the triangular surface at the root of the scapular spine, the infraspinatus, latissimus dorsi, and a small portion of the longissimus dorsi and sacrolumbalis. The upper and lower edges of the muscle are oblique: the former from the occiput to the clavicle, the latter from the last dorsal vertebra to the scapula.

The trapezius carries the shoulder backwards, at the same time making the scapula rotate, so as to turn its inferior angle forwards, and the superior backwards. In this way the shoulder is elevated, as in supporting a burden. If the levator scapula acts with it, the scapula is moved directly upwards: if the rhomboideus, directly backwards. When the shoulder is fixed, it will extend the head, and incline it, with the trunk, to one side.

TRAPEZOID, in *Geometry*, a plane irregular figure, having four sides, no two of which are parallel to each other.

TRAPEZOPOLIS, in *Ancient Geography*, a town of Asia Minor, in the interior of Caria. Ptolemy.

TRAPEZUNTINA LAURUS, a name used by some botanical authors for the *laurocerasus*, or common laurel.

TRAPEZUNTIUS, in *Biography*. See GEORGE of Trebisond.

TRAPEZUS, TREBISONDE, in *Ancient Geography*, a populous town of Greece, E. of Pontus, and on the coast of the Euxine sea. It was a colony of Sinope. In the retreat

retreat of the 10,000 Greeks, they sojourned about a month near this town; and as they had a great number of cattle, they offered sacrifices to Jupiter the Saviour, to Hercules, and to other deities. They celebrated also the Gymnic games on the mountain where they encamped. The inhabitants of Trebifonde furnished the Greeks with two vessels, one of 50 and another of 30 oars. Trapezus was the boundary of the ancient kingdom of Pontus, and the commencement of the Colchide. — Also, a town of Arcadia, S. of the river Alpheus and near it, towards the W. and not far from Megalopolis. It was abandoned by its inhabitants, and sunk into ruin upon the establishment of Megalopolis. On the left of the Alpheus is a place named “Bathos,” where were triennially celebrated the mysteries of the great goddesses. Here was also the fountain “Olympias,” which, as it was pretended, furnished water only once every two years. Here, it is said, the earth discharged flames, and the giants at this place had fought against the gods. See TREBISOND.

TRAPEZUS *Mons*, mountains of the Tauric Chersonesus, W.S.W. of mount Cimmerius. M. de Peyssonnel says that the Trapezus comprehended the mountains now called Jachelow, Bakchefarai, and Katchi.

TRAPEZUSA, a town of Asia, in the interior of the Cappadocian Pontus. Ptolemy.

TRAPOLIZZA, in *Geography*, a town of European Turkey, in the Morea; 30 miles N. of Mistra. N. lat. 37° 40'. E. long. 22° 26'.

TRAPP, JOSEPH, D.D. in *Biography*, a divine and poet, was born in 1679, probably at Cherrington, in Gloucestershire, where his father was rector, educated at Wadham college, Oxford, of which he was a fellow, and in 1702 commenced M.A. and took orders. As a specimen of his talents for poetry, he wrote a tragedy, entitled “Abramule, or Love and Empire,” which was acted in 1704. In 1708 he was chosen professor of poetry at Oxford, the duties of which office he performed by delivering lectures in elegant Latin; which lectures were published under the title of “Prælectiones Poeticæ,” and an English translation was printed by Bowyer in 1742. In 1711 Trapp was chaplain to the lord chancellor of Ireland, and published in the same year “A Character of the present Set of Whigs,” of which, as well as of the author, Swift, who sent it to the press, speaks contemptuously in his letters to Stella. He recommended him, however, to be chaplain to lord Bolingbroke, who gave him the rectory of Harlington in Middlesex. He was also appointed lecturer of St. Martin-in-the-Fields; and afterwards obtained the vicarage of the united parishes of Christ-church, Newgate-street, and St. Leonard's, Foster-lane. At this time he was deemed a popular preacher. As a poet, he published a flat and profane translation of Virgil in blank verse, Latin versions of Anacreon, and Milton's Paradise Lost. He also wrote several English poems, one of which was “On the Four Last Things.” In 1721 he married. His subsequent publications were “Sermons at Lady Moyer's Lecture,” various other “Sermons,” and “A Defence of the Church of England against the Church of Rome.” In 1727 he was created D.D. at Oxford by diploma. He died at the parsonage-house in Christ-church, in 1747, with the character of an excellent scholar, an instructive preacher, and a worthy man. *Biog. Brit.*

TRAPPE, *Monks of La*, in *Ecclesiastical History*, monks of the Cistercian order, belonging to an abbey beautifully situated on a large valley in the province of Le Perche, on the confines of Normandy, in France. The abbey was

founded in 1140 by Rotrou, count of Perche, and dedicated under the name of the Blessed Virgin, in 1214, by Robert, archbishop of Rouen. This abbey was subjected to a very rigorous discipline by the abbé d'Rance, in 1664. *Encyclop.*

TRAPPINGS. Among the ancients, some will have the horse-trappings to have been placed on their breasts; others, on their forehead; and others, again, on their cheeks: that on the breast was a small kind of shield, finely polished.

TRAPRAIN LAW, in *Geography*, a mountain of Scotland, in the county of Haddington; 4 miles E. of Haddington.

TRAPS, *The*, a town of Pennsylvania; 26 miles N.W. of Philadelphia.

TRAPSALO, in *Zoology*, a name given by the Greeks in the Levant to a species or variety of Calamary, or SEPIA *Loligo* (which see), called by the Provençals *Arugi*. It resembles the common calamary, but differs from it by the extraordinary size of its eyes, by a less extent of fins, by its feet having a greater number of small bony points to their cartilaginous tubercles, by a less length of back-bone, by the sheath's having a smaller quantity of black liquor, and by its becoming very large. The Greeks are of opinion, that their trapsalo is only the calamary changed by age. The arugi approaches the coast more frequently than the calamary; it often comes on the sand of the shore, and there deposits its eggs, whereas the calamary never goes on land. The flesh is better and less difficult of digestion; but their eggs have a slight purgative property, from which no bad effects are felt. It is considered as a preface of a tempest, when the calamaries dart out of the water. *Sonnini's Greece*, p. 128.

TRAPTOWN, in *Geography*, a town of Maryland; 7 miles S.W. of Fredericktown.

TRAQUAIR, or TRE-QUAIR, a parish in the shire of Peebles, Scotland, on the southern bank of the Tweed, is watered by the river Quair, which has its rise and its whole course in the parish to which it communicated its name; Tre-quair signifying a dwelling on the Quair. The present parish is composed of the old parish of Traquair, with that half of the ancient parish of Kailzie, which lies on the south side of the Tweed, and to which it was annexed in the year 1674. Its greatest length from E. to W. is about nine miles; its greatest breadth, from the Tweed to the source of the Quair, is from four to five miles: the whole contains 17,290 acres, of which about 4000 are arable. The surface is rocky and mountainous. Minchmoor, one of the hills, is upwards of 2000 feet above the level of the sea; and Gumsleugh and some other heights are elevated above 200 feet more. The hills, in general, afford excellent pasture for sheep, of which there are above 10,000 in the parish. The soil in the low grounds is shallow and stony, but tolerably fertile; and the air salubrious. In the population return of the year 1811, the number of inhabitants was stated to be 621, occupying 102 houses. The church was rebuilt in the year 1785. A parochial school is established, with a salary of 300 merks and perquisites, a free house and garden. Traquair House, the residence of that branch of the Stewart family who derive the title of earl from this parish, is seated on the bank of the Tweed: and on the side of a hill, which overlooks the lawn, are the remains of “The Bush aboon Traquair,” celebrated in ancient melodies, and probably in former times a considerable thicket, but now reduced to five solitary thorn-trees. Part of the mansion is of very remote antiquity;

antiquity; and was built in the castellated form. There have been several other tower-houses in the parish, one of which is still almost entire at Cardrona. Several places, denominated *chesters*, exhibit evident marks of lines of circumvallation: they are mostly circular, and seem rather to have been intended to secure cattle against sudden incursions, than for regular encampments; though tradition dignifies them by the appellation of Roman camps: they are all constructed upon the summits of eminences not easily affailable. At the commencement of the Scoto-Saxon period, the Scottish kings possessed the forest of Traquair, with a castle on the isthmus, which is formed by the junction of the Quair with the Tweed. The first mention of it on record, is in the reign of David I., from whose time, till the death of Alexander III., the castle was occasionally the royal residence. Traquair was then a considerable village, which had arisen under the shelter of the castle, and appears to have been more opulent and populous than Peebles itself; but is now very much reduced.—Carlisle's Topographical Dictionary of Scotland. Beauties of Scotland, vol. ii. Chalmers' Caledonia, 4to. 1810.

TRAQUATUHA, a town of Brasil, on the river of the Amazons; 330 miles W. of Fort Rio Negro.

TRAQUENADE, in the *Manege*. See ENTREPAS.

TRARA, in *Geography*, a range of mountains in Algiers; 6 miles E. of Twunt.

TRASCALETA, a town of Spain, in the province of Galicia; 16 miles S.E. of Lugo.

TRASCINA, in *Ichthyology*, a name by which some authors have called the fish more usually known by the names of the *draco marinus*, and *araneus*.

TRASEN, in *Geography*, a river of Germany, which rises in the S. part of Austria, passes by Marcktl, Lilienfeld, Wilhelmsburg, St. Polten, &c. and runs into the Danube, 8 miles below Mauttern.

TRASIMENUS LACUS, or the *Lake of Trasimene*, in *Ancient Geography*, a lake of Italy, towards Etruria, S.E. of Cortona: famous for the battle called after its name, in which Hannibal, in the year of Rome 536, defeated the Romans under Flaminius; 15,000 Romans having been killed, 10,000 put to flight, and 1500 having died of their wounds.

TRASKIRCHEN, or DRASKIRCHEN, in *Geography*, a town of Austria; 3 miles E.N.E. of Baden.

TRASMAUR, a town of Austria, on the Trasfen, with a citadel; it belonged to the archbishopric of Salzburg; 12 miles W. of Tülm.

TRAS-OS-MONTES, or TRA-LOS-MONTES, a province of Portugal, bounded on the N. and E. by Spain; on the S. by Beira, from which it is separated by the Duero; and on the W. by Entre Duero e Minho. It receives its name from its position, with respect to the province of Entre e Minho, lying on the other side of the mountain of Marzo. In extent from N. to S. it is 70 miles, and from E. to W. about 50, being for the most part mountainous. It is wild, barren, and thinly inhabited, though blessed with fertile and delightful vallies, which produce rye, wheat, wine, and fruits: besides the Duero, it is watered by the small rivers of Tamega, Corgo, Tuella, and Sobor, which run all into the Duero. It contains two cidades or cities, and 57 villas or towns; according to De Lima's list, 549 parishes, in which, in the year 1732, were computed 135,804 souls.

TRASP, a citadel and lordship in the Engadine, on the borders of Tyrol, with a small garrison in it; 27 miles N. of Bormio.

TRATOW, a town of the duchy of Holstein; 6 miles S. of Segeborg.

TRATTINNICKIA, in *Botany*, is so called by Willdenow, in honour of a Vienna botanist named Trattinnick. The name of Leopold Trattinick occurs in Mr. Dryander's *Bibl. Bankf.* v. 3. 646, 648, and 654, as the author of some botanical treatises in German. Perfoon, it appears from Pursh 519, has a *Trattenickia*, which is MARSHALLIA of Pursh, after Schreber. (See that article.) We must presume Willdenow to be most correct in the above orthography.—Willd. Sp. Pl. v. 4. 975.—Class and order, *Polygamia Monoecia*, Willd.; rather *Pentandria Monogynia*. Nat. Ord. *Terebinthaceæ*, Juss.

Gen. Ch. Cal. Perianth inferior, of one leaf, hairy, bell-shaped, with three teeth. Cor. of one petal, bell-shaped, longer than the calyx, with three slight teeth, somewhat hairy at its outside. Stam. Filaments five, awl-shaped, very short, inserted into the receptacle; anthers oblong, erect. Pist. Germen ovate, superior; style awl-shaped, the length of the stamens; stigma simple. Fruit unknown.

Obs. There are some flowers male only, having merely a short style, without any germen. But we cannot for that reason admit the genus into *Polygamia*, there appearing to be no difference of structure in the other parts of the flowers.

Ess. Ch. Calyx bell-shaped, with three teeth. Corolla bell-shaped, with three teeth. Stamens inserted into the receptacle. Germen superior. Stigma simple.

1. *T. rhoifolia*. Sumach-leaved Trattinnickia. Willd. n. 1.—Found in the province of Para, in Brasil, by count Hoffmannsegg, who communicated a dried specimen to professor Willdenow.—A large and very handsome tree, whose ultimate branches are striated and smooth, as thick as the little finger. Leaves alternate, stalked, pinnate, two feet long, composed of seven pair of opposite leaflets, with an odd one, which are stalked, four or five inches in length, oblong, pointed, entire, rigid, rough on both sides, veiny; somewhat heart-shaped at the base. The common footstalk is semi-cylindrical and striated; partial ones half an inch long, corrugated. Stipulas lanceolate, an inch long, rough with hairs, deciduous. Panicle terminal, spreading, compound, five inches in length. Flowers white, sessile, in little round tufts. The panicle ends in a pointed bud, expanding into a branch after the flowering is over, so that the branches of the panicle subsequently become lateral. The habit of this plant most resembles *Canarium*, though the genus is unquestionably distinct. Willd.

TRATUZ, in *Geography*, a town of European Turkey, in Moldavia; 49 miles S. of Niemez.

TRAU, or TROGHIR, a town of Dalmatia, pleasantly situated on a piece of land, which was formerly a peninsula, but now separated from the continent by a canal cut through. It is divided into the New and Old; the latter of which has a double, the former only a single wall, and defended by three towers. The harbour, which is formed by a bay, has depth of water enough for the largest ships, which ride there sheltered by two capes. It abounds also in fish, particularly fine sardines. It was an ancient Roman colony of the emperor Claudius; and so early as the year 997, put itself under the protection of Venice; on which it has been continually dependent ever since the year 1420, though not without many changes and disastrous revolutions. Vines, olives, figs, and almonds are cultivated here, and some corn, which however is not the richest produce of these parts. The internal part of the territory of Trau, which

is about 100 miles in circuit, on the continent, produces very little wine, and scarcely any oil. The flocks that feed there, together with those on the island under the same jurisdiction, yield about 400,000 pounds of cheese, and wool in proportion. The number of inhabitants in this territory is about 20,000; 12 miles W. of Spalatro. N. lat. $43^{\circ} 30'$. E. long. $16^{\circ} 30'$.

TRAU *Vecchia*, a town of Dalmatia; 12 miles S.W. of Trau.

TRAVAIATO, a town of Italy, in the department of the Mela; 6 miles W.S.W. of Brescia.

TRAVAIL, (from the French verb, *travailler*,) labour, toil, fatigue; but it is more generally applied to the pains of labour, or child-birth. See LABOUR.

TRAVAIL, in the *Manege*. See TRAVICE.

TRAVAILLER, Fr., in *Music*, to labour, work. In English music, a fugue is said to be *well-worked*, when the subject is frequently and ingeniously brought in, with new accompaniments and modulation: and an inward part of a Polyphonic composition is said to be *well-worked*, if some particular design is carried on in a spirited manner, while the other parts are sustaining slow notes in pure and pleasing harmony. The Italians express much the same at present by the term *tirato*. A subject or theme well treated, is said to be *ben tirato*. The old Italian masters used to call any series of notes ascending or descending, regularly *tirata*, in the same sense as the French *tirade*; which see.

TRAVANCORE, in *Geography*, a city of Hindoostan, and capital of a country of the same name; 108 miles S.S.W. of Madura. N. lat. $8^{\circ} 22'$. E. long. $77^{\circ} 14'$.

TRAVANCORE, a country of Hindoostan, situated in the S. part of the coast of Malabar, and westward of the Carnatic; about 90 miles in extent from N. to S.; governed by a rajah. This country began to rise into importance about the year 1730, by the abilities of the king, or rajah. Around the capital and chief province, he suffered the woods to grow for a number of years, till they formed an impenetrable belt of great depth. This, cut into labyrinths, afforded easy egress to his people, and rendered all attacks from without impracticable. Immured within these natural fortifications, he encouraged the cultivation of the arts and sciences; he invited the approach of men of genius and knowledge; he cultivated the friendship of the Brahmins, and was himself admitted into their society, by the ceremony of passing (as Raynal says) through a golden cow, which became the property of the Brahmins, the cow being sacred in India, as formerly in Egypt; and by preparing his own military stores, casting iron, making gunpowder, &c. he rendered himself independent of foreign aid. The subjects of his remoter provinces, who, to avoid the ravages of war, had taken refuge within the woody circle, now returned with their families and effects to their former habitations. Even the approach to this difficult retreat was impeded by the famous lines of Travancore, which extended from the southern banks of the river Cranganore, close to the sea, to the foot of the Ghauts, strongly fortified in their whole extent. These proved the first check to the ambition of Tippoo Sultan. Tippoo, from the outside of the lines, was a spectator of the horrid carnage of his soldiers. The Nays pressed on him on all sides, and being repulsed with disgrace, and himself thrown from his horse in the retreat, he is said to have made an oath, that he never would wear his turban again, till he had taken the rajah's lines; and accordingly he prepared to attack them by regular approach. On April 12th, 1790, he completely executed his menaces, and laid Cranganore in ruins, carried desolation through the country, and put every opponent to flight.

TRAVAY BAY, a bay on the S.W. coast of Tiree, one of the Western islands of Scotland. N. lat. $56^{\circ} 31'$. W. long. $6^{\circ} 48'$.

TRÄUCHBURG, or TRAUENBURG, a town and castle of Germany, in the circle of Swabia, which gives name to a small county situated to the S.W. of the territory of Kempten; 12 miles E. of Wangen.

TRAVE, a river of Germany, which rises from a lake in the duchy of Holstein, 2 miles W. of Arensböck, passes by Oldeslohe, Lubeck, &c. and runs into the Baltic, about 10 miles N.E. of Lubeck. N. lat. 54° . E. long. $10^{\circ} 55'$.

TRAVE, in *Agriculture*, a term applied, in some districts, as Essex, to a large sort of stouk of the wheat kind. In the work of traving, fourteen sheaves are set in a slanting position, head to head, across a furrow, and pressed together as close as may be; a single sheaf being then firmly placed in the furrow against each end of the trave. The traves are by this means made quite secure, solid, and compact, and may defy almost any force and violence of the wind. In some cases, instead of placing sheaves at the ends in this way, they are laid along the top or ridge of the trave; which, without doubt, at once better preserves the trave from the rain and wet, and gives a freer passage to the air between the sheaves, and sooner dries them, in case of their having been thoroughly soaked with rain; but then they are not nearly so strong to withstand powerful storms and blasts of wind as in the other mode of constructing them. See HARVESTING.

TRAVE, among *Farriers*, the same with *travice*.

TRAVELLER, in a *Ship*, a sort of thimble, whose diameter is much longer, in proportion to the breadth of its surface, than the common ones. It is furnished with a tail formed of a piece of rope, about three feet in length, one end of which encircles the ring to which it is spliced. These machines are principally intended to facilitate the hoisting or lowering of the top-gallant-yards at sea: for which purpose, two of them are fixed on each back-stay, whereon they slide upwards and downwards, like the ring of a curtain upon its rod; being thus attached to the extremities of the top-gallant-yard, they prevent it from swinging backwards and forwards, by the agitation of the ship, whilst the yard is hoisting or lowering at sea. Falconer.

TRAVELLER'S JOY, in *Botany*. See CLEMATIS.

TRAVEMUNDEN, in *Geography*, a sea-port of the duchy of Holstein, on the Baltic, at the mouth of the Trave, belonging to the city of Lubeck, which appoints a governor or commandant. The harbour is capable of containing 60 vessels, and deep enough for those of 200 tons. Men of war ride at anchor in the road. Travemunden is defended by a small fortress, mounting 40 guns, and a garrison of 50 men; 8 miles N.E. of Lubeck. N. lat. 54° . E. long. $10^{\circ} 51'$.

TRAVENDAL, a town of Holstein, on the Trave; 2 miles S.W. of Segeborg.

TRAVERON, a town of France, in the department of the Meuse; 10 miles E. of Gondrecourt.

TRAVERS, JOHN, in *Biography*, a musician brought up in St. George's chapel at Windsor, and afterwards bound apprentice to Dr. Greene, about the year 1730, was elected organist of St. Paul's Covent-Garden; and in 1737, on the death of Jonathan Martin, was appointed one of the organists of the king's chapel. He afterwards attached himself to Dr. Pepusch, and confined his studies solely to the correct, dry, and fanciless style of that master. His compositions, however pure the harmony, can only be ranked with pieces of mechanism, which labour alone may produce, without the assistance of genius.

His passion for fugues, resembled that of an inveterate punster, who never hears a phrase or sentence uttered in conversation, without considering what quibble or pun it will furnish: so Travers seems never to have seen or heard any series of sounds, without trying to form them into a fugue, and meditating when and where the answer might be brought in.

TRAVERS, in *Geography*, a town of the county of Neuchâtel; 11 miles W. of Neuchâtel.

TRAVERSE, or TRANSVERSE, something that goes athwart another, *i. e.* that crosses and cuts it obliquely.

TRAVERSE is particularly used for a piece of wood or iron placed transversely, to strengthen and fortify another: such are those used in gates, windows, &c.

To plane a board against the grain, is also called, among joiners, &c. to traverse it.

TRAVERSE, in *Gunnery*, signifies to turn or point a piece of ordnance, which way one pleases, upon her platform.

The laying or removing of a piece of ordnance, or a great gun, in order to bring it to bear, or lie level with the mark, is also called *traversing the piece*. See GUNNERY.

TRAVERSE, in *Fortification*, denotes a trench with a little parapet, sometimes two, one on each side, to serve as a cover from the enemy that might come in flank. See GLACIS, and *Plate V. Fortification, fig. 6*, in which *v, v*, represent traverses, constructed at the extremities of the places of arms, which serve to enclose them: these traverses are three toises thick, and as long as the covert-way is broad; and a passage is cut in the glacis round them of about six or eight, in order to have a free communication with the rest of the covert-way. There are also traverses of the same dimensions before every salient angle of the bastion and outworks, and they in the same direction of the faces of those works produced; and the thickness lies at the same side as the parapets. The passages round these last traverses are from six to eight feet wide. The second covert-way has also traverses every where, in the same manner as the first.

Traverses are sometimes covered over-head with planks, and loaded with earth. Each traverse is furnished with a foot-bank, and a row of palisades planted on the foot-bank; and the passage round its end should be furnished with klinkets, or doors, to shut them up when necessary. They are very commodious for stopping an enemy's way, and to prevent being enfiladed: they likewise make a good defence, in a dry foss, in making the parapet on the side next the opposite flank.

TRAVERSE, in a *wet foss*, is a sort of gallery, made by throwing fascions, joists, fascines, stones, earth, and other things, into the foss, over-against the place where the miner is to be put to the foot, or the wall, in order to fill up the ditch, and make a passage over it.

TRAVERSE also denotes a wall of earth, or stone, raised across a work which is commanded, in order to cover the men.

TRAVERSE also signifies any intrenchment, or line fortified with fascines, barrels, or bags of earth, or gabions.

TRAVERSE, in *Navigation*, is the variation or alteration of a ship's course, occasioned by the shifting of the winds, currents, &c.; or a traverse is a compound course, in which several different courses and distances are known.

Traverse sailing is used when a ship, having set sail from one port towards another, whose course and distance from the port sailed from are given or known, is, by reason of contrary winds, or other accidents, forced to shift and sail on several courses, which are to be brought into one course, to learn, after so many turnings and windings, the true course

and distance made from the place sailed from, and the true point or place where the ship is; that so, the wind coming fair, it may be known how, afterwards, to shape a course for the place intended.

This may be performed geometrically two ways: the first by drawing new meridians, through the extremity of every course, parallel to the first meridian, or north and south line at first made, and setting off every course with a sweep of sixty, as if it were a question in plain sailing: you may also let fall perpendiculars to every new meridian, from the point that the ship sailed to upon that course; by which you have the course, distance, difference of latitude, and departure, to every course.

To illustrate this by an example: a ship, being bound for a port distant 120 miles N.E. $\frac{1}{2}$ E. sails S.S.E. 30 miles, then N.E. by N. 40, then E. by N. 25, then N.N.E. 44: it is required to find the course and distance made good, and also the course and distance to the port bound for?

Draw the line H K (*Plate VI. Navigation, fig. 1.*) at pleasure, for a meridian, or north and south line, and therein assume a point, as A, for the port sailed from; then, with 60 of the chords, and one foot in A, draw the arc L m, upon which set off two points (because the course is S.S.E.) from L to m, and draw the line A m, upon which set off the distance 30 from A to B; then is the ship at B: thus letting fall the perpendicular B K, A K $27^{\circ} 7'$ is the difference of latitude, and B K $11^{\circ} 5'$, the departure of the first course.

For the second course: with the distance K B draw the parallel B N, and thereby with the chord of 60, as before, set off the second course and distance, N.E. by N. 40, from B to C, and let fall the perpendicular C L; then is the ship at C, the difference of latitude upon the course is B L $33 : 3$, and departure C L $22 : 2$.

Proceed in the same manner for the third course: with the parallel C O, set off E. by N. 25, from C to D, and draw the line D P, from which set off the last course, N.N.E. 44, then is your ship at E.

Since, then, the ship came from A, and is now at E, the line A E, measured on the same equal parts upon which all the other distances were taken, will be found 91 miles; and the arc R Q, measured on the rhumbs, five points; *viz.* N.E. by E.; so that the ship is now 91 miles N.E. by E. from the port sailed from.

To find her course and distance to the port bound for, set off four half-points upon the arc R Q, from R to S, and from A through S draw the line A S F; upon which set off 120, the distance from the port sailed from, to the port bound for, from A to F; then is F the port bound for: now the port bound for being at F, and the ship being but at E, the line E F, measured on the same equal parts that the rest was taken from, will be found to be 31; and the arc T V, measured on the chords, is $35^{\circ} 12'$, or N.E. by N. somewhat easterly, &c. This method is useful where the courses tend generally one way, without intersecting one another; but if they often cross, it is best to have recourse to the second method, which is without new meridians.

In order to this, observe how many points are between the point next to be laid down, and the point opposite to the course laid down; for that is the point for laying down: then when the chord of 60, and one foot in the point the ship is last come to, describe an arc; upon which set off the points found by the abovesaid rule, and through that draw the line for the next course, &c. For an example:

Draw a north and south line, as in the former, as the line R M (*fig. 2.*), in which assume a point, as at A, for the port

port failed from; then from A set off the first course and distance, viz. N.N.W. 68, from A to B; and for the second course, with the chord of 60, and one foot in B, draw the arc TW, upon which to set off the next course S.S.W. 70: observe the rule above delivered; viz. to take the number of points between the point next to fail on. The reason of which rule is this; if from A to B your course be N.N.W., then back from B to A must needs be S.S.E. the opposite point; and then if you were to sail S. by E. it must be one point to the southward of that S.S.E. line; if S. it is two points; and consequently the next course being S.S.W., you are to set off four points, upon which set off 70 miles, from B to C, and then is your ship at C: for the third course, if from B to C be S.S.W., then from C to B is N.N.E.; but the next course being E. $\frac{1}{2}$ N. the points between N.N.E. and E. $\frac{1}{2}$ N. are five points and a half; and therefore, with the chord of 60, and one foot in C, draw the arc XY, upon which set off five points and a half from X to Y; and through Y draw the line CD, upon which set off 90 miles from C D: then is your ship at D.

After the same manner lay down all the rest, as D E, which is W.N.W. $\frac{1}{2}$ N. 70; then E F, S. 25; then F G, E. $\frac{1}{2}$ S. 45; then lastly G H, S. 30, which is the last course.

Thus your ship being at H, and the port failed from at A, the line A H, 28 miles, is the distance made good; and the angle at A is four points, viz. S.E.; but the port intended for being S.W. 55, set it from A to K; and the ship being at H, the line H K, 62 miles, is the distance from the ship to the port bound for; and the course is found by measuring the angle at H $71^{\circ} 48'$, or W.S.W. more than a quarter westerly, &c.

To work a Traverse by the Tables of Difference of Latitude and Departure.—This is the principal use those tables are intended for; and the way of working a traverse by them is equal to the best for exactness, and superior in point of expedition.

Make a little table with six columns, the first for the course, the second for the distance, the third for the northing, the fourth for the southing, the fifth for the easting, the sixth for the westing. Then find the difference of the latitude and the departure to every course, and set them in their proper columns; as, where the course is northerly, set the difference of the latitude under northing, or in the north column; and where the course is southerly, set the difference of latitude in the south column.

Again, where the course is easterly, set the departure in the east column, and when westerly, set it in the west column; then, adding up each column by itself, subtract the north and south columns, the less from the greater, the remainder is the northing or southing made good. Also subtract the east and west columns, the less from the greater, the remainder is the easting or westing made good; then you have the difference of latitude and departure given to find the course and distance.

In the first example above specified, the first course is S.S.E. 30 miles, or two points 30 miles; for which I find the difference of latitude 27:7. Now the course being between south and east, I place my difference of latitude in the south column, and my departure, 11:5, in the east column, leaving the north and west columns blank.

Then for the second course N.E. by N. or three points 40 miles, my difference of latitude, 33:3, is to be placed in the north column, and the departure, 22:2, in the east column; because the course is between the north and east.

Then the third course being E. by N. or seven points 25 miles, I place my difference of latitude, 4:9, in the north column; and departure, 24:5, in the east column.

And so for the fourth course N.N.E. or two points 44 miles, I place my difference of latitude, 40:6, in the north column; and my departure, 16:8, in the east column: then adding up each column, the sum of the northing column is 78:8, and the sum of the southing column is 27:7; which subtracted from the northing, 78:8, the remainder, 51:1, is the difference of latitude made good, which is northing, because the northing was the greater number.

Again, the sum of the easting column is 75:0, which, because there is no westing to subtract from it, is the easting made good. Thus you have the northing 51:1, and the easting 75:0 given, to find course and distance; and though you cannot find in the table the exact number of 51:1 and 75:0 together, yet find the nearest you can, which is 75:4, and 50:9, over which, at the top, you find 34 degrees for the course, which is N.E. by N. $0^{\circ} 15'$ easterly, and the distance is 91 miles.

To resolve a Traverse by the Scales on Gunter's Scale, improved by Mr. Robertson.—E. g. A ship in 40° N. lat. and $5^{\circ} 14'$ W. long. sails the S.E. by S. 68 min. then S.W. by W. 55 min. and then W.N.W. 75 min. What is her difference of latitude and departure in this general run?

The proportions are, for the

First Course.

As rad. : Dist. :: S. Co. cour. : Diff. lat. :: S. cor. : Depart. S. 8 pts. : 68' :: S. 5 pts. : 57' S. :: S. 3 pts. : 38' E.

Second Course.

S. 8 pts. : 55' :: S. 3 pts. : 30'.6 S. :: S. 5 pts. : 46' W.

Third Course.

S. 8 pts. : 75' :: S. 2 pts. : 28'.8 N. :: S. 6 pts. : 69'.5 W.

Traverse Table.

	Courses.	Dist.	Diff. Lat. N.	S.	Departure. E.	W.
1	S.E. by S.	68		57.0	38.0	
2	S.W. by W.	55		30.6		46.0
3	W.N.W.	75	28.8			69.5
			28.8	87.6 28.8		115.5 38.0
	General diff. Lat.			58.8		77.5

viz. departure made good in this day's run.

To work the above on the Sliding Gunter.—Set sine of 8 points on the fixed piece, by the help of the brass index, against 68 num. on the slide; then draw the said index to S. 5 points, you will find 57 num. on the slide for the difference of latitude; and (without any alteration) against S. 3 points, on the fixed piece, you will have 38 num. on the slide for the departure.

With the compasses, take the extent from 8 points on the sine rhumbs to 68 on the numbers; the said extent laid the same way from sine 5 points will reach to 57 on the num.

num. and the same extent laid the same way will reach to 38 on the num. as before: and in like manner may the rest, and all others of the like kind, be wrought with ease and dispatch. See Mountaine's Description of the Lines drawn on Gunter's Scale, as improved by Mr. J. Robertson, and executed by Messrs. Nairne and Blunt, p. 32, &c.

TRAVERSE-Board, in a *Ship*, a little round board hanging up in the steerage, and bored full of holes upon lines shewing the points of the compass upon it. By moving of a little peg from hole to hole, the steersman keeps an account how many glasses, that is half-hours, the ship steers upon any point.

This implement is particularly useful in light and variable winds. Thus, if the wind is northerly at the beginning of the watch, the ship, being close-hauled on the larboard-tack, will steer W.N.W. If, after the first half-hour, the wind changes to N. by W., the ship will fall off to W. by N. Both these courses are marked by the helmsman upon the traverse-board, by putting in one peg for every half-hour in which she steers the same course: as one peg into W.N.W. and two pegs into W. by N., if she sails an hour on the latter course; and so on. The lee-way and variation of the compass are afterwards allowed by the pilot, on summing up the whole.

TRAVERSE-Table, in *Navigation*, is the same with a table of difference of latitude and departure; being only the difference of latitude and departure ready calculated to every degree, point, half-point, and quarter-point of the quadrant; and for any distance under one hundred miles, though it may conveniently serve for greater distances, by taking their halves, thirds, fourths, &c. and doubling, tripling, quadrupling, &c. the difference of latitude and departure found to those parts of the distance.

This table is one of the most necessary things a navigator has occasion for; for by it he can readily reduce all his courses and distances, run in the space of twenty-four hours, into one course and distance; whence the latitude he is in, and his departure from the meridian, may be found.

See a table of this kind, in which the distances are continued to one hundred and twenty, for the sake of more easy subdivisions, and which is divided into two parts; the first containing the whole points and quarter-points in a quadrant, and the second part fitted to every degree and quarter of a degree in the quadrant; in Robertson's *Navigation*, at the close of book 7. See also a table of the same kind in Mackay's *Complete Navigator*.

TRAVERSE the Yard, on board a ship, is to brace it aft.

TRAVERSE, in *Law*, denotes the denial of some matter of fact, alleged to be done in a declaration, or pleadings; upon which the other side coming, and maintaining that it was done, issue is joined for the cause to proceed to trial.

The formal words of a traverse are in the law-French *sans ceo*; in Latin, *absque hoc*; in English, *without that*, &c.

An answer, says West, (speaking of bills in chancery,) is that which the defendant pleadeth or saith in bar to avoid the plaintiff's bill or action, either by confessing and avoiding, or by denying and traversing the material parts of it. A replication is the plaintiff's reply to the defendant's answer, which must affirm and pursue his bill, and confess and avoid, deny or traverse the defendant's answer.

A plea is naught, which neither traverses nor confesseth the plaintiff's title, &c. Every matter of fact alleged by the plaintiff may be traversed by the defendant, but not matter of law, or what is part matter of law and part matter of fact; nor may a record be traversed, as this is not to be tried by a jury.

If a matter be expressly pleaded in the affirmative, which is expressly answered in the negative, no traverse is necessary, there being a sufficient issue joined: also where the defendant hath given a particular answer in his plea to all the material points contained in the declaration, he need not take a traverse: because when the thing is answered, there needs no farther denial.

TRAVERSE of an Indictment or Presentment is the contradicting or denying some chief point of it, and taking issue thereon. See **INDICTMENT**, and **PRESENTMENT**.

Thus, in a presentment against a person for a highway overflowed with water, for default of scouring a ditch, &c. he may either *traverse the matter*, by alleging that there is no highway, or that the ditch is sufficiently scoured; or he may *traverse the cause*, viz. by alleging that he hath not the land, or that he and they whose estate, &c. have not used to clean the ditch.

It is not customary, nor agreeable to the general course of proceedings, unless by consent of parties, to try persons indicted of smaller misdemeanors at the same court in which they have pleaded *not guilty*, or traversed the indictment. But they usually give security to the court, to appear at the next assizes or sessions, and then and there to try the traverse, giving notice to the prosecutor of the same.

TRAVERSE of an Office, is the proving that an inquisition made of lands or goods is defective, and untrue made. See **OFFICE**.

No person shall traverse an office, unless he can make to himself a good right and title: and if one be admitted to traverse an office, this admission of the party to the traverse supposes the title to be in him, or else he could have no cause to traverse.

TRAVERSE is sometimes used in *Heraldry*, for a partition of an escutcheon, which they blazon *parti per pale*, *traverse*, *argent and gules*.

TRAVERSE, in the *Manege*. A horse is said to traverse, when he cuts his tread cross-wise; and throwing his croupe to one side, and his head to another.

TRAVERSE Tyles. See **TYLE**.

TRAVERSE Bay, Grand, in *Geography*, a bay on the east side of lake Michigan. N. lat. 44° 45'. W. long. 85°.

TRAVERSE Islands, a chain of islands at the east end of Noquet's bay, in lake Michigan: on one of the largest is a town of the Ottoway Indians.

TRAVERSE River, a river of Louisiana, which runs into the Missouri, N. lat. 38° 30'. W. long. 92° 5'.

TRAVERSIERE, FLUTE, commonly called the German-flute, being supposed of German invention. But it has its title of *flute traversiere* in France, from the different manner of holding it from that of *la flute à bec*, or common flute.

Its original compass was from the lowest D in the treble, to a in altissimo.

Such was the extent of the scale in 1752, when Quantz published his "Methode de la Flute," who was the late Frederic king of Prussia's master on that instrument, and the first who added keys to correct and clear the bad notes.

In the folio *Encyclopédie*, tom. vi. there is a scale of all the tones, semi-tones, and shakes possible on the instrument, with an additional half-note, C \times or D \flat , below the usual lowest note of its compass, and three notes above A in altissimo, the highest note of Quantz's scale. See *Music Plates*.

For the history of the flute traversiere, Quantz tells us that in the year 1620 it had no key to make D \times or E \flat , and was called the Swiss flute. It was the French who added the first key; but it was not known by whom or when.

when, Quantz himself added a second key in the year 1726, and about 1732, a third. Two more keys have since been added by subsequent performers on the instrument; but it has been thought more for parade than use: as the management of five keys in rapid performance, would be as difficult as running divisions on an organ with all the five short keys split into quarter-tones. See TACET.

TRAVESTY, or TRAVESTI, a term which some late authors have introduced into poetry: it is originally French, being a participle of the word *travestir*, to disguise one's self, or to appear in masquerade. Hence travesty comes to be applied to the disguising of an author, or the translating him into a style and manner different from his own; and is generally applied to pieces of humour.

Travesty, or parody, may be divided into two classes:— that which is intended to ridicule absurdity, and that the purpose of which is to extract gaiety and laughter from compositions in their own nature grave and admirable. The Rehearsal by the duke of Buckingham is the best specimen of the former. At a period when false taste seems to have prevailed in an eminent degree, which would be most likely to happen when a man of splendid talents like Dryden condescends to sacrifice his better judgment for the specious allurements of a temporary popularity, an author of wit has the appearance of doing the public a service, who shall call them to sobriety and good sense by the force of ridicule. The second kind of travesty has still less that can be alleged in its favour. Its direct operation is to pollute our better feelings, and tarnish with a putrefying film of ridicule all the noblest and most exquisite effusions of the human mind. Here unfortunately ridicule most easily takes hold. We cannot laugh at nothing; the prattle of inanity bids defiance to the ludicrous. There must be something of what we have been accustomed to view with honour in the composition we are successively invited to contemplate again and again with bursts of laughter against the author. But that which is most easily turned into burlesque, and affords the most permanent hold of an attack of this sort, is the language and sentiments that had before excited in us the deepest and most sacred emotions. The very contrast between the solemn feelings with which these things had been formerly regarded, and the unexpected colour of absurdity which is given them now, makes the temptation to laughter the more violent and irresistible.

G. Battista Lalli has travestied Virgil, or turned him into Italian burlesque verse. Scarron has done the same in French; and Cotton and Philips in English verse.

Castalio is, by some, charged with having travestied the sacred text, by reason of the difference of air and style between his version and the original.

TRAVICE, in the *Manege*, is a small inclosure or oblong quadrangle placed before a farrier's shop, and consisting of four pillars or posts, kept close together by cross poles. This inclosure is designed for holding and keeping in a horse that is apt to be unruly or disorderly in the time of shoeing, or of any operation.

This, in some of the remoter parts of England, goes by the name of a *break*; and is called in French, *travail*.

TRAUMATICS, *Τραυματικά*, *Vulneraries*, or medicines good for the healing of wounds. See VULNERARY and AGGLUTINANT, HEALING, and CONSOLIDATION.

TRAUMATICUM, BALSANUM. See BALSANUM *Traumaticum*.

TRAUN, in *Geography*, a river of Austria, which rises in the Halfatter See, forms a considerable lake, called Traun See, and runs into the Danube, about three miles below Steyregg.—Also, a river of Bavaria, which rises

from two lakes, Forchensee and Daubensee, and enters the Alza, 4 miles N. of Chiemsee.

TRAVNIKOVA, a town of Russia, on the Lena; 6 miles S.S.E. of Orlenga.

TRAUNKIRCHEN, a town of Austria; 10 miles S.S.E. of Voglbruck.

TRAUNSTAIN, a town of Austria; 4 miles S.W. of Zwettl.

TRAUNSTEIN, a town of Bavaria, on the Traun, where are some considerable salt-works; 18 miles W. of Salzburg. N. lat. 47° 51'. E. long. 12° 35'.

TRAUSI, in *Ancient Geography*, a people of Thrace, in the environs of mount Hæmus, whose manners, described by Herodotus, resembled those of the other Thracians.

TRAUSTADT, or Wschowa, in *Geography*, a town of the duchy of Warfaw; 40 miles S.S.W. of Posen.

TRAUTENAU, a town of Bohemia, in the circle of Konigingratz; 21 miles N. of Konigingratz. N. lat. 50° 27'. E. long. 15° 48'.

TRAUTENFELS, a town of the duchy of Stiria; 7 miles E.N.E. of Groming.

TRAUTMANSDORF, a citadel in the county of Tyrol; 4 miles N.E. of Tyrol.

TRAUTMANSTORFF, a town of Austria; 6 miles W.N.W. of Brugg.

TRAVUS, in *Ancient Geography*, a river of Thraee, which discharged its waters into the lake of Bistonis.

TRAYAGUERA, in *Geography*, a town of Spain, in Valencia, surrounded by a wall flanked with towers. Here is a manufacture of fine earthenware; 80 miles N.E. of Valencia.

TRAYL-BASTON, or TRAIL-BASTON. Edward I. in his 32d year, sent out a new writ of inquisition, under this denomination, against the intruders on other men's lands, who, to oppress the right owner, would make over their lands to great men; against batterers hired to beat men, breakers of peace, ravishers, incendiaries, fighters, false assisors, and other malefactors: which inquisition was so strictly executed, and such fines taken, that it brought in much treasure to the king.

Hence, also, *justices of trayl-baston*, a denomination given to the justices appointed to execute this commission, either by reason of their severe and summary way of proceeding, or because a staff was delivered them as the badge of their office, and the offenders were dragged before this jurisdiction.

TRAYTOR, TRAITOR, *Traditor*, a betrayer of his king and country, or one guilty of high-treason. See TREASON.

TRAYTOROUS or TRAITEROUS *Position*, is particularly understood of a tenet, which some formerly held, of the legality of taking arms, by the king's authority, against his person, and those commissioned by him: which is condemned by statute 14 Car. II. c. 3.

TRAZA, in *Geography*, a town of Arabia, in the country of Yemen; 70 miles N. of Loheia.

TREACLE, in *Pharmacy*, &c. See THERIACA.

The word treacle is also popularly used for melasses; and in this sense it is that Dr. Shaw, in his "Essay on Distillery," has endeavoured to bring into use several sorts of treacles, which might be made at home, and would serve very conveniently for the distillation of spirits, or the making of potable liquors. These are the inspissated juices or decoctions of vegetables: such as the sweet juice of the birch, or sycamore, procured by tapping or piercing the trees in spring, and the common wort made from malt, or from other vegetable substances treated in the same manner. These
liquors

liquors are severally to be boiled down in a copper till they begin to inspissate, and then to be poured into a balneum Mariæ, when the remainder of the evaporation may be finished without burning the inspissated juices: thus prepared, it may be at any time reduced to the state of wort, only by adding a sufficient quantity of warm water.

Treacle is employed for the more quickly fattening some sorts of domestic animals, such as sheep and neat cattle, when properly mixed and united with different sorts of dry materials, such as pollard, bruised grain, cut hay, and many other matters of the same nature, as they mostly soon become very fond of it, and it is well known to be of a very nutrient quality. Trials have been made with it in this view, with great success. See *STALL-Feeding*.

TREACLE-Mustard, or *Mithridate*, in *Botany*. See *THLASPI*.

The seed enters into the composition of the theriaca, and externally used, cleanses all sorts of ulcers, and is also a ptarmic, but not very common. It is reckoned an enemy to pregnant women, because it kills the fœtus. James. See *THLASPEOS Semen*.

TREACLE-Mustard, is also a name given to the clypeola.

TREACLE-Water, *Aqua Theriacalis*, a compound cordial, or spirituous water, distilled with a spirituous menstruum, from any cordial and sudorific drugs and herbs, with a mixture of some of the theriaca Andromachi, or Venice treacle; whence its name.

TREAD, in the *Manege*. See *PISTE*.

The tread of a horse is considered to be good, when firm, and without the animal resting upon one side of the foot more than upon the other, or setting down the toe or heel one before the other. Where the heels are first set down to the ground, it is often supposed to be a sign that the animal is unsound in its feet. And where the toes are first put to the ground, it is considered as shewing that the horse has been of the team or draught kind. Consequently, in a good going horse of the saddle sort, the whole foot should be set down equally, at the same instant of time, and neither turned out nor in, in any perceptible degree.

TREAD upon the *Coronet*, is a term applied to any injury which is done to it by the treading of the other horses or animals on it. See *CORONET*.

TREADHAVEN CREEK, in *Geography*, a branch of the river Choptank.

TREADING in *Wheat*, in *Agriculture*, the practice of making such land as is light, sandy, and friable, hard and firm by such means after the seed has been put into it, in order to secure its vegetation and growth in a more perfect manner. It has been suggested as useful on different kinds of soil, but it is evidently the most proper for those that are light and open, either from their particular nature and quality, or the sorts of crops by which they have been occupied, as those of the potatoe, turnip, or other similar kinds. In all such cases, it will be found of great utility and advantage in promoting the establishment of the roots of the plants, by forcing the wheat to strike more strongly into the soil, and by keeping the frosts from injuring and throwing them out while in the early state of their growth. But in stronger lands it may be injurious and hurtful in many instances, and mostly unnecessary.

The best mode of effecting it is probably by the use of sheep immediately after the land has been sown and harrowed, by turning them upon it in sufficient quantities, as they do it in a very effectual manner. Some have, however, recourse to other sorts of animals, as neat cattle and horses, and to rolling; but this last seldom answers well, as it is liable to increase the friability below in such soils. The

cattle and horses, when in sufficient number, often produce much benefit in this way; and in some places, where the land is of a soft abraded stony quality, teams of six or eight oxen are used in covering in the seed, in drawing a light pair of harrows, in this intention. Wherever treading is necessary in this view, it should constantly be performed in an effectual manner, with whatever sort of live-stock it is done, whether sheep, oxen, or horses. Sometimes treading is found beneficial for wheat, on such soils, so late as March, even more so than at the time of putting in the seed, as tending to destroy weeds, such as the corn-poppy, &c.

The practice of treading in the wheat is, of course, mostly to be adopted, in all these cases, as tending to secure and increase the quantity of the produce whenever such sorts of land are sown with that kind of crop. See *WHEAT*.

TREASON, TREACHERY, the act or crime of infidelity to one's lawful sovereign.

Treason is a general appellation made use of by the law, to denote not only offences against the king and government, but also that accumulation of guilt which arises whenever a superior reposes a confidence in a subject or inferior, between whom and himself there subsists a natural, civil, or even spiritual relation; and the inferior so abuses that confidence, and so forgets the obligation of duty, subjection, and allegiance, as to destroy the life of any such superior or lord. Whence

Treason, in our laws, is of two sorts, *high* and *petty*.

TREASON, *High*, or *Treason Paramount*, which is equivalent to the *crimen læsæ majestatis* of the Romans, (as Glanvil denominates it also in our English law,) is an offence committed against the security of the king or kingdom, whether by imagination, word, or deed.

In order to prevent the inconveniences which arose in England from a multitude of constructive treasons, the statute 25 Edw. III. c. 2. was made; which defines what offences only for the future should be held to be treason: and this statute comprehends all kinds of high-treason under seven distinct branches.

1. "When a man doth compass or imagine the death of our lord the king, of our lady his queen, or of their eldest son and heir." A queen pregnant is also within the words of the act, though it does not extend to the husband of such a queen. And the king here intended is the king in possession, without any respect to his title: consequently, a king who has resigned his crown, such resignation being admitted and ratified in parliament, is no longer the object of high-treason: and the same reason holds in case the king abdicates the government; or, by actions subversive of the constitution, virtually renounces the authority which he claims by that very constitution. As the compassing or imagination, expressed by this statute, is an act of the mind, it cannot possibly fall under any judicial cognizance, unless it be demonstrated by some open or *overt* act. The statute expressly requires, that the accused "be thereof upon sufficient proof attainted of some open act by men of his own condition." Thus to provide weapons or ammunition for the purpose of killing the king, is held to be a palpable overt act of treason in imagining his death: to conspire to imprison the king by force, and move towards it by assembling company, is an overt act of compassing the king's death: and taking any measures to render treasonable purposes effectual, as assembling and consulting on the means to kill the king, is a sufficient overt act of high-treason. It now seems clearly to be agreed, that, by the common law and the statute of Edw. III., words spoken amount only to a high misdemeanor, and no treason. If the words be set
down

down in writing, it argues more deliberate intention; and it has been held, that writing is an overt act of treason; for *scribere est agere*. But even in this case, the bare words are not the treason, but the deliberate act of writing them. It was formerly held, that the publication of a treasonable writing was a sufficient overt act of treason at the common law; though of late even that has been questioned.

2. The second species of treason is, "if a man do violate the king's companion, or the king's eldest daughter unmarried, or the wife of the king's eldest son and heir." By the king's companion is meant his wife, and by violation is understood carnal knowledge, as well without force, as with it; and this is high-treason in both parties, if both be consenting.

3. The third species of treason is, "if a man do levy war against our lord the king in his realm." And this may be done by taking arms, not only to dethrone the king, but under pretence to reform religion, or the laws; or to remove evil counsellors, or their grievances, whether real or pretended; and by intimidation and violence to force the repeal of law.

4. "If a man be adherent to the king's enemies in his realm, giving to them aid and comfort in the realm, or elsewhere," he is also declared guilty of high-treason. This must likewise be proved by some overt act, as by giving them intelligence, by sending them provisions, by selling them arms, by treacherously surrendering a fortress, or the like.

5. "If a man counterfeit the king's great or privy seal," this is also high-treason.

6. The sixth species of treason under this statute is, "if a man counterfeit the king's money; and if a man bring false money into the realm counterfeit to the money of England, knowing the money to be false, to merchandise and make payment withal." Counterfeiting the king's money is treason, whether the false money be uttered in payment, or not. Also if the king's own minters alter the standard or alloy established by law, it is treason. But gold and silver money only are held to be within this statute. With regard, likewise, to importing foreign counterfeit money, in order to utter it here; it is held that uttering it, without importing it, is not within the statute.

7. The last species of treason ascertained by this statute is, "if a man slay the chancellor, treasurer, or the king's justices of the one bench or the other, justices in eyre, or justices of assize, and all other justices assigned to hear and determine, being in their places doing their offices." This statute extends only to the actual killing of them, and not to a wounding, or bare attempt to kill them. The barons of the exchequer are not within the protection of this act; but the lord keeper or commissioners of the great seal now seem to be within it, by virtue of the statute 5 Eliz. c. 18. and 1 W. & M. c. 21.

The new treasons created since the statute 1 M. c. 1. and not comprehended under the description of statute 25 Edw. III. may be comprised under three heads. The first species relates to Papists; the second, to falsifying the coin (see *BRITISH COINS*) or other royal signatures; as falsely forging the sign manual, privy signet or privy seal, which shall be deemed high-treason. (1 M. ft. ii. c. 6.) The third new species of high-treason, is such as was created for the security of the Protestant succession in the house of Hanover. For this purpose, after the Act of Settlement was made, it was enacted by statute 13 & 14 Will. III. c. 3. that the pretended prince of Wales, assuming the title of king James III., should be attainted of high-treason; and it was made high-treason for any of the king's subjects to hold cor-

respondence with him or any person employed by him, or to remit money for his use. And by 17 Geo. II. c. 39. it is enacted, that if any of the sons of the Pretender shall land or attempt to land in this kingdom, or be found in the kingdom or any of its dominions, he shall be adjudged attainted of high-treason; and corresponding with them or remitting money to their use, is made high-treason. By 1 Ann. stat. 2. c. 17. the offence of hindering the next in succession from succeeding to the crown is high-treason: and by 6 Ann. c. 7. if any person shall maliciously, advisedly, and directly, by writing or printing, maintain, that any other person hath any right to the crown of this realm, otherwise than according to the Act of Settlement, or that the kings of this realm, with the authority of parliament, are not able to make laws to bind the crown and its descent; such person shall be guilty of high-treason.

The punishment of high-treason in general is very solemn and terrible. 1. That the offender be drawn to the gallows, and not be carried or walk; though usually (by connivance, at length ripened by humanity into law) a sledge or hurdle is allowed, to preserve the offender from the extreme torment of being dragged on the ground or pavement. 2. That he be hanged by the neck, and then cut down alive. 3. That his entrails be taken out, and burned, while he is yet alive. 4. That his head be cut off. 5. That his body be divided into four parts. 6. That his head and quarters be at the king's disposal.

The king may, and often doth, discharge all the punishment, except beheading, especially where any of noble blood are attainted. For beheading being part of the judgment, that may be executed, though all the rest be omitted by the king's command. But where beheading is no part of the judgment, as in murder or other felonies, it hath been said that the king cannot change the judgment, although at the request of the party, from one species of death to another. See EXECUTION.

In the case of coining, the punishment is milder for male offenders; being only to be drawn, and hanged by the neck till dead. But in treasons of every kind, the punishment of women is the same, and different from that of men: for, as the decency due to the sex forbids the exposing and publicly mangling of their bodies, their sentence is to be drawn to the gallows, and there to be burnt alive.

The consequences of the judgment pronounced upon a traitor are *attainder*, *forfeiture*, and *corruption of blood*. See ATTAINDER, &c.

It is a maxim, that, *in majori proditione, omnes sunt principes*, there are no accessories in high-treason, all are accounted principals.

Also, that *voluntas non reputabitur pro facto, nisi in causa proditionis*, the will is never taken for the deed in any case, but in that of high-treason. See INDICTMENT.

TREASON, *Petty* or *Petit*, according to the stat. 25 Edw. III. c. 2. may happen three ways: by a servant killing his master, a wife her husband, or an ecclesiastical person (either secular or regular) his superior, to whom he owes faith and obedience. A servant, who kills his master whom he has left, upon a grudge conceived against him during his service, is guilty of petit treason: so if a wife be divorced *a mensa et thoro*, still the *vinculum matrimonii* subsists; and if she kill such divorced husband, she is a traitress; and if a clergyman is understood to owe canonical obedience to the bishop who ordained him, to him in whose diocese he is beneficed, and also to the metropolitan of such suffragan or diocesan bishop; and therefore to kill any of these is petit treason.

A person indicted of petit treason may be acquitted thereof, and found guilty of manslaughter or murder; and in such case,

it should seem that two witnesses are not necessary, as in the case of petit treason they are. See INDICTMENT.

The punishment of petit treason, in a man, is to be drawn and hanged; and in a woman, to be drawn and burnt: the idea of which latter punishment, says judge Blackstone, seems to have been handed down to us by the laws of the ancient Druids, which condemned a woman to be burnt for murdering her husband; and it is now the usual punishment for all sorts of treasons committed by those of the female sex. Persons guilty of petit treason, were first debarred the benefit of clergy by stat. 12 Hen. VIII. c. 7. which has been since extended to their aiders, abettors, and counsellors, by stat. 23 Hen. VIII. c. 1. 4., and 5 P. & M. c. 4.

This kind gives forfeiture of lands by escheat to the lord of the fee. See FORFEITURE and ESCHEAT.

TREASON, *Accumulative*. See ACCUMULATION. Blackst. Comm. vol. iv. &c.

TREASON, *Appeal of High*. It was anciently permitted, that any subject might appeal another subject of high-treason, either in the courts of common law, or in parliament, or (for treasons committed beyond the seas) in the court of the high constable and marshal. The cognizance of appeals in the latter still continues in force; and so late as 1631, there was a trial by battle awarded in the court of chivalry, on such an appeal of treason; but that in the first was *virtually* abolished by the first stat. 5 Edw. III. c. 9. and 25 Edw. III. c. 24. and in the second *expressly* by stat. 1 Hen. IV. c. 14. So that the only appeals now in force, for things done within the realm, are appeals of felony and mayhem. Blackst. Comm. vol. iv.

TREASON, *Constructive*, an offence raised, by forced and arbitrary construction, into the crime and punishment of treason, which never was suspected to be such: a multitude of these existed before the inconvenience was remedied by 25 Edw. III. c. 2. Constructive treasons were also numerous in the reign of Richard II. and afterwards between the reign of Henry IV. and queen Mary, and particularly in the bloody reign of Henry VIII., all which were abrogated by the stat. 1 Mary, c. 1. which once more reduced all treasons to the standard of the stat. 25 Edw. III.

TREASON, *Misprision of*. See MISPRISION.

TREASURE, THESAURUS, *θησαυρος*, a store, or stock of money, in reserve.

TREASURE-trove, q. d. *treasure found, thesaurus inventus*, in Law, is when money, gold, silver, plate, or bullion, is found in the ground, in any place, and none knows to whom it belongs.

This should naturally fall to the finder, to whom it formerly belonged, as was the rule of the civil law: but particular nations have made particular provisions for it. The Jews give it to the proprietor of the place where it was found: the Roman jurisprudence was various with regard to it; sometimes it was given to the master of the grounds, sometimes to the finder, and sometimes it was adjudged to the public treasury.

In England, and also in Germany, France, Spain, and Denmark, the general usage is, to have such treasure sequestered to the king, unless where the benefit of it is expressly granted or made over by the king to some other, as the lord of the manor: and that the prince shall be intitled to this hidden treasure, is now become, according to Grotius, *jus commune & gentium*. If, indeed, he that hid it be known, or afterwards found out, the owner, and not the king, is intitled to it. Also, if it be found in the sea, or upon the earth, it doth not belong to the king, but the finder, if no owner appears. So that it seems it is the hiding, not the abandoning of it, that gives the king a property.

In some places in France it is divided into three parts, one for the king, one for the proprietor of the land, and one for the finder.

Briton says, it is every subject's part, as soon as he hath found any treasure in the earth, to make it known to the coroner of the county, &c.

The punishment for concealing treasure found in England, was formerly no less than death; but now it is only imprisonment and fine: but if any mine of metal be found in any ground, it always appertains to the lord of the soil, except it be a mine of gold or silver, which anciently always belonged to the king, in whose ground soever it were found; but, by an act of parliament, the king hath now only the pre-emption.

TREASURER, an officer to whom the treasure of the prince, or corporation, is committed to be kept, and duly disposed of, in payment of officers, and other expences. See TREASURY.

Of these there is a great variety. His majesty of Great Britain, in quality of elector of Brunswick, was formerly arch-treasurer of the Roman empire. In the states of Poland are two grand-treasurers; that of the kingdom of Poland, and that of the duchy of Lithuania.

In England, the principal officers under this denomination are, the lord high-treasurer, the treasurer of the household, treasurer of the navy, of the king's chamber, &c. Anciently, we had likewise a treasurer of the exchequer, treasurer of war, &c. In the Romish countries, the title of treasurer is also given, somewhat abusively, to an ecclesiastic, who has the keeping of the relics, and of the charters and archives of a church or monastery. This dignity succeeds, in some measure, to that of the ancient deacons, who had the like charge in the primitive church.

TREASURER of England, *Lord High*, is the principal officer of the crown; under whose charge and government is all the king's revenue kept in the exchequer.

He receives the office by delivery of a white staff to him from the king, and holds it during the king's pleasure: anciently he received it by delivery of the golden keys of the treasury.

He has the cheque of all the officers any way employed in collecting imposts, customs, tributes, or other revenues of the crown. He has the gift of all the customers, comptrollers, and searchers' places, in all the ports of London; and the nomination of the escheators in every county.

He alone (or others in commission with him) lets leases of all the crown-lands, gives warrants to certain persons of quality to have their wine custom-free, &c.

Killing the lord-treasurer in the execution of his office, is high-treason.

The office of lord-treasurer is now in commission.

The number of lords-commissioners is five.

TREASURER of England, *Under*. See UNDER-Treasurer.

TREASURER of the Household, is an officer who, in the absence of the lord-steward, has power, with the comptroller and other officers of the Green-cloth, and the steward of the Marshalsea, to hear and determine treasons, felonies, and other crimes committed within the king's palace. See HOUSEHOLD.

There is also a treasurer belonging to the establishment of her majesty's household, &c.

TREASURER of the Navy, is an officer who receives money out of the exchequer, by warrant from the lord high-treasurer, or the lords-commissioners executing that place; and pays all charges of the navy, by warrant from the principal officers of the navy. See NAVY.

TREASURER of the County, he that keeps the county flock.

There are two of them in each county, chosen by the major part of the justices of the peace, &c. at their general quarter-session; under previous security given for the money entrusted with them, and the faithful execution of the trusts reposed in them.

The justices may continue or remove these treasurers at pleasure, and allow each of them a salary of 20*l.* a year.

The county flock, of which this officer hath the keeping, is raised by rating every parish yearly; and is disposed of to charitable uses, for the relief of maimed soldiers and mariners, prisoners in the county-gaols, paying the salaries of governors of houses of correction, and relieving poor almshouses, &c. And the duty of these treasurers, with the manner of raising the flock, and how it shall be disposed of, is set forth particularly in the statutes of 43 Eliz. cap. 2. Jac. I. cap. 4. 11 & 12 W. III. cap. 18. 5 Ann. cap. 32. 6 Geo. I. cap. 23. See particularly 11 Geo. II. c. 20, and 12 Geo. II. cap. 29.

TREASURER, in *Cathedral Churches*, an officer whose business was to take charge of the vestments, plate, jewels, relics, and other treasures belonging to the said churches. At the time of the Reformation, the office was extinguished as needless in most cathedral churches; but it is still remaining in those of Salisbury, London, &c.

TREASURY, the place in which the revenues of a prince are received, preserved, and disbursed.

In England, the treasury is a part of the exchequer; by some called the *lower exchequer*.

The officers of his majesty's treasury, or the lower exchequer, are the lords-commissioners, one of whom is chancellor, two joint secretaries, private secretary to the first lord, two chamberlains, an auditor, four tellers, a clerk of the pells, ushers of the receipt, a tally-cutter, &c. See each officer under his proper article, CHANCELLOR, TELLER, TALLY, &c.

At Rome, under the emperors, there were two kinds of treasuries, the one called *ærarium*, wherein the monies destined to support the charges of the government were kept; the other *fiscus*, wherein were preserved those intended for the particular subsistence of the emperor and his court. In effect, the *ærarium* belonged to the people, and the *fiscus* to the prince. See *ÆRARIIUM* and *FISCUS*.

We have still a resemblance of this difference among us; but it is confounded in France, &c. where the king disposes absolutely of the public treasure, &c.

The Athenian treasury was sacred to Jupiter *Σωτηρ*, or the *Saviour*, and to Pluto the god of riches. Besides the public monies, there were always a thousand talents kept in it, which it was capital to touch, unless on the most pressing occasions. See *ΟΠΙΣΘΙΟΔΟΜΟΣ*.

The funds among the Athenians, which supplied their treasury, were four; *viz.* the *tele*, *τελη*; the *phori*, *φοροι*; the *eiphora*, *εισφοραι*; and the *timemata*, *τιμηματα*.

The public treasury was divided into three parts, according to the use it was applied to: as, 1. The *χρηματα της διοικησεως*, or that expended in civil uses. 2. The *ερασιολικα χρηματα*, or money designed to defray the charges of war. 3. The *θροικια*, or money intended for pious uses, in which they included the expences at plays, public shows, and festivals, &c. Potter *Archæol. Græc.* tom. i. p. 82.

To each of these branches of the public revenue there was a treasurer appointed, as *ταμινας της διοικησεως των ερασιολικων, and θροικικων*.

TREASURY, *Lords of the*. In lieu of one single director and administrator of his majesty's revenues, under the title

of lord high-treasurer, it is frequently thought proper to put that office in commission, *i. e.* to appoint several persons to discharge it, with equal authority, under the title of lords-commissioners of the treasury. See *Lord-high-TREASURER*. TREASURY *Islands*, in *Geography*, a cluster of islands among Solomon's islands. S. lat. 6° 38' to 7° 30'. E. long. 155° 34' to 156°.

TREAT, in our old *Law-Books*, signifies as much as *taken out*, or *withdrawn*. Thus a juror was challenged, because he could not dispend 40*l.* and therefore was *treat* by the statute, or discharged.

TREATISE, TRACTATUS, a set discourse in writing, on any subject.

A treatise is supposed more express, formal, and methodical, than an essay; but less so than a system.

TREATY, Lat. *Fœdus*, a covenant between several nations; or the several articles or conditions stipulated and agreed upon between sovereign powers.

Sovereigns treat with each other by their proxies, who are invested with sufficient power, and who are commonly called plenipotentiaries. The rights of the proxy are expressed in the instructions that are given him; but every thing he promises within the terms of his commission, and the extent of his powers, bind his constituent. At present, in order to avoid all danger and difficulty, princes reserve to themselves the ratification of what has been concluded upon in their name by their ministers. A treaty is valid, if there be no fault in the manner in which it was concluded; and for this purpose nothing more can be required than a sufficient power in the contracting parties, and their mutual consent, sufficiently declared. If, however, a treaty has been honestly concluded by a sovereign without his perceiving any iniquity in it, and turns at length to the detriment of an ally, nothing can be more amiable, more laudable, more conformable to the reciprocal duties of nations, than to yield as much as possible, without being wanting to himself, without putting himself in danger, or without suffering a considerable loss. Since every treaty ought to be made with a sufficient power, a treaty pernicious to the state is null, and not at all obligatory; no conductor of the nation having the power to enter into engagements to do such things as are capable of destroying the state, for the safety of which the empire is entrusted to him. Moreover, a treaty made for an unjust and dishonest intention is absolutely null; nobody having a right to engage to do things contrary to the law of nature. Nations and their conductors ought to keep their promises and their treaties inviolable. This great truth, though too often neglected in practice, is generally acknowledged by all nations: the reproach of perfidy is esteemed by sovereigns a most atrocious injury; and he who does not observe a treaty is certainly perfidious, since he violates his faith. On the contrary, nothing adds so great a glory to a prince, and the nation he governs, as the reputation of an inviolable fidelity to his promise. To violate a treaty, is to violate the perfect right of him with whom we have contracted, and this is to do him an injury. No subsequent treaty can be made contrary to those that actually subsist. Nothing hinders a sovereign from entering into engagements of the same nature with two or more nations, if he is at the same time able to fulfil them with respect to all his allies. But in causes of competition or difference, the most ancient ally ought to be preferred; and, besides, the justice of the cause is another reason of preference between two allies; nor ought we to assist him whose cause is unjust, whether he be at war with one of our allies, or with another state.

Grotius (*De Jure Belli et Prin.* l. ii. c. 15. § 5.) divides treaties into two general classes: *viz.* 1. Those which turn

merely on things to which we were already bound by the law of nature; and 2. Those by which we engage something more. Of the first class are all the simple treaties of peace and friendship, when the engagements contracted in them add nothing to what men owe each other as brethren, and as members of the human society; as those that permit commerce, passage, &c. Treaties of the second class, in which sovereigns engage to do what they are not obliged to perform by the law of nature, are either equal or unequal. Equal treaties are those in which the contracting parties promise the same things, or things that are equivalent, or, in short, that are equitably proportioned, so that their condition is equal; such, *e. gr.* is a defensive alliance, in which they reciprocally stipulate for the same succours: such is an offensive alliance, in which it is agreed that each of the allies shall furnish the same number of vessels, the same number of troops, of cavalry and infantry, or an equivalent in vessels, in troops, in artillery, or in money. Such is also a league, in which the contingent of each of the allies is regulated in proportion to the interest he takes or may have in the design of the league. Equal treaties may be subdivided into as many kinds as the sovereigns have different transactions between them. Thus they treat of the conditions of commerce, of their mutual defence, of associations in war, of the passage they shall reciprocally grant to each other, or refuse to the enemies of their ally, &c.

Nations ought as much as possible to preserve equality in their treaties.

Equal treaties are distinguished from equal alliances. The former are those where equality is kept in promises; and the latter are those where equal treats with equal, forming no difference in the contracting parties, or, at least, admitting no superiority too plainly pointed out; but only some pre-eminence of honours and rank. Unequal treaties are those in which the allies do not promise the same things; and the alliance is unequal when it makes a difference in the dignity of the contracting parties. Those unequal treaties that are at the same time unequal alliances, are divided into two kinds; the first, where the inequality is found on the side of the most considerable power, and the second comprehending treaties where the inequality is on the side of the inferior power. Unequal alliances are subdivided into two kinds, such as degrade the sovereignty, and such as do not.

By another general division of treaties or alliances, they are distinguished into personal and real; the former are those that relate to the person of the contracting parties, and are restrained and in a manner attached to them. Real alliances relate only to the things of which they treat, without any dependence on the person of the contracting parties. The personal alliance expires with him who contracted it; but the real alliance is affixed to the body of the state, and subsists as long as the state, if the time of its duration is not limited. The alliance terminates as soon as the term of it is expired; but a treaty made for a time may be renewed by the common consent of the allies, and the renewal is manifested either expressly or tacitly.

Treaties between nations are sacred; and he who violates his treaties, violates at the same time the law of nations; for he despises the faith of treaties, that faith which the law of nations declares sacred, and he does all in his power to render it vain. But unhappy experience having too fully convinced mankind, that the faith of treaties is not always a sufficient warrant for their being observed, securities have been sought for against perfidy; and hence is derived the origin of a *guaranty*, and *hospage*, which see. The interpretation of treaties is subject to certain rules or maxims, of which writers on this subject have enumerated the following. It is not

allowable to interpret what has no need of interpretation: if he who can and ought to explain himself has not done it, it is to his own damage: neither of the contracting parties has a right to interpret the treaty at his pleasure: what a person has sufficiently declared, ought to be taken for true against him: the interpretation ought to be made according to certain rules previously understood and allowed. For these and other particulars, we refer to Vattel's Law of Nations, b. ii.

For the solemn manner in which the Romans used to conclude treaties, see Livy, lib. i. cap. 24. The ceremonies observed by the Greeks in making treaties may be seen in Pottier, *Archæol. Græc.* lib. ii. cap. 6. tom. i. p. 252, seq.

In general, it appears that the ancients were very religious, grave and solemn in making treaties; which were always confirmed by sacrifices and mutual oaths, with horrid imprecations on the party that should break the terms of agreement.

There are treaties of war, of peace, of marriage, of confederacy, of neutrality, of capitulation, and of commerce and navigation.

Treaties relating to war are of several kinds. Some of these are connected with alliances, defensive and offensive. In judging of the morality of these several treaties or alliances, or of the lawfulness of them, according to the law of nations, the following is an incontestable principle: It is lawful and commendable to succour and assist, in any way, a nation making a just war; and this assistance is the duty of every nation, which can give it without being wanting to itself. But he who makes an unjust war is not to be assisted in any manner. Other treaties relating to war include those of neutrality. Sometimes necessity renders a treaty of this sort justifiable; at other times this kind of treaty is the best method of securing peace, and preventing altercation. Some treaties relate to the passage of troops through a neutral country; and others to the search of neutral ships, &c. When the powers at war have agreed to lay down their arms, the agreement or contract in which they stipulate the conditions of peace, with the manner in which it is to be restored and supported, is called the "treaty of peace." The effect of this treaty is to put an end to the war, and to abolish the subject of it. It leaves the contracting parties without any rights of committing hostility, either for the very subject which kindled the war, or for what has passed in the course of it: it is therefore no longer permitted to take up arms again for the same cause. Accordingly, in these treaties, the parties reciprocally oblige themselves to a perpetual peace, which is not to be understood as if the contracting parties promised never to make war on each other for any cause whatever. Peace relates to the war which it terminates; and as it forbids the revival of the same war by taking arms for the cause which at first kindled it, is in reality perpetual. As it is the end of peace to extinguish all subjects of discord, amnesty, or a perfect oblivion of what is past, should be the leading article of the treaty; and though the treaty should be silent on this head, it is necessarily understood. This treaty binds the contracting parties from the moment of its conclusion, as soon as it has passed through all its forms. From this time all hostilities cease, unless a day is specified when the peace shall take place; but this treaty becomes obligatory on subjects only from the time of its being notified to them. When no term is assigned for the accomplishment of the treaty, and the execution of the several articles, common sense dictates that every point should be executed as soon as possible. The faith of treaties equally excludes from the execution of them all neglect, all dilatoriness, and deliberate delays. A treaty of peace is a public treaty,

treaty, obligatory upon the whole nation; it is also a real treaty, obliging successors as well as the prince who signed it, since it obliges the state itself.

Treaties of commerce are the compacts or agreements by which different states secure to themselves and to one another something constant in their mutual trading intercourse; and they are usually followed by various tariffs, to adjust the duties of exportation and importation of merchandizes into the respective dominions of the contracting powers.

A nation having a full right to regulate itself in commercial affairs by what is useful or advantageous, it may make such commercial treaties as it shall think proper; and no other has a right to take offence, provided these treaties do not affect the perfect rights of another. Every such treaty is allowable among nations, and the execution of it ought not to be opposed; but that alone is in itself just and commendable, which, as far as is possible and reasonable in the particular case, is transacted with a tenderness for the general interest. Nations may accordingly, in their treaties, insert such clauses and conditions as they think proper; and they are at liberty to make them perpetual or temporary, or dependent on certain events. But when once a nation has entered into engagements by treaty, it is no longer at liberty to do, in favour of others, contrary to the tenor of the treaty, what it might otherwise have granted to them, agreeably to the duties of humanity, or the general obligation of reciprocal commerce; being to do for others no more than what is in its power. Having deprived itself of the liberty of disposing of a thing, that thing is no longer in its power. Therefore, when a nation has engaged to another that it will sell only to them certain goods or provisions, as, *e. gr.* corn; it can no longer carry them for sale to another market. The case is the same in a contract to purchase certain goods only of that nation. The natural liberty of trade is not hurt by treaties of this nature; for this liberty consists only in every nation being unmolested in the right of trading with those which consent to traffic with it; every one remaining free to close with or decline a particular commerce, as it shall judge most advantageous.

The celebrated treaties are those of Nimeguen, of Munster, of the Pyrenées, of Westphalia, of Ryswick, of Utrecht, of Hanover, Vienna, &c.

The great treaty of peace, commerce, navigation, &c. between England and France, was signed at Utrecht, the 11th of April, 1713, and consists of 39 articles.

For other treaties, see the general titles.

It is the king's prerogative to make treaties, leagues, and alliances, with foreign princes and states; and yet, lest this plenitude of authority should be abused to the detriment of the public, the constitution has interposed a check, by the means of parliamentary impeachment, for the punishment of such ministers as, from criminal motives, advise or conclude any treaty, which shall afterwards be judged to derogate from the honour and interest of the nation.

TREATY, *Guarantee of a.* See GUARANTY.

TREBA, or TREBÆ *Augustæ*, in *Ancient Geography*, a town of Italy, in the interior of Latium. Ptol.

TREBA, in *Geography*, a town of Saxony, in Thuringia; 2 miles S.W. of Salza.

TREBAU, or *Mabrisch Trebau*, a town of Moravia, in the circle of Olmutz; 10 miles W. of Muglitz.

TREBBIN, a town of the Middle Mark of Brandenburg; 20 miles S.S.W. of Berlin. N. lat. 52° 10'. E. long. 13° 6'.

TREBBIO ANTICO, a town of the Popedom, in the duchy of Urbino; 17 miles E.N.E. of Urbino.

TREBEJO, a town of Spain, in the province of Leon; 46 miles S. of Ciudad Rodrigo.

TREBELLIANICA, or TREBELLIAN *Fourth*, in the *Roman Jurisprudence*, a right belonging to an heir instituted by testament. If the testator, after appointing a full and general heir, spent and disposed of all his effects in legacies; or if he went *ultra dodrantem*, beyond three-fourths thereof; in that case, the heir was allowed to retrench and detain one fourth part of the legacies to his own use. This was called the *trebellianica*.

In like manner, if the testator charges his heir with a feoffment of trust, and to restore the inheritance to another; in that case, the heir might likewise retain a fourth of the whole succession, that the quality of heir might not be rendered wholly vain and fruitless.

TREBELLIIUS-POLLIO, in *Biography*, a Latin historian, flourished about the year 298 of the vulgar era. According to Vopiscus, he wrote the lives of the Roman emperors from the two Philips to Claudius; but we have extant only the latter part of the reign of the elder Valerian, that of his son, the lives of the two Gallieni, those of the thirty tyrants, and that of Claudius. He is reckoned one of the "*Historiæ Augustæ Scriptores*," and praised by Vopiscus for his exactness, which applies only to some dates, as in other points he is very incorrect. His style is somewhat superior to that of the other historians. Vossius.

TREBENDA, in *Ancient Geography*, a town of Asia Minor, in the interior of Lycia. Ptol.

TREBENITZ, in *Geography*, a town of Bohemia, in the circle of Leitmeritz; 70 miles S.W. of Leitmeritz. N. lat. 50° 27'. E. long. 14° 5'.

TREBENTSCHIKOV, a fortress of Russia, in the government of Caucasus, on the Ural; 64 miles N. of Guriev.

TREBERK, a town of Germany, in the duchy of Anhalt-Cothen; 4 miles N. of Cothen.

TREBES, a town of France, in the department of the Aude; 6 miles E. of Carcassone.

TREBIA, in *Ancient Geography*, a river which ran from south to north, commencing in Liguria, south of the valley inhabited by the Friniates, and passing into Gallia Cispadana, across the territory of the Anamani, watered the town of Placentia, and discharged itself into the Padus. The Trebia was famous for the victory obtained by Hannibal, near its mouth, over the presumptuous and imprudent Sempronius, in the year of Rome 435; on which occasion the Romans lost 26,000 men.

TREBIA, in *Geography*, a river of Italy, which runs into the Po, 2 miles W. of Piacenza.

TREBIGNO, a town of European Turkey, in Dalmatia; the see of a bishop; 60 miles S. of Mostar.

TREBINA, a town of Naples, in Basilicata; 5 miles S.S.W. of Turfi.

TREBISACCIA, a town of Naples, in the province of Calabria Citra, on the coast; 10 miles N.E. of Cassano.

TREBISOND, or TARABOSAN, a city of Asiatic Turkey, with a harbour, on the Black sea, in the country of the Colchians; founded by a Greek colony of Sinope, descended from the Milesians. It derives its historical fame more from the circumstance of its hospitable reception of the 10,000 Greeks after their celebrated retreat, than for having been the capital of that portion of the Lower empire. From the Romans it was taken by the Scythians, or Tartars, in the time of Valerian. The Greek emperors became afterwards masters of Trebisond, and erected it into a principality; Alexis Comnenes took possession of it in the year 1204. When the French and Venetians made themselves masters

masters of Constantinople, this principality, or, as it is sometimes called, empire, continued till the year 1462, when it was taken by Mahomet II., who carried David Comnenes and all his family prisoners to Constantinople, where they were mostly put to death. The town of Trebifond is built on the sea-side, at the foot of a little hill, pretty steep; its walls are almost square, high embattled, and, though they are not of the first ages, yet it is very probable they stand upon the foundations of the ancient inclosure, which got this town the name of "Trapezium," or "Trapezus." The present walls are built of the ruins of the ancient edifices, as appears by old pieces of marble set in several parts, and whose inscriptions are not legible, because they are too high. The town is large, and not well peopled; there are more woods and gardens in it than houses; and those houses that are there, though well built, are but one story high. The castle, which is pretty large, but very much neglected, is situated upon a flat rock, and its ditches are cut in the rock. The inscription that is on the gate of this castle, the arch whereof is a semi-circle, shews that the emperor Justinian repaired the edifices of the town. The port of Trebifond, called "Platana," is to the east of the town. The emperor Adrian caused it to be repaired, as we are informed by Arrian. This port is now proper for nothing but saiques. The mole which the Genoese are said to have built there is almost destroyed, and the Turks give themselves very little trouble about repairing such works; 170 miles N.N.E. of Sivas. N. lat. 41° 1'. E. long. 39° 40'.

TREBITSCH, or TREBITZ, a town of Moravia, in the circle of Iglau, on the Iglawa, with considerable manufactures of cloth, iron, glafs, &c.; 20 miles S.E. of Iglau. N. lat. 49° 14'. E. long. 15° 50'.

TREBITZ, a town of Saxony; 3 miles N.N.W. of Schmiiedeberg.

TREBIUS, in *Ichthyology*, a name given by Joannes Cuba, and some other writers, to the fish called *phycis* by Aristotle, *Ælian*, and Pliny.

TREBLE, in *Musick*, the highest or acutest of the four parts in symphony, or that which is heard the clearest and shrillest in a concert.

In the like sense we say, a treble violin, treble hautboy, &c.

In vocal music, the treble is usually committed to boys and girls. Their part is the treble.

The treble is divided into first or highest treble, and second or base treble. The half treble is the same with the counter-tenor.

TREBLIZ, in *Geography*, a town of Bohemia, in the circle of Leitmeritz; 10 miles S.W. of Leitmeritz.

TREBNITZ, a town of Silesia, in the principality of Oels; 12 miles N. of Breslaw. N. lat. 51° 18'. E. long. 17° 2'.

TREBNIZ, a town of Bohemia, in the circle of Leitmeritz; 6 miles S.W. of Leitmeritz.

TREBOWE. See TRIBAU.

TREBSCHEN, a town of Brandenburg, in the New Mark; 6 miles S.E. of Zulichau.

TREBSEN, a town of Saxony, in the circle of Leipzig, on the Muldan; 26 miles W. of Meissen. N. lat. 51° 10'. E. long. 12° 40'.

TREBUCHET, TREBUCKET, or *Trebuchetum*, a tumbler, ducking, or cucking-stool. See CUCKING-STOOL and SCOLDS.

TREBUCHET, in *Artillery*, a machine for throwiag stones, for which purpose a sling was sometimes fixed to it: it acted by means of a great weight fastened to the short arm

of a lever, which being let fall, raised the end of the long arm with a great velocity.

TREBULA MUTUSCA, in *Ancient Geography*, a town placed by Strabo and Pliny among the Sabines, the existence of which is testified by many inscriptions. Virgil recognizes it for its olives, which perhaps might have occasioned its being called "Oliveto."

TREBULA SUFFENATA, a town of Italy, in the Sabine territory. It is supposed to have been situated in the valley of Turano, probably at the place called Rocca Sinibalda.

TREBURG, in *Geography*, a town of Hesse-Darmstadt; 10 miles W. of Darmstadt.

TREBUXENA, a town of Spain, in the kingdom of Seville; 12 miles from Xeres de la Frontera.

TRECASE, a town of Naples, in the province of Otranto; 5 miles E.N.E. of Alessano.

TRECASSES, or TRICASSI, in *Ancient Geography*, a people of Celtic or Lyonesse Gaul, according to Pliny and Ptolemy; subject, in the time of Cæsar, to the city of Sens (civitas Senonum), which was very powerful.

TRECATE, in *Geography*, a town of Italy, in the department of the Olona; 5 miles E. of Novara.

TRECCHINA, a town of Naples, in Basilicata; 36 miles S. of Potenza.

TRECENTA, a town of Italy, in the department of the Mincio; 25 miles E.S.E. of Mantua.—Also, a town of Italy, in the department of the Lower Po; 12 miles N.N.W. of Ferrara.

TRECHEDIPNA, *τρεχεδιπνη*, formed of *τρεχω*, *I run*, and *διπνος*, *a supper*, in *Antiquity*, a kind of livery, or distinguishing habits worn by parasites; the wearing of which was a sufficient passport to the tables of their patrons whose livery it was.

TRECHINIA, or TRACHINIA, in *Ancient Geography*, a small country of Theffaly, occupying the whole mountainous part west of the Maliac gulf, between the river Sperchius to the north and mount Oeta to the south. Near it was Heraclea Trachinia.

TRECHIS. See TRACHIS.

TRECHON, one of the many names by which the chemical writers have called quicksilver.

TRECOTHIC, in *Geography*, a township of New Hampshire; 65 miles N.W. of Portsmouth.

TREDDLE, or TREADLE, *Chalaza*, in *Natural History*, a part of an egg. See CHALAZA.

TREDECILE. See ASPECT.

TREE, ARBOR, the first and largest of the vegetable kind, consisting of a single trunk, out of which spring forth branches and leaves.

Mr. Ray distinguishes the trees and shrubs of our native growth of England into, I. Such as *have their flower disjoined and remote from the fruit*: which are,

1. The *nuciferous* trees, or such as bear nuts: as the walnut-tree, the hazle-nut-tree, the beech, the chestnut, and the common oak.

2. *Coniferous* trees, or such as bear a squamous or scaly fruit, of a conical figure, and a woody or hard substance, in which are many seeds, which, when they are ripe, the cone opens or gapes in all its several cells or partitions, and lets drop out: of this kind are the Scotch firs, male and female; the pine, which, in our gardens, is called the Scotch fir; the common alder-tree, and the birch-tree.

These trees are also called resiniferous, by reason that coniferous trees are generally covered with a bark that abounds in resin.

3. *Bacciferous* trees, are such as bear berries, as the juniper and yew-tree.

4. *Lanigerous* trees, or such as bear a woolly, downy substance: as the black, white, and trembling poplar, and willows and others of all kinds.

5. Trees which bear their seeds (having an imperfect flower) in leafy membranes and cases: as the horn-beam, or hard-beam, called, in some places, the horn-beech.

II. Such as have their fruits and flowers contiguous; which are either with the flower placed on the top of the fruit, or adhering to the base or bottom of the fruit. Of the former kind, some are *pomiferous*, as apples and pears; and some *bacciferous*, as the forb, or service-tree, the white-thorn, or hawthorn, the wild rose, sweet-briar, currants, the great bilberry-bush, honey-suckle, ivy, &c.

The latter kinds are either such as have their fruit moist and soft when ripe: as, 1. *Pruniferous* ones, whose fruit is pretty large and soft, with a stone in the middle; as the black-thorn, or sloe-tree, the black and white bullace-tree, the common wild cherry, the black cherry, &c.

2. *Bacciferous* trees, as the strawberry-tree common in the west of Ireland, mistletoe, water-elder, the dwarf or spurge-laurel, the viburnum, or wayfaring-tree, the dog-berry-tree, the sea black-thorn, the berry-bearing elder, the privet, barberry, common elder, the holly, the buck-thorn, the berry-bearing heath, the bramble, and the spindle-tree or prickwood.

Or such as have their fruit dry when ripe: as the bladder-nut-tree, the box-tree, the common elm and ash, the maple, the gaule, or sweet willow, common heath-broom, dyer's-weed, furze or gorse, and the lime-tree.

TREES in full Air, or Standards, are such as naturally rise a great height, and are not topped. See STANDARDS, STANDARD-TREES, and TIMBER.

TREES, Dwarf, are such as are kept low, and never suffered to have above half a foot of stem. These are used to be kept vacant, or hollow in the middle, that the branches, spreading round about the sides, may form a kind of round bowl, or bush. See DWARF-TREES.

TREES, Forest. See FOREST-TREES and PLANTING.

TREES, Wall, are those whose branches are stretched out, and nailed against walls.

For dwarf and wall-trees, such are to be chosen out of the nursery for transplantation as are straight, and consist of a single stem, and a single graft, rather than two or three grafts in several branches: their thickness at bottom, when removed, should be two or three inches.

TREES, Fruit, are such as bear fruit. See FRUIT-TREES.

TREES, Timber, are those whose trunks are tall and straight, of which beams, masts, &c. are used to be made.

Trees that are nine inches girth about a yard from the ground, are commonly reckoned timber-trees, but none under this size. See TIMBER and PLANTING.

The growth of trees is a curious and interesting subject; but few experiments have been made in order satisfactorily to ascertain the annual accretions that are made to the bulk of trees at different periods of their age. Mr. Barker has furnished a table exhibiting the increase of three kinds of trees, viz. the oak, ash, and elm, in the Phil. Transf. for 1788. He states the result as follows:

"I find (says he) the growth of oak and ash to be nearly the same. I have some of both sorts planted at the same time, and in the same hedges, of which the oaks are the largest; but there is no certain rule as to that. The common growth of an oak or an ash is about an inch in girth in a year; some thriving ones will grow an inch and a half; the unthriving ones not so much. Great trees grow more

timber in a year than small ones; for if the annual growth be an inch, a coat of one-sixth of an inch is laid on all round, and the timber added to the body every year is its length multiplied into the thickness of the coat and into the girth, and therefore the thicker the tree is, the more timber is added."

We will present our readers with a table, shewing the growth of 17 kinds of trees for two years. The trees grew at Cavenham in Suffolk.

Names of Trees.	July 1785.	July 1786.	July 1787.
	Ft. In.	Ft. In.	Ft. In.
1. Oak - - -	0 10 $\frac{1}{2}$	0 11 $\frac{1}{2}$	1 0 $\frac{1}{2}$
2. Larch - - -	1 0 $\frac{1}{2}$	1 3	1 4
3. Scotch fir - - -	1 3 $\frac{1}{2}$	1 5 $\frac{1}{2}$	1 7 $\frac{3}{4}$
4. Spruce fir - - -	0 5 $\frac{3}{4}$	0 6 $\frac{1}{2}$	0 7 $\frac{1}{4}$
5. Spanish chefnut - - -	0 7 $\frac{1}{4}$	0 7 $\frac{1}{2}$	0 8
6. Elm - - -	2 7 $\frac{1}{2}$	2 9	2 11
7. Pinaster - - -	2 3 $\frac{1}{2}$	2 4 $\frac{1}{2}$	2 7 $\frac{1}{2}$
8. Larch - - -	1 5 $\frac{3}{4}$	1 6	1 7
9. Weymouth pine - - -	0 5	0 6	0 7 $\frac{3}{4}$
10. Acacia - - -	1 2 $\frac{3}{4}$	1 5 $\frac{3}{4}$	1 6 $\frac{1}{2}$
11. Beech - - -	0 6 $\frac{1}{4}$	0 6 $\frac{1}{2}$	0 7 $\frac{1}{4}$
12. Plane occidental - - -	0 6 $\frac{1}{2}$	0 7 $\frac{3}{4}$	0 8 $\frac{3}{4}$
13. Lombardy poplar - - -	1 8	2 0	2 3 $\frac{3}{4}$
14. Black poplar - - -	1 2 $\frac{1}{4}$	1 4 $\frac{1}{2}$	1 5 $\frac{3}{4}$
15. Willow - - -	2 9 $\frac{1}{2}$	3 2	3 3
16. Silver fir - - -	0 7 $\frac{3}{4}$	0 8 $\frac{3}{4}$	0 9 $\frac{1}{4}$
17. Lime - - -	1 8 $\frac{1}{2}$	1 10 $\frac{3}{4}$	2 0

Heat is so essential to the growth of trees, that we see them grow larger and smaller in a sort of gradation as the climates in which they stand are more or less hot. The hottest countries yield, in general, the largest and tallest trees, and those also in much greater beauty and variety than the colder do; and even those plants which are common to both, arrive at a much greater bulk in the southern than in the northern climates; nay, there are some regions so bleak and chill, that they raise no vegetables at all to any considerable height. Greenland, Iceland, and the like places, afford no trees at all; and what shrubs grow in them are always little and low.

In the warmer climates, where trees grow to a moderate size, any accidental diminution of the common heat is found very greatly to impede vegetation; and even in England, the cold summers we sometimes have, give us an evident proof of this; for though the corn and low plants have succeeded well enough, and gooseberries, currants, raspberries, or other low shrubs, have brought forth fruit in sufficient plenty, yet the production of taller trees has been found very much hurt; and walnuts, apples, and pears, have been very scarce among us.

Heat, whatever be the producing cause, acts as well upon vegetation one way as another. Thus the heat of dung, and the artificial heat of coal-fires in stoves, is found to supply the place of the sun.

Great numbers of the Indian trees, in their native soil, flower twice in a year, and some flower and bear ripe fruit all the year round; and it is observed of these last, that they are at once the most frequent and the most useful to the inhabitants; their fruits, which always hang on them in readiness, containing cool juices, which are good in fevers, and other of the common diseases of hot countries.

Plantations of useful trees might be made to very great advantage in many places in every country, and the country greatly

TREES.

greatly enriched by it, while the public would be also benefited by it, since it would raise a continual supply of timber used in ship-building, and on other public as well as private occasions.

We have in many places heaths, and other barren and uncultivated lands, of very great extent; and how great an advantage would it be to the public to bring these to be truly valuable. Many, if not all of these heaths, would be found on trial capable of producing trees; and some of them are truly the remains of destroyed forests; and though the profit to be reaped from the planting of them would come late, yet the expence of doing it would be very trifling in comparison of that profit, and the means easy. See **TIMBER and PLANTATION.**

The authors who have given rules for planting, having employed themselves only about small spots of ground, the establishing of orchards or parks, are by no means to be supposed proper guides in attempts of this kind; and *Monf. de Buffon*, who had a great opinion of the knowledge of our *Evelyn* and *Miller*, who seem to speak of every thing from their own experience, found, when he set about large plantations, that their opinions and rules were erroneous; and was obliged to have recourse to experience only, which he varied a thousand ways; and though many of them proved unsuccessful, yet they all gave hints towards others, by which the attempt might afterwards be brought to succeed.

This sagacious enquirer into the operations of nature in the growth of vegetables, having set apart a considerable quantity of land for the trial, and procured a number of young trees, first divided the whole quantity into a number of small squares, and having made a plan of it, examined the nature, depth, and other circumstances of the soil in each, and minutely the whole down on a proper part of the plan; that himself, or whoever succeeded him, might judge from the different growths of a number of trees planted in the same state in these different soils, the different advantages and disadvantages of every circumstance in the depth and nature of the ground, in regard to the growth of useful trees. Different numbers of labourers were employed upon different spots of this ground, and the acorns for the young growth planted at different seasons: but the result in general was, that what should seem the best methods succeeded the worst; and those pieces where many labourers had been employed, and the acorns planted before winter, were much thinner of young oaks than those where the least labour had been bestowed upon the ground, and where the acorns had been planted in the spring: but those places which succeeded best from the sowing, were those which had the acorns planted in holes made by a pick-axe, without any preceding culture of the ground. And those where the acorns had only been laid upon the earth, under the grass, afforded a great number of vigorous young trees, though the greater part had been carried away by birds and other devouring animals. Those spots of ground where the acorns were set at six inches depth were much worse furnished with young shoots, than those where they had been buried but at an inch deep; and in some places where they were buried at a foot deep not one shoot appeared, though in others, where they had been buried at nine inches, there were many.

Those acorns which had been steeped for eight or nine days in wine lees, and in the water of the common sewers, appeared out of the ground much earlier than those which were put in without this previous management.

But the most successful of all the trials, was that of planting in the spring such acorns as had been sown toge-

ther in another place, and had time to shoot there; of these scarcely any one failed, and the plantation was perfectly flourishing, though the growth of these young shoots was not so quick or vigorous as those of the acorns which had remained when first sown; which was probably owing to the injury the tender radicles received in transplanting.

Thus succeeded the experiments by sowing, while of those made by planting young trees, such as had been brought out of woods and places under covert, succeeded much worse than those which had grown in more exposed places.

The young trees of the several parts of the plantation kept on the ground in the manner they had begun to shoot, those of the more laboured parts continuing more weak, and lower than those of the less laboured.

Thus were a number of necessary experiments carefully tried, and the result of the whole was, that to make a plantation of oaks, on a soil of the common clayey or loamy kind, the most successful method is this: the acorns must be preserved during the winter in the earth in this manner; let there be made a bed of earth of six inches deep; on this place a layer of acorns, two inches deep; over these lay a bed of another half foot of earth, over that another layer of acorns, and so on successively, till as many are employed as there will be occasion for: the whole is then to be covered with a foot depth of earth to preserve all from the frost. In the beginning of March these beds are to be opened, and the acorns, which will by that time have shot out, and are then in reality so many young oaks, are to be planted out a foot distance each, and the success of a plantation of this kind need not be feared. This is a manner of planting that is done at a small expence, and even that might be in a great measure spared, were it not for the birds and other devouring animals; since, could the acorns be defended from these, they might be only laid on the surface of the ground under the grass in autumn, and they would infallibly shew themselves in so many young oaks the succeeding spring.

It is easy to continue the carrying of the acorns, when taken out of their winter's bed, to the place where they are to be planted, without doing them much injury; and the small stop the transplanting puts to their growth is in reality rather an advantage than an injury, since it only retards the young shoots for about three weeks, or less than that; and by that means secures them from the few cold mornings that may be expected about the time of their natural appearance. *Mem. Acad. Scienc. Paris, 1739.* See **TIMBER.**

An experiment to determine the comparative durability of different kinds of timber, when exposed to the weather, was made by a nobleman in Norfolk; of which an account is given by *fir Thomas Beevor*. This nobleman, in the year 1774, ordered three posts, forming two sides of a quadrangle, to be fixed in the earth on a rising ground in his park. Into these posts were mortised planks, an inch and a half thick, cut out of trees from 30 to 45 years' growth. These, after standing ten years, were examined, and found in the following state and condition:

The cedar was perfectly found; larch, the heart found, but the sap quite decayed; spruce fir, found; silver fir, in decay; Scotch fir, much decayed; pinaster, quite rotten; chestnut, perfectly found; abele, found; beech, found; walnut, in decay; sycamore, much decayed; birch, quite rotten. *Sir Thomas Beevor* justly remarks, that the trees ought to have been of the same age; and *Mr. Arthur Young* adds, they ought to have been cut out of the same plantation.

The immense quantity of timber consumed of late years in ship-building and other purposes, has diminished in a very great degree the quantity produced in this country. On this account, many gentlemen who wish well to their country, alarmed with the fear of a scarcity, have strongly recommended it to government to pay some attention to the cultivation and preservation of timber.

It appears, on the authority of Mr. Irving, inspector-general of imports and exports, that the shipping of England in 1760 amounted to 6107 in number, the tonnage being 433,922; and the shipping in Scotland amounted to 976 in number, the tonnage being 52,818. In 1788, the whole shipping of Britain and Ireland and their colonies amounted to 13,800, being 1,359,752 tons burden, and employing 107,925 men. The tonnage of the royal navy in the same year was 413,667. It also appears, from the report of the commissioners of the land revenue, that the quantity of oak-timber of English growth, delivered into the dock-yards from 1760 to 1788, was no less than 768,676 loads, and that the quantity used in the merchants' yards in the same time was 516,630 loads; in all 1,285,306 loads. The foreign oak used in the same period was only 137,766 loads. So that after deducting the quantity remaining in the dock-yards in 1760 and 1788, and the foreign oak, there will remain about 1,054,284 loads of English oak, consumed in 28 years, which is at an average 37,653 loads *per annum*, besides from 8300 to 10,000 loads expended annually by the East India Company within the same period.

A writer in the Bath Transactions, cited in the Encyclopædia Britannica, article *Tree*, says, that the aggregate of oaks felled in England and Wales for 30 years past, has amounted to 320,000 loads in a year; and as this statement seems to differ from that above given, under the authority of the commissioners of land revenue, we think it necessary to point out the reason of this difference. This we are enabled to do, by the liberal communication of the ingenious Samuel Purkis, esq. whose diligence of research and accuracy in making the necessary calculations, and fidelity in reporting the result of his inquiries, must be admitted by all who knew him without hesitation. He informs us, that the calculation was made by himself and a friend at the request of Mr. Pitt, then prime-minister, in order to ascertain whether there was a sufficient quantity of oak-timber in this country to supply the probable demand for many years.

The calculations were made from documents furnished by government, and upon principles which could not fail to afford an accurate result. This result was communicated by Mr. Purkis to Mr. South, a man of fortune and respectability in Hampshire, and was published by him in the Bath Transactions. The discrepancy above-mentioned is merely apparent, and not real. For the commissioners of the land revenue only stated the annual consumption in the royal navy, and by the East India Company; whereas Mr. Purkis's statement comprehended the annual consumption of the *whole kingdom*; nor had they the means which he possessed of making the latter estimate.

The building of a 70-gun ship, it is said, would take 40 acres of timber; and though this may seem to be an exaggerated estimate, it should be considered, that, according to the prevailing opinion of experienced surveyors, it will require a good soil and good management to produce 40 trees on an acre, which, in 100 years, may, at an average, be computed at two loads each. Reckoning, therefore, two loads at 8*l.* 16*s.*, one acre will be worth 350*l.* and consequently 40 acres will be only worth 14,200*l.* The building of a 70-gun ship is generally supposed to cost 70,000*l.*; and as ships do not last many years, the navy continually re-

quires new ships, so that the forests must be stripped in a century or two, unless young trees are planted to supply their place.

As the consumption of oak-timber is so considerable, methods should be devised and diligently practised for procuring a fresh supply.

Trees are liable to a variety of diseases and injuries, for the prevention or cure of which various means have been proposed.

The chevalier de Bienenberg of Prague, we are told, has discovered a method of effectually preserving trees in blossom from the fatal effects of those frosts which sometimes in the spring destroy the most promising hopes of a plentiful crop of fruit. His method is extremely simple. He surrounds the trunk of the tree in blossom with a wisp of straw or hemp. The end of this he sinks, by means of a stone tied to it, in a vessel of spring-water, at a little distance from the tree. One vessel will conveniently serve two trees; or the cord may be lengthened so as to surround several, before its end is plunged into the water. It is necessary that the vessel be placed in an open situation, and by no means shaded by the branches of the neighbouring trees, that the frost may produce all its effects on the water, by means of the cord communicating with it.—This precaution is particularly necessary for those trees, the flowers of which appear nearly at the same time as the leaves; which trees are peculiarly exposed to the ravages of the frost. The proofs of its efficacy, which he had an opportunity of observing in the spring of 1787, were remarkably striking. Seven apricot espaliers in his garden began to blossom in the month of March. Fearing that they would suffer from the late frosts, he surrounded them with cords as above directed. In effect, pretty sharp frosts took place six or eight nights: the apricot-trees in the neighbouring gardens were all frozen, and none of them produced any fruit, whilst each of the chevalier's produced fruit in abundance, which came to the greatest perfection. See FROST.

For Mr. Forsyth's remedy, we refer to the article COMPOSITION for *Trees*. See also GRAFTING.

Mr. Ray, and other authors, speak of several trees of prodigious bulk.

The jesuit d'Acosta, in his History of the Indies, lib. iv. cap. 3, mentions a hollow tree at Tlacocharaya, three leagues from Guaxa, in New Spain, nine fathoms within side near the ground, and sixteen without side. He adds, that it is under this tree the barbarians assembled to perform their religious ceremonies, dance round their idols, &c. Herrera mentions another, which sixteen men, joining hands, could not fathom. And F. Kircher, in his *Latium*, p. 50, affirms that he has seen a tree, near Gonzano, which would lodge a whole family of twenty-five persons in its cavity. The common people had a tradition, that this was planted by Augustus.

There are forests of very large chestnut-trees, growing out of the lava of mount *Ætna*, in Sicily. One of these, called the *Castagno di Cento Cavalli*, is much the most celebrated. It measures 204 feet round, and though said to be united below in one stem, it is a bush of five large trees growing together. The hollow of one of these chestnut-trees is said to contain a hundred sheep, and it is also related, that thirty people have been in it on horseback. Brydone's Letters, vol. i. p. 109, &c. See *ÆTNA*.

In the Indies there are very large forests formed from a single tree, whose branches bending to the ground, take root, and put forth new trees: the Indian fig-tree and parrotviver are of this kind.

M. Lonvillers mentions trees in Peru, one part of whose branches produce fruit one half the year, and the other part

TREES.

part the other half. In China there is a tree which bears tallow, of which that nation make their candles. See *SEBIFERA* and *TALLOW*.

Mr. Marshall saw spruce and silver firs in the dock-yard at Venice above forty yards long, and one of thirty-nine yards was eighteen inches in diameter at the smallest end. It was said that they were brought from Switzerland. Some yews have been found in Britain sixty feet round. Palms in Jamaica attain the height of 200 feet, and some of the pines in Norfolk island are 280 feet high.

At Tortworth, in Gloucestershire, it is said by the writer of the report on agriculture for that district, that a chestnut-tree was measured in 1791, which was found to be forty-four feet and four inches in circumference.

The great Boddington oak, belonging to the manor-farm of the same name in the same district, before it was burnt down in 1790, either by accident or design, was not less remarkable. It grew in an old orchard-ground, and the following account was given of it by Marshall, in his work on planting, as it appeared in 1783. The stem was remarkably collected and snug at the root; the sides of its trunk more upright than those of large trees in general; its circumference at the ground somewhat more than eighteen yards, and at its smallest dimensions twelve. The greatest extent of arm, eight yards from the stem; and the greatest height of the branches, forty-five feet. The stem quite hollow, forming a capacious well-sized room, measuring on the floor, one way, more than sixteen feet in diameter. At that time it was perfectly alive and fruitful, with a large fine crop of acorns upon it. Part of the trunk, it is said, escaped the fire, and still remains.

In Needwood forest, the oak-tree called the Swilcar lawn oak contains, as Mr. Pitt supposes, in his account of the agriculture of Staffordshire, at least a thousand feet of timber. The Rev. Mr. Snow says, this oak, the father of the forest, girths at five feet high twenty-one feet; the lower stem is ten feet clear; the whole height about sixty-five; the extent of the arms about forty-five feet. It is of great antiquity, but still fruitful in acorns.

In the first volume of the Agricultural Survey for the County of Essex, it is stated, that in Hatfield forest sir John Barrington has a very beautiful oak, for which a timber dealer offered one hundred guineas. And that near it is the ruin of a most venerable tree of the same kind, which gave the name of Broad-Oak to Hatfield.

There is a Lombardy poplar in this district which is a very fine and beautiful tree, guessed to be above seventy feet high, and which at five feet from the ground measures seven feet three inches in circumference. It is one of the three original trees of this kind which were brought by lord Rochfort from Italy, and planted at St. Osyth above forty years ago, and from which much the greater part of those which are now scattered through the kingdom originated.

Very near to it is the largest and most beautiful laurel of the Portugal kind that is almost any where to be seen; it is nearly of a semi-globular form; feathered all round to the lawn it grows in, and is fifty-two yards in circumference.

At a small distance from these prodigies of vegetation is, it is said, another at least equally interesting, an arbutus, which would make no inconsiderable figure at Killarney. They are in the grounds of Mr. Nassau, in which the soil is a fine rich found loam. See the Report.

There are now growing about Townley Hall, in Lancashire, besides many large fine oak timber-trees, an ash-tree, called the wain-house ash, which measures fourteen feet in circumference: a hazle-tree, which is three feet in girth: a yew-tree, which has six feet two inches of girth: and a

white-thorn, in New Copy field, which measures seven feet in circumference.

There are two or three very remarkable phenomena in the growth of trees, which have escaped the observation of the naturalists of all ages, except those of our own: these are the perpendicularity of their trunks or stems to the horizon, and the parallelism of their tufts to the spot of earth they grow on. See *PARALLELISM* and *PERPENDICULARITY*.

For the planting, transplanting, semination, pruning, felling, grafting, shroding, &c. of trees. See *PLANTATION*, *PLANTING*, &c.

On felling of trees, letters have sometimes been found in the midst of them. We have instances of this kind mentioned in the *Philos. Transf.* N^o 454, sect. 16. where the trunk of a beech being sawed, discovered several letters in the wood, about an inch and a half from the bark, and near the same distance from the centre of the trunk. It seems these letters had been formerly cut into the bark, and in process of time these might be covered.

In the same Transactions, we have an account of the horn of a deer found in the heart of an oak. Crucifixes have also been found in trees, and were of course shewn as miraculous to the ignorant. See p. 236. of the said Transactions in the Remarks.

Trees are often found buried in the earth. See *MORASS*, *Fossil Wood*, and *Bog Wood*.

For the punishment of stealing trees, see *LARCENY*.

By stat. 1 Geo. I. c. 48. maliciously to set on fire any underwood, wood, or coppice, is made single felony. By the Black-act, to cut down or destroy any trees planted in an avenue, or growing in a garden, orchard, or plantation for ornament, shelter, or profit, is felony without benefit of clergy; and the hundred shall be chargeable for the damages, unless the offender be convicted. By 6 Geo. III. cap. 36. and cap. 48. wilfully to spoil or destroy any timber or other trees, roots, shrubs, or plants, is, for the two first offences, liable to pecuniary penalties; and for the third, if in the day-time, and even for the first, if at night, the offender shall be guilty of felony, and liable to transportation for seven years.

TREES, Distemperature of. See the preceding article, and *COMPOSITION*, &c.

TREES, Hollowness of. See *HOLLOWNESS*.

TREES, Juices of. See *JUICE* and *SAP*.

TREES, Felling of. See *FELLING* and *TIMBER*.

TREES, Parallelism of Rows of. See *PARALLELISM*.

TREES, Fruit, Barking of, in *Rural Economy*, the injury of their having the bark eaten off by hares and rabbits in the winter season. It is particularly the case with young apple and pear trees, and occasionally with forest-trees and shrubs. Several different methods of preventing it, and of protecting the trees, have been proposed at different times; such as twisting straw-ropes round the trees; driving in small flat stakes all about them; and the use of strong-scented oils. But better and neater modes of effecting the business have lately been suggested in the Transactions of the Scotch Horticultural Society; as with hog's-lard, and as much whale-oil as will work it up into a thin paste or paint, with which the stems of the trees are to be gently rubbed upwards, at the time of the fall of the leaf. It may be done once in two years, and will, it is said, effectually prevent such animals from touching them.

Another and still neater method, is to take three pints of melted tallow to one pint of tar, mixing them well together over a gentle fire. Then, in the month of November, to take a small brush, and go over the rind or bark of the trees with the composition, in a milk-warm state, as thin

as it can be laid on with the brush. It is found that such a coating does not hinder the juices or sap from expanding in the smallest degree; and the efficacy of the plan is proved, in preventing the attacks of the animals, by applying the liquid composition to one tree and missing another, when it was found that the former was left, while the latter was attacked. Its efficacy has been shewn by the experience of five years. The trees that were gone over the first two years have not been touched since; and none of them have been injured by the hares.

It is a mode particularly well adapted for nurseries, where the ground is not well secured with a fence to protect the young fruit-trees and tender shrubs from hares.

The above is the proportion of the materials; whatever may be the extent of trees.

TREES, *Mossing of*, their becoming much affected and covered with the moss-plant or mossy substance. It is found to prevail in fruit-grounds of the apple kind, and in other situations, when they are in low, close, confined places, where the damp or moisture of the trees is not readily removed. It is thought to be an indication of weakness in the growth, or of a diseased state of the trees, and to require nice attention in preventing or cradicating it. The modes of removing it have usually been those of scraping, rubbing, and washing, but they are obviously calculated for trees only on a small scale. How far the use of powdery matters, such as lime, chalk, and others, which are capable of readily absorbing and taking up the wetness that may hang about the branches and other parts of the trees, by being well dusted over them, may be beneficial, is not known, but they would seem to promise success by the taking away the nourishment and support of the moss, when employed at proper seasons. And they are known to answer in destroying moss in some other cases, when laid about the stems of the plants, as in thorn-hedges, &c.

In the fruit-grounds of Gloucestershire it is recommended, the writer of the account of the agriculture of that district says, to wash with soap-suds, and rub off the moss with a brush, in wet weather when it is soft, and easily separable from the different parts of the trees. This work should be begun at an early period of the growth of the trees, when the branches are few and open, and be repeated every season; otherwise the labour would be too great to undertake on a large extent, when the trees are full-headed, and entangled with shoots. The fruit-farmer should not, however, be too easily discouraged, since it has been discovered, that the eggs of caterpillars are often lodged between the moss and the rind of the trees, and probably the insects issue forth from these depositaries in the spring, to the destruction of leaf and blossom.

In this district, the mossing of the trees is attributed to the plantations being made on grass-lands, which is the common practice in a great part of the county; as, it is said, that in the neighbouring counties, where the fruit-trees are planted in hop-grounds and arable fields, the trees, though not free, are less affected by it. This may, it is supposed, be owing to the frequent manuring and stirring of the mould near the roots, by which means the sun and rain have power to exert their influence, and by invigorating the fibres, promote a general kindness in the growth of the trees.

The mossing in all sorts of trees is injurious to their growth by depriving them of a portion of their nourishment, but more particularly hurtful to those of the fruit-tree kind, as preventing them from bearing full good crops of fruit by rendering them in a weak and unhealthy state.

TREES, *Espalier, Cast-iron Rails for*, a new mode of forming this sort of rails. It is noticed in a Paper in the first volume of the Memoirs of the Caledonian Horticultural Society, that the advantages attending rails of this kind in gardens, in respect to utility as well as ornament, are well known and acknowledged. The greater chance they afford to the fruit in setting and ripening, by the branches being laid in at regular and equal distances, the neatness of appearance which the trees exhibit, and the elegant vistas produced by the rail and trees when bordering the sides of well-kept walks, are all matters with which the admirers of horticulture have long been acquainted. It does not appear, however, whatever may have been the cause, that this, by no means uninteresting branch of the art, has hitherto in any considerable degree engaged the attention of the improver.

The rails for trees of this kind have, for the most part, been made of wood, though not without objections; the principal of which are, want of durability in the substance; the difficulty of keeping them in a perfectly rectilinear position; and the clumsiness of appearance which they constantly, in some degree, exhibit, when made of the dimensions necessary for the proper extension of the trees.

The most usual modes of constructing such rails are two: first, the having upright splints of dressed timber sunk into the ground, and mortised into a horizontal top-rail. This is greatly objectionable on account of the speedy decay, and from the splints always soon giving way where sunk into the ground, as well as from its being scarcely practicable to keep them straight. The second, or that which is the most generally practised, is to sink upright posts into stones, to mortise two cross-bars into them, and to nail upright slips to the bars. The great defect in this mode is, that by the bulk of the posts, rails, and splints, so great a strain is thrown upon the stones during high winds, that they cannot long resist it: and the consequence is, that the rail soon begins to twist, while the part sunk into the stones, in spite of every precaution, will at no great length of time decay, in consequence of moisture getting in between the wood and the stone.

In order to obviate these objections, the substitution of espalier rails formed of cast-iron instead of wood, has been proposed and tried with success by a gentleman in Dunbartonshire, Scotland.

Each portion of rail is formed of two rails inserted at the different ends into handsome upright columns or posts, having erect arrows or pieces fixed into them, somewhat in the manner of common iron paling, the whole sheet or portion resting upon three supports at the bottom, in the way directed below. The supporters on which it stands are thus contrived: the centre one is a piece of seasoned oak, driven firmly into the ground, and sunk a little below its surface. It receives the upright middle arrow-piece, which keeps up the centre of the bottom rail, and through which the different upright arrow-pieces to each side of it are put. It is supported below the rail by two pieces of the same metal in a triangular manner. Those at the ends are stones of two feet in length, having their tops hewn into a hemispherical shape, and perforated in the middle by a hole of four inches in depth, and two in diameter, which receives the bottom ends of the columns or posts. The upright arrow-pieces are each furnished with a ruff at the places where they meet the top and bottom rail.

The columns or posts have the length of six feet, their bottoms being sunk, as above, into the stones: the diameter of them at the bottom rail is an inch and a half, and at the top, one inch and one-eighth: the upright arrow-pieces are five feet in length, and their diameter half an inch: the bottom rails are three-eighths of an inch in thickness, and in
breadth

breadth one inch and five-eighths; the top ones three-fourths by one-fourth of an inch. The columns, at the parts where the rails enter them, have a flank projecting at right angles to them, with a hole, through which, and through a hole in the end of the rail, a leaden rivet is put, for fastening the rail to the column or post. See TRELLAGE.

TREE, *Onion*, in *Gardening*, that sort of onion-plant which rises somewhat in the tree-like form, and which affords its produce or bulbs at the top of the stem or stalk. At what period this valuable and useful bulb-rooted plant was first introduced into this country, seems now to be quite uncertain; and it has never yet perhaps been grown or cultivated to any extent in any part, being mostly had in growth merely for the sake of curiosity. From a Paper inserted in the first volume of the Memoirs of the Caledonian Horticultural Society, it would appear, however, to be capable of being raised with advantage as a substitute, in part, for onions of the keeping kind, as might have been supposed from the severe nature of the climate from which it originally came.

In addition to the little which has been said of the nature of its culture for the purposes of ornament and variety under the head *Allium*, (which see,) the following observations on its culinary use may be given in this place.

It is stated, on the experience of some years, in the Paper alluded to above, that the root-bulbs, when two years old, put up each a stem from thirty inches to three feet in height, on which good-sized bulbs are formed at top: that from these, others push out of a second size; and that sometimes a third set is produced, which are still smaller; but that the first and second sizes are the only ones which are fit for planting. Towards the end of summer, the top-bulbs are in a proper state for gathering, and should be collected and carefully dried in a shady place, then put in a dry airy situation, until the season for planting them out. At this time the old stool-bulbs should be lifted, which have mostly one or two onions to each of them, which are of good quality, and keep well until late in the following spring season.

About the last week in the month of April is the most proper time for planting out the young top-bulbs for the purpose of a crop, as if sooner planted, they are apt to push that season, and neither produce good root-bulbs nor top-bulbs. The old roots should be planted out any time in the month of February, or the following one, as early planting has the power of making them produce good bulbs at top. The young bulbs of the first size should be separated and planted out in rows in any good garden ground, which is in an open situation, six inches by four: the second size in rows six inches by three, in shallow drills of very little depth, as the swelling and ripening of the roots are spoiled when they are deep.

The whole of these will, it is said, produce onions of a good size, which will keep, when well taken care of, until the middle of May. The old stool-bulbs, when not all wanted for planting, will likewise keep equally well; and after a sufficient stock of them has been provided, the rest may be used with the other principal sorts.

It is noticed that the old roots are the best for replanting for a crop of top-bulbs, as they are the most certain of running to stems.

The writer has never known these crops to be infested with vermin in any stage of their growth; the reason of which is, it is thought, their quick growth and coming to maturity before the season at which vermin commonly attack the usual spring-down roots, as it has been found that the late or autumn-down crops of the common kind, when

allowed to stand for an over-year produce, are seldom or ever affected in this way, even on light dry ground.

This sort of onion, besides its property of long keeping, is a strong well-flavoured kind, equal, if not superior, to most of the common sorts.

It is, however, perhaps the best calculated for private gardens, as requiring a good deal of attention, as in such, when once provided with a certain quantity of stool-bulbs, the proprietors would be rendered independent of the failure of the crops of common onions; and it is confidently asserted, that if the cultivation of it were generally well understood, it would be capable of being grown with both pleasure and profit in a great many cases.

TREE, *Celandine*. See BOCCONIA.

TREE, *Cork*. See CORK and OAK.

TREE, *Chaste*. See AGNUS CASTUS.

TREE of Life, *Arbor vite*, in *Botany*. See THUJA.

The occidental, which grows naturally in Canada and other northern countries, is used, according to professor Kalm, for many medicinal purposes. It is much extolled for rheumatic pains; with this intention the fresh leaves are pounded in a mortar, and mixed with hog's grease, or any other grease; this is boiled together, till it becomes a salve, which is spread on linen, and applied to the part where the pain is. This salve gives certain relief in a short time.

Against violent pains which move up and down in the thighs, and sometimes spread all over the body, they recommend four-fifths of the leaves of polypody (*polypodium fronde pinnata*, &c.) and one-fifth of the cones of the thuja, reduced separately to a coarse powder, and afterwards mixed. With this powder, and milk-warm water, they make a poultice, which they spread on linen, and wrap round the body; but they commonly lay a cloth between it and the body, otherwise it would burn and scorch the skin.

The decoction of thuja leaves is used as a remedy for the cough; and they use this at Saratoga for the intermitting fever.

TREE-Frog. See RANUNCULUS *Viridis*.

TREE, *Germander*. See TEUCRIUM.

TREE, *Mallow*. See LAVATERA.

TREE, *Mealy*, or *White-leaf*. See WAYFARING-TREE.

TREE-*Moss*, a species of *Lichen*; which see.

TREE, *Primrose*. See OENOTHERA.

TREE-*Loufe*. See APHIS.

TREE, *Diana's*, in *Chemistry*. See ARBOR.

TREE, *Dormant*. See DORMANT.

TREE-Fold, in *Sheep-farming*, a term applied to that sort of sheep-fold which is formed or surrounded by trees in the growing state, and which is well suited for protecting them in certain exposed situations, as well as affording them other advantages. See SHEEP.

TREES, in a *Ship*, are of several sorts, as *chests-trees*, *cross-trees*, *roof-trees*, *waste-trees*, *trussel-trees*. See CHESS-trees, &c.

TREE *Island*, in *Geography*, a small island in the Indian sea, near the coast of Africa. N. lat. 17° 10'. — Also, a small island in the East Indian sea, near the E. coast of Sumatra. S. lat. 3° 50'. E. long. 105° 51'. — Also, a small island near the W. coast of Sumatra. S. lat. 1° 58'. E. long. 100° 15'. — Also, an island in the bay of Bengal, near the coast of Ava. N. lat. 18° 12'. E. long. 94° 15'.

TREE-A-TOP ISLAND, one of the Chufan islands, which undoubtedly deserved the appellation given to it, when it was first described by the Europeans above half a century ago, at which time they were permitted to trade to Chufan;

but the tree is gone, and this island, which is as bare as those surrounding it, is only known by its relative position in the chart. To the southward of this island, about three or four miles, there is excellent anchorage in five or six fathoms water, where ships are sheltered from every wind.

TREE-NAILS, or **TRENNELS**, in a *Ship*, are long cylindrical wooden pins, employed to connect the planks of a ship's side and bottom to the corresponding timbers, and to fasten the anchor-stock.

The tree-nails are justly esteemed superior to spike-nails or bolts, which are liable to rust and loosen, as well as to rot the timber: but it is necessary that the oak of which they are formed should be solid, close, and replete with gum, to prevent them from breaking and rotting in the ship's frame. They ought also to be well dried, so as to fill their holes when swelled with moisture. They have usually one inch in thickness to 100 feet in the vessel's length; so that the tree-nails of a ship that is 100 feet long, are one inch in diameter, and one inch and a half for a ship of 150 feet.

TREET, **TRITICUM**, in our *Statutes*, is used for fine wheat. See stat. 51 Hen. III. Hence *treet-bread*. See **BREAD**.

TRE-FALLOW, *To*, in *Husbandry*, is to plough land the third time before sowing.

TREFFEN, in *Geography*, a river of Carinthia, which runs into the Drave, 6 miles below Villach.

TREFFORT, a town of France, in the department of the Ain; 7 miles N.E. of Bourg-en-Bresse. N. lat. $46^{\circ} 16'$. E. long. $5^{\circ} 27'$.

TREFFURT, a town of Westphalia, in the territory of Eichsfeld; 10 miles W.S.W. of Muhlhausen.—Also, a town of Germany, in the principality of Hesse-Rhinfels, situated on a hill near the Werra; 36 miles E.S.E. of Casfel. N. lat. $51^{\circ} 8'$. E. long. $10^{\circ} 18'$.

TREFOIL, in *Architecture*, the usual mode of ornamenting an arch in the pointed style by the insertion of a *cusp* or point on each side of it. Other trefoils are inscribed within a circle, and resemble a head of clover-grass more perfectly.

TREFOIL, in *Botany*. See **TRIFOLIUM**.

Trefoil is a plant of the clover kind, which is not unfrequently sown or met with in grass-lands. It is always a valuable plant in such grounds as are kept under a permanent state of grass; and not much less useful, when sown and cultivated in those of the arable kind. See **CLOVER** and **MEDICAGO Lupulina**.

It succeeds well on soils of different descriptions, as on those of the dry, loamy, and the calcareous kinds and qualities. It was found to succeed perfectly on the stone-brash kinds, by Mr. Davis, in Oxfordshire; and it has been greatly advised for the chalky and some other dry forts, by Mr. Boys of Kent. It is constantly known to answer well in all the less moist loams. It is a plant, however, which has been objected to by some farmers, as being only a biennial; but as it sheds its seeds annually in great abundance, this is probably a matter of little consequence; and it is well known to seldom wear out of lands, in which it has been once well established. Its seed is readily procured, and with little expence or trouble.

The plant is of much less growth than that of common clover, being considerably slender in the stem or stalk part; yet notwithstanding this, it is not unfrequently sown with crops of the grain kinds, in the manner of that grass-seed. The proportion of seed, which is made use of in such cases, is usually about three pottles, or two gallons, when perfectly cleared of the husks; but when in the contrary state,

two bushels are mostly the quantity that is sufficient for the purpose. These quantities should, however, be constantly varied, according to the nature, circumstances, and conditions of the lands.

By some it is supposed to be a beneficial practice to sow it in these ways, especially where large stocks of animals are kept; as with the oats or wheats in the spring season, when they are to be followed with grain in the next; as, by this means, good feed is provided in the stubbles for the stock, in the latter part of the summer and in the autumnal months, while, at the same time, the land is left free for the purposes of tillage in the spring. When it is employed in the way of laying down land for pasture, as it is always of much importance to the farmer to have such land to produce a full crop the first year, this is proper; and as there are some grass-plants which require two or more years to establish themselves, and acquire their full growth, while others arrive at their extreme and perfect size and expansion the first year after being sown; some of the latter sort should constantly be had recourse to, among which this should never be neglected, as it is found, in most cases, to be highly valuable and useful in such circumstances. Hence, too, the advantage of mixing it with other sown grass-seeds is shewn in different instances. Some farmers consider the quantity of four pounds of trefoil-seed to the acre as too small a proportion; and think it an improvement to either double the quantity, or to add as much red clover-seed, which is probably the preferable method. In this quantity, it is supposed, they will not injure the other grass-seeds which may be sown at the same time, but furnish a copious vegetation, until the other may come to perfection; at which period, both the trefoil and clover have a natural tendency to disappear and be worn out of the land.

Trefoil is said to produce excellent pasturage for cattle-stock, but to be more particularly calculated for sheep, when either in mixture with clover or alone, as it is found not to be so liable to hurt them by swelling or *boving* them as clover. It is of great importance in the feeding and support of sheep, in consequence of its being more early than clover, and its coming in well after the consumption of the rye and turnip crops, before the clovers become ready in the spring season.

The writer of the "Experienced Farmer" states, that this, by some, is supposed a bitter plant, and that sheep are not fond of it, but that he must own that nothing within the compass of his experience has led him to form such an opinion. It vegetates about a month earlier than white clover, and long before the rye-grass is exhausted. But it is thought improper for being sown alone, except for the express purpose of raising feed. There are no soils, it is thought, proper for trefoil but what are capable of producing rye-grass and white clover. Hay made from this plant alone, is a pretty hay, but seldom abundant in produce. It is conceived that more trefoil is capable of being raised on any sort of land, in any quantity, by sowing rye-grass among it, than without; as it has been observed that trefoil, like the vine and pea, wants support from some stronger material to which it may cling. For this reason it prospers well with red clover, round which its tendrils twine as woodbines in a thorn-hedge. It is believed, too, that the crop of clover will be very little less in quantity or weight from the trefoil growing in a state of mixture with it. The after-grass of trefoil is considered as not worth much, on which account some recommend it to be followed with wheat, but it can be declared on the grounds of constant experience, that land intended for wheat, cannot possibly

be too much smothered with crops of every sort of the close-growing shady kinds.

It has been stated by a late writer, that upon light and poor sandy soils, or lands on which clover does not succeed well, it is common husbandry to sow trefoil with a portion of white clover and rye-grass, with the intention of leaving it two years. In this case, six pounds of trefoil, four of white clover, and half a bushel of rye-grass seeds are the common quantities. These are with the intention of providing sheep-feed.

Where trefoil is left for hay, it does not afford a large produce, but a sort which is highly useful and advantageous as a sheep-fodder in the winter season, and less wasteful than most other kinds, when used in that way. At the same time, it is supposed to be less troublesome in the process of making into hay. However, it is asserted by Mr. Kent that it readily runs together, and becomes mouldy by wet.

The seed is to be collected from the second shoot, in the same manner as in common clover, the produce being in general from six to eight bushels of clear seed from the acre. In districts where it is grown for the seed, the crops are mown in the beginning of July; the heads or husks being often threshed off the straw in the field on a cloth, and then sold by the quarter to those who have mills and collect them, who grind the seed out of the husks, and then dispose of it to others, in different places, for the use of the farmers in those districts where it is rarely sowed. The acre mostly produces from about four or five to ten quarters in the husk, each of which affords about two bushels of clean seed when grown solely in this intention.

This plant has often the names of *black-grass*, *nonfuch*, *yellow clover*, and others, given it by writers on husbandry.

There are other different sorts or varieties of this plant occasionally cultivated by the farmer, such as the trefoil termed *bird's-foot*, which has been found useful when cultivated in meadows that are inclined to be moist, as growing to a great height, and affording an excellent hay. In some places too it is raised as pasturage for sheep. Also the trefoil called by the name of *hop*, which is often confounded with the real trefoil, as being nearly of the same duration, but which is more grateful to animals. The trefoils seem, on the whole, not to be so much discriminated by agricultural writers, as their importance as artificial grasses would appear to demand. Besides, much confusion is introduced in consequence of the diversity of their provincial titles. It has been remarked, that as some are annual, some biennial, and others perennial, where the two former sorts are sown where it is intended to have a permanent pasture, disappointment must of necessity be the consequence.

TREFOIL, *Bean*, a species of *Cytisus*; which see.

TREFOIL, *Stinking Bean*. See ANAGYRIS.

TREFOIL, *Bird's-foot*. See LOTUS.

The fruit of the lotus was, by the ancients, imagined to be endowed with the virtue of making strangers forget their native country.

TREFOIL, *Marsh*. See MENYANTHES.

TREFOIL, *Moon*. See MEDICAGO.

TREFOIL, *Shrubby*. See PTELEA.

The second species of this genus, or the ptelea with single leaves, was formerly shewn for the tea-tree in many of the European gardens, where it many years passed for it among those who knew no better.

TREFOIL, *Snail*. See MEDICAGO and LUCERNE.

TREFOIL of *Candia*, *Thorny*. See FAGONIA.

TREFOIL, *Base Tree*. See CYTISUS.

The ancient botanists seem to have been acquainted with two very different shrubs under the name *cytissus*; and there have been no small errors about the true meaning of several passages in Dioscorides and Theophrastus, on occasion of the mistaking one of these things for another. Dioscorides describes the *cytissus*, as being a shrub with leaves white and hoary, both on the upper and under side, and of no use, or value, to mankind: as to its wood, Pliny translates this account, and adds to it from Hyginus, that it was a very hardy and strong shrub, not being affected by heat or cold, snow or hail, or any other injuries of the weather, nor of its enemies, as Pliny expresses it (*boffium*). It is not very easy to conceive what enemies these should be; but the most probable conjecture, as to this odd passage, is, that Pliny had transcribed it in his usual careless way, and that what is called *boffium*, should be the word *nostrum*.

The sense then is clear enough; the author had just before said that the wood was good for no use to mankind; and, therefore, when he was speaking of the trees standing a long time, and fearing the injuries of no weather, he might very well add, *nor of us*; for the wood being good for nothing, men would not be at the trouble of cutting it up. It is plain, however, that Theophrastus means quite a different shrub by this name *cytissus*; for, as Dioscorides says, that the wood of his was white throughout, and very light. Theophrastus observes, that it was black at the heart, and as heavy and solid as ebony; and, in many places, where he speaks of the hard and elegant woods used for inlaying, he mentions the *cytissus* wood, coupling it with the ebony, heart of oak, and other the hardest and most elegant woods known in his time.

Pliny mentions no other *cytissus* than that of Dioscorides, which was the common kind cultivated by the Greeks and Romans, as a food for cattle; he says it was raised by seed, and came to its perfection in three years, and that it was gathered in the spring just after the time of its flowering: he adds, that this was usually the office of children, or old women, unfit for other work, and was the cheapest of all the offices of husbandry. It is easy to conceive, that such a shrub as the *cytissus* of Theophrastus, with a wood as firm as the heart of oak, and hard as ebony, did not come to perfection in three years from the sowing; nor could any more be cut up by boys and old women, than eaten by cattle when taken up. There were, therefore, two kinds of *cytissus* among the ancients, the one sown and cultivated as food for cattle, the other a wild tree, or shrub, growing in woods, and being larger than the sown kind. Dioscorides and Pliny describe the first, and Theophrastus alone the latter, except that Pliny has now and then taken a sentence from Theophrastus, when he mentions the *cytissus* occasionally among other hard woods, and placed it to the account of his manured *cytissus*.

Ovid, indeed, where he mentions the *cytissus* as a wild wood shrub, certainly means this kind mentioned by Theophrastus:

“Nec tenuis *cytissus* curtave tinus abest.”

And Columella acknowledges both kinds. It may seem a natural objection, that culture could never make such a difference in this plant, as that it should be hard and black in the wood in its wild state, and soft and white in the cultivated kind. But we are not to suppose that the cultivated and wild *cytissus* were the same species of shrub, only altered by these two states. The ancients were not so accurate in their names as later botanical writers have been; and if a wood-shrub, in some respects, resembled their manured *cytissus*, they would call it by that name, though it had

had not all the generical characters to make it the fame. Columella, de R. R. lib. ix. cap. 4.

TREFUMEL, in *Geography*, a town of France, in the department of the North Coasts; 6 miles S. of Dinan.

TREGARON, or TREV GARON, or *Caron*, a small market-town in the hundred of Pen-Arth, and county of Cardigan, South Wales; is situated in a valley watered by the river Berwyn, a contributory stream to the Teifi; 18 miles S. by E. from Aberystwith, and 170 miles W. from London. It was formerly a corporate town, but for some improper conduct at the election of a member to serve in parliament in the year 1742, the house of commons voted that the corporation had forfeited their charter. A weekly market is held on Tuesday, and an annual fair of three days' continuance in March. The church, which is a spacious structure of very rude masonry, consists of a nave and chancel: it stands on a rocky eminence, regularly circular, and forming an elevated centre to the town. In the church-yard are the remains of a Druidical circle, with the spaces filled up with stone-walling. The parish of Tregaron, which extends nine miles in length, and four miles in breadth, comprehends eight parcels or townships, and, according to the population return of the year 1811, contained 244 houses, and 1133 inhabitants. At a place called Castell Flemys, in this parish, is a very large intrenchment of a semi-circular form, well defended on three sides by a morass. On a hill called Penrhiwflur are three heaps of stones, called Carneddau, sepulchral monuments of Druidical origin: and a bank of raised earth runs in a straight line for several miles, in this parish as well as that of Gwnnws, and is said to lead into the sea, called "the furrow of Bannoy's oxen," the same as were said to be employed in building the church of Llandewi Brefi. But it is probably the remains of an old British road. Thomas Jones, an eminent antiquary and poet, who lived at the end of the sixteenth century, was a native of Tregaron.—Malkin's *Scenery, &c.* of South Wales, 2 vols. 8vo. 1807. Carlisle's *Topographical Dictionary of Wales. Beauties of England and Wales*, vol. xviii. South Wales; by the Rev. T. Rees. *Meyrick's History and Antiquities of the County of Cardigan*, 4to. 1808.

TREGIANO, a town of Naples, in the province of Bari; 6 miles E.S.E. of Bittetto.

TREGONY, a market-town and borough in the western division of the hundred of Powder, and county of Cornwall, England; is situated on the river Fal, 8 miles E. from Truro, 40 miles S.W. from Launceston, and 250 miles S.W. by W. from London. This town was formerly a place of some consequence, but fell to decay when Truro began to flourish, and attract its trade and population. Tregony sent two members to parliament in the reign of Edward I.; and after a long dispute, recovered its ancient privilege in the year 1559: the right of election is vested in the housekeepers: the number of voters who polled in the year 1812 was 183, the exact number of houses returned under the population act of 1811; the number of inhabitants were therein stated to be 923. The town consists principally of one long street. It was anciently governed by a portreeve, or mayor; but in the year 1620, king James I. granted it a charter of incorporation. The market, which is on Saturday, is held by prescription: Henry de Pomeroy certified his right to it in the reign of Edward I. Henry III. granted a fair to the said Henry in the year 1266. Here are now five fairs. Both the fairs and market have for many years been in a declining state: till the middle of the last century, they were very considerable, and particularly noted for the sale of

woollen cloth, of which there was an extensive manufactory in the town. Tregony castle, of which there are now no remains, is said to have been built by Henry de Pomeroy at the time king Richard I. was in the Holy Land: it was standing, and was the feat of the Pomeroyes, in the reign of Edward VI. In the year 1696, Hugh Boscawen founded an hospital for decayed housekeepers, and endowed it with lands, now let at 30*l.* per annum, but capable of being soon raised to three times that value. On the north side of the town stood, what is called, Old Tregony, where was a church dedicated to St. James, the walls of which were standing till about the middle of the last century.

On the opposite bank of the Fal, is Trewarthenick, the feat of Francis Gregor, esq. The house is seated on an elevated piece of ground, abounding with fine groves, and commanding a variety of interesting prospects.

About two miles south-west of Tregony, is Ruan Laniorne, a village seated on the banks of the Fal, of which the Rev. John Whitaker, the learned historian of Manchester, was nearly forty years the resident rector. He died Nov. 4, 1808, in the 73d year of his age, and lies buried within the rails of the communion-table.—Lysons's *Magna Britannia*, vol. iii. Cornwall, 1814. *Beauties of England and Wales*, vol. ii. Cornwall; by J. Britton and E. W. Brayley, 1802.

TREGUIER, a sea-port town of France, in the department of the North Coasts, on a peninsula, near the English Channel; before the revolution the see of a bishop; 9 miles N.E. of Lannion. N. lat. 48° 47'. W. long. 3° 8'.—Also, a river of France, which runs into the English Channel, 6 miles N. of Treguier. N. lat. 48° 51'. W. long. 3° 8'.

TREIA, in *Ancient Geography*, a town of Italy, in Picenum, S.E. of Cingulum.

TREIA, in *Geography*, a town of the Popedom, in the marquisate of Ancona; 6 miles W. of Macerata.

TREIGNAC, a town of France, in the department of the Correze; 16 miles N. of Tulle.

TREIGNY, a town of France, in the department of the Yonne; 9 miles S.E. of St. Fargeau.

TREILLAGE, in *Gardening*, a sort of rail-work consisting of ranges of light posts and railings, for the purpose of training espalier trees to, and occasionally for wall-trees, where the walls do not admit of nailing the branches immediately against them; likewise for training wall-trees in forcing-frames, &c. They are made in different ways for use and ornament, as well as of different dimensions, from four or five to six or seven feet high.

For common espalier fruit-trees in the open ground they are absolutely necessary, and may either be formed of common stakes and rails nailed together, or of regular joinery work.

The cheapest and the easiest, and soonest made treillage for common espalier trees, is that formed with any kind of straight poles or stakes of under-wood, as cut in the coppices, being then cut into proper lengths, and driven into the ground in a range at distances of a foot each, all of an equal height, and then railed along the top with the same kind of poles, to preserve the whole straight and firm in a regular position. See ESPALIER.

And to render these still stronger, two or three horizontal ranges of rods may be nailed along the back part of the uprights, a foot or eighteen inches asunder.

The more elegant and ornamental treillages are formed with regularly squared posts and rails of hard timber, neatly planed and framed together; having for this purpose deal or oak posts, uniformly worked two or three inches square; but if the main posts are of oak, it will be of advantage

vantage in respect to strength and durability, fixing the main posts in the ground ten or twelve feet asunder, with smaller ones between, ranging the horizontal railings from post to post in three or more ranges; the first about a foot from the bottom, a second at top, and one or two along the middle space, and, if convenient, one between each of the intermediate spaces; then fixing thin slips of lath, or the like, upright to the horizontal railing as far as the branches of the trees extend, ten inches or a foot asunder; and painting the whole white in oil colour, to render it more ornamental and durable. In training the trees, their branches are tied both to the railing of the treillage and the upright laths, according as they extend in length on each side. In either of the above cases, for an espalier, five feet are generally of sufficient height, as, if much higher, the winds, having greater power, will loosen and displace them.

Where walls are built with large stones with the joints irregular and far asunder, and which do not afford opportunities, like brick-walls, for nailing properly in the regularity which is required, a neat treillage is sometimes uniformly erected all along close to the wall, to train and nail the branches to in a regular manner.

These may be made of coarse pieces of battens, railings, &c. or of such as are wrought in a neat manner, according to the convenience and taste of the person who has them.

In constructing treillages of this nature, some make them with clean straight rods or poles, and others with squared laths, which are an inch and a half in thickness; each of which sorts of materials answers the purpose very well. In performing the business, the workmen, as soon as they have provided themselves with a sufficient quantity of either of these kinds of articles, and a proper supply of hooked iron hold-fasts, first drive some of the hold-fasts into the joints of the walls in rows as much as possible at regular distances, which are left projecting about an inch or inch and half from it, in order to receive the rods or laths in both a horizontal and perpendicular direction, at nine or ten inches from each other, fixing in the first row of these hold-fasts towards the top or upper part of the walls, the second near to the bottom, and the third all along the middle space. When this has been accomplished, and the rods or laths are in readiness, the latter of which may, if thought necessary, be squared and planned to the place, they begin to proceed to the framing of the treillage, by first fixing the rods horizontally in three rows, in the three ranges of hooks as above, taking care that these horizontal rods be previously chopped off to nothing at each end, in order that they may be readily spliced to each other to extend them in length as far as it may be requisite. Having thus fixed up the first three rows of horizontal poles, some uprights or standard rods are fastened up in the front of the horizontal poles, at the distance of five or six feet, after which the remainder of the horizontal laths are ranged behind the standards, nine or ten inches asunder, fastening them with wire to the uprights, when they being all thus placed and fixed, the rest of the standards are fastened up in front at the same distance, the whole being made perfectly fast with wire twisted round the hooks, and the crossings or interfections of the rods of the treillage or frame-work. Where square laths are employed for this purpose, they are usually about an inch and half in the square, being planed quite even and smooth, and then framed together in a neat manner by proper mortises, and fixed up with strong hooks and nails.

Either of these kinds of treillages, when finished and fixed up, should be well painted over with white lead paint, in order to render them more lasting and handsome.

In frames and stoves where wall-trees are intended for forcing, as they are planted both against the back wall, and

occasionally in a detached low range forward towards the middle or front space; treillages are indispensably necessary upon which to arrange the branches of the trees in a regular expansion, not to train them immediately close to the wall of the flues of that department, but detached several inches, and formed with light neat squared upright battens, and small horizontal rails, uniformly framed together, in a light open manner. See TREES, *Espalier*, *Cast-iron rails*, &c.

TREISENFELD, in *Geography*, a town of Germany, in the principality of Culmbach; 8 miles S.E. of Bayreuth.

TREISZ, a town of France, in the department of the Sarre, on the Moselle; 19 miles S.W. of Coblenz.

TREIZIEME, Fr. in *Music*, is the octave of the 6th, or the 6th of the octave; and is called in English the 13th, from its containing twelve diatonic degrees, that is to say, thirteen sounds.

TRELAWNY, in *Geography*, a town of Jamaica, and chief town of the Maroons; 60 miles N.W. of Kingston. N. lat. 18° 21'. W. long. 77° 42'.

TRELAZE, a town of France, in the department of the Mayne and Loire; 3 miles E.S.E. of Angers.

TRELLECH, a town of England, in the county of Monmouth; 5 miles S. of Monmouth.

TRELLIS, or TREILLIS, in *Gardening*, a term sometimes employed to signify the same as treillage, or a slighter and less strong sort of wooden frame-work of this nature, which is sometimes used in particular situations and circumstances. See TREILLAGE.

TRELON, in *Geography*, a town of France, in the department of the North; 9 miles S.E. of Avesnes.

TRELOOBING, in *Mining*, denotes a stirring and working the loobs or slimy earth of tin, &c. in a slime-pit, that the mud may be flinty washed off with the water, and the ore settle at bottom.

TRELOU, in *Geography*, a town of France, in the department of the Aisne, on the Marne; 9 miles E. of Chateau Thierry.

TREMA, in *Botany*, from *τρῆμα*, *τρῆματις*, a hole, alluding to the perforations in the shell of the nut.—Loureir. Cochinch. 562.—Class and order, *Monoclea Pentandria*. Nat. Ord. *Urtica*, Juss.

Gen. Ch. Male, *Cal.* Perianth of five lanceolate spreading leaves. *Cor.* none. *Stam.* Filaments five, longer than the calyx; anthers roundish.

Female, on the same plant, above the male, *Cal.* as in the male, permanent. *Cor.* none. *Pist.* Germen superior, roundish, depressed; style none; stigmas two, short, villos. *Peric.* Drupa roundish, somewhat depressed, single-seeded. *Seed.* Nut minute, pierced with several holes.

Ess. Ch. Male, Calyx of five leaves. Corolla none. Female, Calyx of five leaves. Corolla none. Stigmas two. Drupa superior, roundish, with a perforated nut.

1. *T. cannabina*. Cây Rách chiéo of the Cochinchinese.—Native of the woods of Cochinchina. A tree of middling size, with a filamentous bark, and ascending branches. Leaves alternate, ovato-lanceolate with a long point, serrated, downy. Flowers on axillary branched stalks. Drupa yellow.—We know nothing of this plant but from the above description.

TREMANDREÆ, a new natural order of plants, pointed out by Mr. Brown in his truly excellent and instructive "Remarks on the Botany of Terra Australis," published at the end of captain Flinders's Voyage. This order is founded on the genus TETRATHECA, (see that article,) and another from the same country, named by Mr. Brown *Tremandra*, apparently from *τρῆμα*, a perforation, and *ανδρ*, a man, because of the pores of the anthers. The characters of the order are thus given.

Calyx of four or five equal leaves, overlapping each other in the bud. *Petals* four or five, equal, involute, and unfolding the stamens, before expansion. *Stamens* eight or ten, below the germen, distinct; *anthers* attached by their base, of two or four cells, bursting by either a tube or pore at the summit. *Germen* (superior) of two cells, with from one to three pendulous seeds in each; *style* one; *stigmas* one or two. *Capfule* of two cells, and two valves, with partitions from their centres. *Seeds* albuminous, with a naked scar, and an appendage at the opposite extremity; *embryo* in the axis of the fleshy albumen, and half as long again; *radicle* directed towards the scar. The plants are humble shrubs, resembling *Ericæ*, with either scattered or whorled leaves, destitute of *stipulas*. Their *stalks* axillary, and single-flowered.

Mr. Brown prefers the name he has chosen for this order to one derived, as it ought in right of priority to be, from *Tetrateca*; because it better describes the structure of the stamens in both genera: the four distinct cells not existing in the ripe state of the anthers of *Tremandra*, nor even of all the species of *Tetrateca*. We are well aware of the truth of his assertion, that bilocular anthers in general have each cell divided by the inflexed valves, till they burst, being while young truly quadrilocular. We were however of opinion, in founding the genus *Tetrateca*, that the four cells being permanent, afforded an excellent name, as well as character. If this character does not exist in every species, it may be less important; but that it is not found in *Tremandra*, surely renders it the more descriptive of *Tetrateca*. Mr. Brown proceeds to remark, that the writer of this, like Labillardiere, has mistaken the fungous appendage to the apex of the feed for an umbilical *caruncula*, or appendage to the scar; hence one end of the seeds was taken for the other, and they were supposed erect, not pendulous; Labillardiere moreover was thus led to conceive that the radicle pointed towards the scar.

The *Tremandree*, as Mr. Brown observes, are nearly related to *Polygaleæ*, but he esteems them sufficiently distinct from the latter, not only in the regularity of the *flower*, and structure of the *anthers*, but in the æstivation, or manner of folding, of both *calyx* and *corolla*; in the appendage of the *feed* being at its apex; and, it may be added, in the tendency to produce an indefinite number of *seeds* in each cell. We would rather condense than dilate the number of natural orders, as well as genera, and with respect to the first reason of our learned friend, we would recall a remark of the sagacious Correa, that every natural order contains some regular and some irregular-flowered genera. The different æstivation is perhaps a necessary consequence of the last-mentioned difference. The other characters are surely of small account in this case.

"The greater number of *Tremandree* are found in the principal parallel of New Holland. They extend also to the south end of Van Diemen's island, but none have been observed within the tropic."

TREMBLADE, in *Geography*, a town of France, in the department of the Lower Charente; 3 miles S. of Marennes.

TREMBLANT, in *Music*, the name of a very disagreeable stop in large church-organs on the continent. Its name describes its effect. In general, a *steady tone* in a voice or wind-instrument capable of sustaining a note, is the most essential requisite; but in the tremblant stop there is a perpetual quivering, such as we sometimes hear in the streets by the *vielle* and barrel-organ. See ORGAN.

TREMBLAY, LE, in *Geography*, a town of France, in the department of the Mayne and Loire; 18 miles N.E. of Angers.

TREMBLAY le Vicomte, Le, a town of France, in the department of the Eure and Loire; 7 miles S. of Dreux.

TREMBLEMENT, in *French Music*, is equal to *trillo* in Italian, and *cadence* in old French music: they all mean the same thing, which in English is a *shake*.

TREMBLEY, ABRAHAM, in *Biography*, an eminent naturalist, was born at Geneva in 1710, and having finished his own education in Holland, he undertook that of the children of M. Bentinck. He thence went to London, and had the charge of the young duke of Richmond. In the course of these employments he travelled into various parts, and directed his attention to various objects, particularly of natural history. His discovery with regard to the propagation of the fresh-water polypes (see POLYPE), engaged general attention, and he gave an account of it in his work printed at Leyden in 1744, and entitled "Memoire pour servir á l'Histoire Naturelle d'un Genre de Polypes d'eau douce a Bras en Forme de Cornes." His papers on other subjects of natural philosophy, as electricity, geology, &c. are printed in the Transactions of the Royal Society, of which he was a member. In 1757, upon his return to Geneva, he became a member of the Grand Council, and his conduct as a citizen contributed no less to his reputation, than his researches and discoveries as a philosopher. Having the superintendance of a granary, he made some useful observations on the insects that destroy corn, and the mode of counteracting the injury they occasion. To the young he was a pleasing instructor, adapting his mode of conveying useful knowledge to their years and capacities. With this view he published "Instructions d'un Père á ses Enfants sur la Nature et la Religion," 2 vols. 8vo. 1775; "Instructions d'un Père á ses Enfants sur la Religion Naturelle et Révélé;" 3 vols. 8vo. 1775; and "Instructions d'un Père á ses Enfants sur le Principe de la Religion, et du Bonheur," 8vo. 1782. This excellent person died at Geneva, highly esteemed and respected, in 1784. Haller.

TREMBLING POPLAR, in *Planting*, a name often applied to the aspen-tree. See POPLAR-Tree and POPULUS.

TREMBLING-ILL, a disease in sheep, which often produces great loss among lambs. It is an affection of the paralytic kind, which is sometimes lingering, but at others so speedy, that the animals are not unfrequently dead before it is suspected. Washing in cold water has been found useful. See THWARTER or LOUPEING-ILL.

TREMBLOWA, in *Geography*, a town of Austrian Poland; 16 miles S. of Tarnopol.

TREMECEN, or TLEMSAN, a city of Algiers, and capital of the western division, which is governed by a bey or viceroy; situated on a rising ground, below some rocky precipices, from which issue a number of springs. In the west part of the city is a large square basin, of Moorish workmanship, 200 yards long, and about half as broad. Most of the walls of Tremecen have been built or rather moulded in frames, a method of building used by the Africans and Spaniards. The mortar of which they consist, is made up of sand, lime, and gravel; which, by being at first well tempered and wrought together, has attained a strength and solidity not inferior to stone. About the year 1670, Hassan, then dey of Algiers, laid most of this city in ruins, as a punishment for the disaffection of the inhabitants; so that there is not remaining above one-sixth part of the old Tremecen, which, when entire, might have been four miles in circuit. Among the eastern part of these ruins we meet with several shafts of pillars, and other fragments, of Roman antiquities; and in the walls of a mosque, made out of these old materials, we have a number of altars, dedicated to the Dii Manes; 50 miles S.W. of Oran. N. lat. 35° 1'. W. long. 0° 28'.

TREMELLA, in *Botany*, so called by Dillenius, from *tremo*, to tremble, or quake, because of its gelatinous, tender

TREMELLA.

and tremulous substance.—Dill. Musc. 41. Linn. Gen. 567. Schreb. 758. Mart. Mill. Dict. v. 4. Sm. Prodr. Fl. Græc. Sibth. v. 2. 336. Hudf. 562. Juss. 6. Lamarek Illustr. t. 881. Perf. Fung. 622.—Class and order, *Cryptogamia Alga*, Linn. *Crypt. Fungi*, Perfoon. Nat. Ord. *Alga ambigua*, Sm. *Fungi*, Perf.

Ess. Ch. Fructification scarcely perceptible, in a membranous, gelatinous, expanded, undulated substance.

Nothing is more uncertain than the generic character, and even the natural order, of *Tremella*. The genus seems made up of various gelatinous productions, in which no traces of fructification have been detected. Having no shields, tubercles or warts, they could not be referred to *Lichen* or its allies; neither have they seeds imbedded throughout their substance, to make them *Ulva*; much less any aggregated seeds with or without a perceptible pericarp, as in *Fucus*. They moreover differ from both the latter genera, in not being *submersed Alga*; for the aquatic species are, as Roth and Perfoon observe, much better excluded. The able cryptogamist last named refers *Tremella* to the order of *Fungi*; but without any attempt to shew that they produce powdery seeds from the surface of a *hymenium*, or superficial membrane; a most material character of such *FUNGI* (see that article) as have not a real pericarp with numerous enclosed seeds. Their habit indeed is essentially different. They are repeatedly revivifcent by means of moisture, thriving in a wet atmosphere only, though not living immersed in water. In these particulars they agree exactly with the *Lichenes*, not with genuine *Fungi*; which last, though they generally flourish in humidity, are scarcely revivifcent after having been once dried up.—The various species, of which Perfoon defines twenty-four, are generally parasitical, on the bark or branches of living trees, or on dead wood. We doubt the reality of several, which appear to us mere gummy exudations of the plants on which they are found. This will presently form a subject of enquiry. We propose to detail all the British species, real or supposed, along with any exotic ones that seem particularly worthy of notice.

We are not much satisfied with Perfoon's sections of this genus, nor do we think it advisable to adopt them here, on account of the uncertainties above-mentioned. Our determination does not arise from any disrespect for that excellent author, one of the most methodical and accurate in this obscure and much neglected path.

T. mesenterica. Plaited Yellow Tremella. Retz. Prodr. 294. Perf. n. 1. Dickf. Crypt. fasc. 1. 14. Engl. Bot. t. 709. (*T. mesenteriformis*; Jacq. Misc. Austr. v. 1. 142. t. 13. *T. juniperina*; Hudf. n. 1. *Noctoc luteum*, *mesenterii* formâ; Vaill. Paris. t. 14. f. 4.)—Sessile, clustered, plaited, lobed, waved, orange-coloured.—Found in rainy weather in the autumn and spring, on dead branches of oak and other trees, or on decayed stumps of broom or furze; never on living wood or bark. This very striking and conspicuous species forms clusters of various dimensions, from one to four inches broad, of a rich orange hue, more or less deep; when young pale or whitish. The substance is soft and flexible, neither viscid, nor very tender. In dry weather, or after being gathered, it shrinks, becomes hard, and assumes a dirty brown colour; but revives in moisture. Little taste or smell is perceptible in any part, nor has any sign of fructification been discovered. Yet the plant appears to be annual, and consequently must be propagated by seed.

T. lutescens. Soft Yellowish Tremella. Perf. n. 2. Ic. et Deser. Fung. 33. t. 8. f. 9.—“Convolutè, extremely soft, deliquescent, pale yellow.”—Observed by Perfoon on

the branches of beech in autumn, but rarely. Half an inch broad, and of a softer substance than the foregoing. We are unacquainted with this species.

T. persiflens. Perennial Purplish Tremella. Bulliard Fung. v. 1. 223. t. 304.—Horizontal, leafy, somewhat coriaceous, smooth, undulated, pale violet.—Found on the stems of the Savine, *Juniperus Sabina*, according to Bulliard, lasting for a number of successive years. When dried up it is hardly distinguishable from the black scales of the bark; but in very moist or rainy weather it appears in the form of horizontal leaves, half an inch or more in length, bluntly rounded and lobed, of a pale vinous purple. Bulliard.

T. ferruginea. Plaited Rusty Tremella. Engl. Bot. t. 1452.—Sessile, clustered, lobed, waved, of a rusty-brown; the surface finely pubescent.—Observed by the late Mr. Crowe, at Lakenham, near Norwich, growing on dead wood, in wet weather in winter, composing plaited convoluted tufts, three or four inches broad, pliable and tender, shrivelled and shapeless when dry, reviving imperfectly with moisture. The segments are rounded and waved, not lobed or notched; their colour a rich brown, white within; the surface finely downy, or rather covered with pale velvet-like granulations, interspersed with brown irregular specks, more like fructification than any thing else that has fallen under our notice in this genus, except perhaps what Bulliard describes in the following species.

T. verticalis. Upright Dark-purple Tremella. Bulliard Fung. v. 1. t. 272. (*T. mesenteriformis violacea*; Ibid. v. 1. 230. t. 499. f. 6, X, Y.)—Clustered, erect, lobed, sinuated and plaited, smooth.—Found on decayed stumps of trees in autumn. Of a vinous violet-colour when young; afterwards of a blackish red-brown. It always grows erect, from one to four inches high, gelatinous and elastic, crackling between the teeth. Laid when fresh on glass or white paper, it discharges from every point of its surface a very fine powder, supposed to be the seeds. This answers to the nature of *Fungi*, and high microscopic examinations are requisite to determine how these seeds are produced; whether in series of eight together, from cells of the upper surface, as in *PEZIZA*, see that article; or in a less regular manner, from pores of the *hymenium* investing the under surface. Bulliard has finally reduced the present species to a variety of his *mesenteriformis*; but it is surely very distinct in many essential points from our *mesenterica*, and we cannot but suspect him to have here confounded several things together. His original *verticalis* is said to be valuable for its colouring principle. When boiled in water for many hours, by which the form and colour of the plant are not altered, it yields a deep brown, likely to be useful in dyeing. For limning, Bulliard obtained by infusion of this Tremella in simple water, a fine reddish bistre-colour, very durable, and preferable to any that he could buy in the shops.

T. intumescens. Brown Tumid Tremella. Engl. Bot. t. 1870.—Sessile, clustered, twisted, tumid, brown, shining and gelatinous; when dry thin and membranous.—Gathered by Mr. W. Borrer, in January 1807, on a beech in St. Leonard's forest, Suffex. This consists of roundish soft pulpy masses, two or three inches broad, convoluted and inflated, like the intestines of some animal, of a darkish, dull, not red, brown; but with a shining viscid surface, obscurely dotted. When cut, brown vertical streaks are observable a little way into the substance, which may contain the seeds, though none have as yet been detected.

T. moriformis. Mulberry Tremella. Engl. Bot. t. 2446.—Sessile, clustered, twisted, black, opaque; internally fleshy, deep purple.—Found by Mr. C. E. Sowerby, on pales and rails in Surry, early in June. This grows sessile, on exposed

posed wrought wood; in roundish or oblong, tumid, sinuous masses, various in length from a quarter to an inch, not unlike mulberries, but coal-black; their inside only is of a rich deep purple, and the centre is attached by a strong root. The plant communicates a violet stain to whatever it touches in drying.

T. farcoides. Fleehy Tremella. With. v. 4. 78. Engl. Bot. t. 2450. (*T. amethystea*; Bulliard Fung. v. 1. 229. t. 499. f. 5. With. v. 4. 82. *Helvella farcoides*; Dickf. Crypt. v. 1. 21. Bolt. Fung. v. 3. 101. t. 101. f. 2. Lichen farcoides; Jacq. Misc. v. 2. 378. t. 22. *Elvela purpurea*; Schæff. Fung. v. 4. 114. t. 323, 324.)—Sessile; gelatinous, reddish-purple; at first club-shaped; then rounded, lobed, plaited or curled; finally blackish.—Found on rotten wood, in damp shady situations, during the autumn. Perfoon has confounded with this *Tremella* his *Peziza farcoides*, the *tremelloidea* of Bulliard, t. 410. f. 1, which we believe to be a real *Peziza*. Our present *Tremella* is much more variable in figure, club-shaped at first, then turbinate, or funnel-shaped, variously rounded or lobed, in dense tufts. The colour is nearly uniform, a vinous purple, turning black in decay; the substance is internally gelatinous and semi-pellucid, with a toughish elastic skin. The plant has little taste or smell; nothing of the fungus nature.

T. vesfcaria. Bladder Tremella. (Bulliard Fung. v. 1. 224. t. 427. f. 3. Engl. Bot. t. 2451.)—Membranous, somewhat rigid, brownish-white, pouch-like, filled with viscid evanescent jelly.—Found by the late Mr. Jacob Rayer, near Maidstone, Kent. Bulliard speaks of it as very rare. It always grows on the ground, solitary or in tufts, attached by fibrous radicles. When young, the plant is a turgid, firm, but elastic, bag, full of viscid jelly, and nearly upright, from one to three inches high. The jelly in time escapes, by a rupture in the bag, which collapses, and looks like a fresh bladder, just emptied. From its original dirty white, it changes in decay to a reddish-brown; the inside being always brownish. Bulliard mentions a green variety.

T. flaccida. Pendulous Black Tremella. Engl. Bot. t. 2452.—Membranous, thin, flaccid and pendulous, very black; externally opaque and roughish; internally corrugated.—Found by Mr. Sowerby on the perpendicular trunk of a living oak in Peterham park. Several specimens, two or three inches long, grew one above another, pendulous, in a bell-shaped manner, so that the outer surface, naturally inferior, became uppermost, and when fresh resembled black crape in colour and roughness; the concave part being paler, smooth and shining, marked with coarse reticulated veins. This species, except its position, seems most akin to Bulliard's supposed variety of his *Peziza nigra*, v. 1. 238. t. 116, which we cannot conceive to belong to his t. 460. f. 1.

T. auricula. Jew's-ear Tremella. Linn. Sp. Pl. 1625. Perf. n. 9. Bulliard Fung. t. 427. f. 2. Engl. Bot. t. 2447. (*Peziza auricula*; Bulliard Fung. v. 1. 241. *Agaricum auriculæ formâ*; Mich. Gen. 124. t. 66. f. 1.)—Sessile, leathery, reddish-brown; rough beneath; rugged and plaited above, resembling an ear.—Not rare upon rotten elder-trees. Perfoon says he never found this species in any other situation. It forms large tufts of irregularly plaited and convoluted fleshy cups, of a semi-transparent reddish-brown; the inner or upper surface palest, smooth and shining; the outer darkest, opaque and roughish. The plaits branch from the middle, so as to convey an idea of the human ear; whether Jewish, Pagan, or Christian, depends on the complexion or cleanliness of the prototype. Bulliard asserts the seeds to be discharged from the upper surface entirely. If this

be correct, he is justified in transferring the plant to *Peziza*.

T. arborea. Witches'-butter Tremella. Hudf. 563. Engl. Bot. t. 2448. (*T. spiculofa*; Perf. n. 8. *T. glandulofa*; Bulliard Fung. v. 1. 220. t. 420. f. 1. *T. arborea nigricans*, *mundus pinguis et fugax*; Dill. Musc. 54. t. 10. f. 15.)—Sessile, gelatinous, roundish, undulated, blackish, beset with mammillary white-headed processes on the upper side.—Common in autumn and winter on the decayed trunks of trees, and dead sticks, especially the Alder. The English name, according to Dillenius, arose from the plant being supposed efficacious against witchcraft, when thrown into the fire. It consists of roundish, unequal, lobed, indeterminate masses, most corrugated beneath, scarcely elevated on any stalk, of a brown pulpy substance, becoming darker by age, from two lines to half an inch thick; the upper side bearing short scattered black prominences, each with a little white head.

T. boletiformis. Brown Rough-backed Tremella. Engl. Bot. t. 1819.—Nearly sessile, scattered, roundish, depressed, brown; smooth and shining above; rough and dotted beneath.—Found scattered over the dead branches of trees; in Suffex by Mr. W. Borrer, and in Norfolk by Mr. W. J. Hooker. Each plant is nearly sessile, irregularly orbicular, depressed, all over of a dull pale umber-brown; unequal, smooth and polished above; rough with prominent points beneath, whence the edges seem crenate. The diameter is from half an inch to an inch.

T. albida. Whitish Tremella. Hudf. 565. Engl. Bot. t. 2117. (*T. candida*; Perf. n. 7? *T. cerebrina*; Bulliard Fung. v. 1. 221. t. 386.)—Sessile, dilated, obtuse, whitish or somewhat brownish, pulpy, semi-pellucid.—Found on dead or rotten wood, in shady situations, bursting through cracks in the bark, and composing horizontal, rounded, convoluted masses, white and extremely tender, often very like the brain of an animal. Bulliard says, a plate of glass, on which the plant is laid, becomes covered with its powdery feeds. Such Mr. Sowerby found imbedded in the substance of the frond, forming round black masses. This should make it an *Ulva*. There are yellow, brown, or blackish varieties. The whole require further investigation.

T. Nostoc. Ground Tremella. Linn. Sp. Pl. 1625. Hudf. 564. Engl. Bot. t. 461. (*T. terrestris sinuosa*, *pinguis et fugax*; Dill. Musc. 52. t. 10. f. 14. *Ulva terrestris pinguis et fugax*; Dill. in Raii Syn. 64.)—Sessile, roundish, plaited, waved, of an olive-green.—This much controverted plant occurs after rainy weather in summer, on gravel walks, or in grassy pastures, growing slightly attached to the ground. It generally spreads two or three inches, being of a tender gelatinous substance, thin and smooth, variously dilated and tumid, of a dull olive-green. When young, it is said by Dillenius to be small and globular, or like little scales; but its growth is very rapid, and its existence short. We are not sure that it revives after being shrivelled and blackened by dry weather. The duration of the plant is therefore, in the strictest sense, annual, and yet we do not know any thing of the feeds. Roth, Perfoon, and others esteem it an *Ulva*, an opinion we cannot refute, if we are unable to confirm it. The most remarkable circumstances in the history of this vegetable, are its being mistaken by the vulgar for the remains of a Will-of-the-wisp, or fallen star; and by some philosophers for an animal production. The latter have been deceived by a similar substance, proved by Dr. Withering to be the remains of frozen frogs, or as some say, the skin and bones of those animals disgorged by herons. Whether these or the real plant were the object of examination

tion by Paracellus, or any other chemist, as Geoffroy, cited by Dillenius, nints; from which those sapient philosophers hoped to extract an universal solvent, or medicine; we feel little courage or curiosity to enquire. The subject is as unprofitable as Geoffroy's own analyses of various plants, the only advantage of which is to prevent any similar mode of investigation in future.

T. granulata. Granulated Tremella. Hudf. 566. Engl. Bot. t. 324. (*T. palustris*, *vesiculis sphaericis fungiformibus*; Dill. Musc. 55. t. 10. f. 17. *Ulva granulata*; Linn. Sp. Pl. 1633; not Mant. 136.)—Green, globular, clustered, membranous, containing a fluid.—Frequent on the mud of ditches and ponds, partly dried up, in autumn, in various places round London. Innumerable crowded, somewhat stalked, globules, each about the size of mustard-seed, and attached by fibrous radicles, compose broad green patches, which crackle under the feet when trodden upon. Their watery contents, if not thus prematurely dislodged, are finally discharged spontaneously, by a hole at the top of each globule, after which the skin collapses into a cup-like form, with the same hole in the centre. This also must be an annual plant, and something like seeds appears under its pellucid coat. It might safely be removed, with *T. Nostoc*, to *Ulva*. Both these species were noticed by Dr. Sibthorp in the isle of Zante.

We are now to speak of some reputed *Tremella* involved in more uncertainty than any of the foregoing, and which we have therefore reserved for the conclusion of our subject.

T. cruenta. Gory Tremella. Engl. Bot. t. 1800.—Minutely granulated, diffuse, indeterminate, shining, dark purple.—Common about the lower parts of walls and houses, in damp situations, during the wet wintry months. We have observed it in particular itreets for many successive years; though in summer no traces of such a production are visible. Nobody can overlook this vegetable, which forms very broad, continuous, but indeterminate, patches, of a deep, rich, shining purple, as if blood, or red wine, had been poured over the stones or ground. Under a microscope, it proves to be a congeries of minute, pellucid, globular granulations, all nearly of equal size. No particular scent or flavour is perceptible, nor is there any other indication of affinity to the *Bifus Jolithus* of various authors, known by its violet scent. This plant retains its colour when dried.

T. Sabinae. Savine Tremella. Dickf. Crypt. fasc. 1. 14. (*Fungus gelatinus dentatus*, *Sabinæ adnascens*, *fulvi coloris*; Raii Syn. 16.)—Sessile, prominent, oblong, tooth-shaped, tawny, somewhat powdery.—This production springs from the live wood, under the bark, of the most vigorous branches of the Savine, which are always swelled in that part, though otherwise healthy. It is seen only in rainy, chiefly autumnal, weather; and consists of a number of oblong, tremulous, gelatinous bodies, of a pale brownish-orange, sometimes hollow, externally powdery, often lobed, various in length, from a line to about an inch, their size bearing a regular proportion to that of the branch whence they originate. In dry weather these bodies suddenly collapse and dry up. Similar excrescences are found on the Common Juniper, particularly its larger, or Swedish, variety, and are certainly what Linnæus meant by his *Tremella juniperina*, for which our first-described species, *T. mesenterica*, has more than once been taken. Bulliard has represented what is found on the Juniper, in his *Fungi*, t. 427, by the name of *T. ligularis*; from which the *T. digitata* of Villars, Dauph. v. 3. 1007. t. 56, appears not at all dissimilar; nor does his *T. juniperina*, described and figured in the same place, materially differ. Why the latter

is retained by Perfoon, n. 10, in his second section; and the *ligularis* of Bulliard, conjoined with other things in his fourth, n. 22, under Wulfen's name of *clavariaformis*, we are at a loss to imagine, their forms being so similar and so variable. It would be idle to detail all the imaginary species of various genera, by the name of *Tremella*, *Clavaria*, *Puccinia*, &c. which authors of the first authority have made out of the above-described, or similar, productions. We have tried in vain to understand them as such, and cannot but persist in our original opinion, that they are mere gummy exudations, caused by immoderate wet, accompanied by refinous particles, insoluble in water, which give them a powdery appearance. Objections have been brought against this hypothesis, but no facts that disprove it. We have seen in Italy a similar and indubitable exudation, in wet weather, from the stem of the vine.

TREMELLIUS, EMANUEL, in *Biography*, an excellent Hebrew scholar, was the son of a Jew at Ferrara, and born there about the year 1510. Having been converted to the Christian faith by cardinal Pole and M. Flaminio, he imbibed the principles of the Reformers, accompanied Peter Martyr, and resided for some time at Stralburg. From Stralburg he came to England in the reign of Edward VI., and on his death left this country, and employed himself in teaching Hebrew in the college of Hornbach in Germany. He was afterwards professor of Hebrew at Heidelberg, and at this place translated into Latin the Syriac version of the New Testament, and joined Francis Junius in a translation of the Old Testament from the Hebrew. From hence he removed to Metz, and finally to Sedan, prosecuting his employment of teaching Hebrew, and died at the latter place in 1580. All Tremellius's writings related to the Oriental languages; and of these were Hebrew, Chaldaic, and Syriac grammars, a Hebrew Catechism, Commentaries on the Prophecy of Hosea, and the above-mentioned translations. Of his version of the Bible, F. Simon says that it is not much esteemed by the Protestants; and that the writer's Judaism has given him a singularity of manner, which makes him often wander from the true sense of a passage, and moreover that his Latin style is affected and inaccurate. Simon, Hist. Crit. du Nouv. Test.

TREMENTINE, in *Geography*, a town of France, in the department of the Maine and Loire; 6 miles N.E. of Chollet.

TREMEZZO, a town of Italy, in the department of the Lario; 14 miles N. of Como.

TREMITI, three small islands in the Adriatic, near the coast of Naples; they are called Capraria, St. Donino, and Tremiti or St. Nicolo. N. lat. 42° 10'. E. long. 15° 34'.

TREMITUS, a town of the island of Cyprus, at one time the see of a bishop. It was destroyed by Richard I. king of England; 12 miles W.S.W. of Nicosia.

TREMLITZ, a town of Bohemia, in the circle of Bechin; 7 miles S. of Pottschaken.

TREMOLANTE, in the *Glass Trade*, a name for the preparation of calcined brass, otherwise called *orpello*, used either for a sky-blue, or a sea-green.

TREMOLITE, in *Mineralogy*, a mineral which received its name from Tremola, a valley in the Alps, where it was discovered. This mineral is classed by Häuy with hornblende or amphibole, and called by him *amphibole grammatite*. It is divided by some mineralogists into three subspecies; asbestous tremolite, common tremolite, and glassy tremolite. They have all a fibrous or radiated structure, with a vitreous or pearly lustre. The filaments feel harsh

and rough to the touch, and scratch glass when rubbed upon it under water. By this property it may always be distinguished from asbestos, to which it bears a considerable resemblance.

Asbestous tremolite (*amphibole blanc* and *soyeuse* of Häüy) is of various shades of white. It occurs massive in wedge-shaped or splintery concretions. The structure is fibrous and radiated: it is translucent on the edges, and somewhat brittle and sectile. The specific gravity is 2.683. It melts before the blowpipe into an opaque white mass. When rubbed or struck in the dark, it emits a pale reddish-coloured light: when thrown on hot coals, it gives out a greenish-coloured light.

Asbestous tremolite occurs most frequently in granular foliated lime-stone, or in dolomite. It is sometimes found in chlorite, and more rarely in trap-rocks. It occurs at Glenelg in Invernessshire, in Aberdeenshire, and Icolmkill, and in basalt at the castle-rock of Edinburgh. It is found also in various parts of Europe, and in granular lime-stone with augite on mount Vesuvius.

Common tremolite (*grammatite*, Häüy) occurs of various shades of white, and sometimes dark smoke-grey. It occurs massive and crystallized. The primitive form of the crystal, according to Häüy, is an oblique prism, with a rhomboidal base, the planes of which are inclined at an angle of 127° and 53° . The more common form of the crystals is a very acute rhomboidal prism, with the edges more or less truncated, and the lateral planes longitudinally streaked.

This mineral splits easily, not only in the direction of the planes of the crystal, but also in that of its diagonals. When one of the prisms is broken across, we may observe a line strongly marked in the direction of the principal diagonal; hence it may at first sight be considered as a twin crystal, but this is not the fact.

Common tremolite is translucent or semi-transparent; it scratches glass, is brittle, and is fusible, but with great difficulty, by the blowpipe. According to Brongniart, the crystals of tremolite are rarely found pure, but generally contain a portion of the accompanying rock in the interior. The constituent parts are stated as under:

	Chenevix.	Langier.
Silex	27.0	50
Magnesia	18.5	25
Lime	21.0	18
Alumine	6.0	0
Carbonic acid	25.0	5

It occurs in the same situations as asbestous tremolite, and also in metalliferous beds, and sometimes in serpentine and granite.

Glassy Tremolite.—Its colours are the same as those of common tremolite. It occurs massive, and in acicular crystals. The lustre is shining, but in a less degree than that of common tremolite. It is translucent and rather brittle. The constituent parts of this mineral vary in different specimens. According to Langier, the tremolite from St. Gothard varies as under:

Silex	28.4	to	41
Lime	30.0		15
Magnesia	18.0		15
Water and Carbonic acid	23.0		23

Though tremolite is arranged under a distinct species from hornblende and actinolite by professor Jameson, it is classed under the same family. In a general view he observes, that tremolite is characterized by its white colours,

actinolite by its light green colours, and hornblende by its dark green colours. The count de Bournon states, that the phosphorescence of tremolite is owing to an intermixture with dolomite, and when the latter mineral is separated from it by acids, the property is destroyed.

TREMÓN, in *Ancient Geography*, an island situated near that of Delos, subject to frequent earthquakes.

TREMONT, in *Geography*, a town of France, in the department of the Maine and Loire; 3 miles E.N.E. of Vihiers.

TREMOR, in *Medicine*. See PALSY.

TREMOR of the Heart. See PALPITATION.

TREMORÉL, in *Geography*, a town of France, in the department of the North Coasts; 8 miles S. of Broons.

TREMOUILLE, LA, a town of France, in the department of the Vienne; 6 miles E. of Montmorillon. N. lat. $46^\circ 28'$. E. long. $1^\circ 7'$.

TREMP, a town of Spain, in Catalonia, on the Noguera Palarefa; 20 miles N. of Balaguer.

TREMSBUTTEL, a town of the duchy of Holstein; 20 miles E. of Hamburg.

TREMULA, in *Ancient Geography*, a town of Africa, in Mauritania Tingitana, upon the route from Ptolemaida to Tingis. Anton. Itin.—Also, a town of Hispania, belonging to the Bastitani.

TRENCH, in *Agriculture*, a narrow opening or furrow cut in land by the spade or plough, for the purpose of draining or watering, and some other uses. Also, a small opening made in digging and working land over in different cases, and in laying it up both in ploughing and gardening. See SPRING and SURFACE DRAIN, WATERING LAND, RIDGES, and RIDGING-UP.

The cutting should be very exact for the two first purposes, the different sorts of materials raised being laid to the different sides of the trenches, which, in the latter case, are now mostly made in the wedge form.

Many of the bogs in Ireland have been drained, and made good ground, by only digging trenches round them.

TRENCH Filled-Drain, that sort of surface-drain which is laid with some kind of material for affording a proper passage to the water in its lower part, the upper being covered in with loose earth. See SURFACE-Drain.

TRENCH-Planting, in *Agriculture and Gardening*, the practice of setting and putting out plants and other productive matters in trenches. It is a method which is had recourse to for many different sorts of crops in each of these departments of cultivation. In the former for potatoes and some others, and in the latter for a very great number of plants and roots, as is seen under their different heads.

It has lately too been practised for asparagus, and some other crops, with very great success. In planting this valuable vegetable in this way, it was done in the early spring, the ground being first dug to the depth of eighteen inches, and well incorporated with rotten dung quite to the surface; a trench four or five inches deep was then formed, in which the plants, at the time twelve inches in height, were planted at three inches apart, keeping the tops perfectly upright, and breaking or hurting the roots as little as possible, covering them in with the spade, and treading them gently with the foot; after which the work was finished by a good watering. The plants scarcely flagged at all, though no care had been taken to preserve the mould about their roots, and not one of them died, but they far surpassed in the course of the summer those in the seed-bed rows, and some of them were capable of being cut the following year, in consequence of their great progress. The soil had a large proportion of peat-earth in it.

Sea-kale has likewise been raised in trenches with great advantage. They were made the same depth as above, eight inches of loose soil being left in the bottom, with which, six inches depth of river-sand were then intimately blended. The trench was now a foot deep, and being filled with six inches more of very light sandy loam, and the whole well mixed together, was sown in a line along the middle; and as the plants grew they were earthed up. The plants became, in this mode, so stout in the second year, as to be made use of by being blanched by means of straw shaken loosely over them, removing it as it became wet and heavy.

There are probably many other plants, seeds, and roots, that have not yet been tried, which may be raised in this method of planting with great success and advantage.

TRENCH-Plough, in *Agriculture*, that sort of tool of this kind, which is contrived for the purpose of opening and working land to a much greater depth than the common kind, so as to allow tap-rooted plants to strike them deeper, and form them better. See **PLOUGH** and **TAP-Root**.

TRENCH-Ploughing, the practice of opening and loosening the soil of lands to a great depth by means of such ploughs, which is a method that is essentially necessary where the roots of crops are to shoot and strike down to great depths, as without it such roots are incapable of being grown in the best and most profitable manner. The work is sometimes performed at one operation, but in other cases the tool does it by going twice in the same track, rendering the earth loose, and capable of being penetrated to a still greater depth. This mode of preparing land is much too little had recourse to by farmers in many cases.

TRENCHES, in *Fortification*, are ditches which the besiegers cut, to approach more securely to the place attacked; whence they are also called *lines of approach*. See **PARALLELS**.

They say, *mount the trenches*, that is, go upon duty in them. *To relieve the trenches*, is to relieve such as have been upon duty there.

The enemy is said to have *cleared the trenches*, when they have driven away, or killed, the soldiers who guarded them.

TRENCH, *Tail of the*, is the place where it was begun: and the *head*, that to which it was carried.

Trenches are of several sorts, according to the nature of the soil: if the adjacent territory be rocky, the trench is only an elevation of bavons, gabions, wool-packs, or epaulements of earth, cast round about the place; but where the ground may be easily opened, the trench is dug in it, and bordered with a parapet on the side of the besieged.

The breadth of the trenches is from eight to ten feet, and the depth from six to seven: they are cut in *talus*, or a slope.

The trenches are to be carried on with winding-lines, in some manner parallel to the works of the fortress, so as not to be in view of the enemy, nor to expose their length to the enemy's shot: for then they will be in danger of being enfiladed, or scoured by the enemy's cannon: this carrying of the trenches obliquely, they call carrying them by *coudees*, or returns. See **PARALLELS**.

TRENCHES, *Opening of the*, is when the besiegers begin to work upon the line of approaches; which is usually done in the night; sometimes within musket-shot, and sometimes within half, or only whole cannon-shot of the place, if there be no rising ground about it, the garrison strong, and their cannon well served.

The workmen that open the trenches, are always supported by bodies of men against the sallies of the besieged; and sometimes those bodies lie between them and the place, as also on their right and left.

The pioneers sometimes work on their knees; and the men that are to support them, lie flat on their faces, in order to avoid the enemy's shot; and the pioneers are likewise usually covered with mantelets, or fauciflons.

TRENCH-Guard. See **GUARD**.

TRENCH the Ballast, To, is a sea-phrase, signifying to divide the ballast into several trenches in a ship's hold.

TRENCHARD, JOHN, in *Biography*, a political writer, was the son of sir John Trenchard, secretary of state under king William, and born in 1669. Liberally educated, he was placed in one of the inns of court, with a view to the study of law. He was called to the bar, but as he preferred a political life, he abandoned the profession, and obtained the place of the commissioner of the forfeited estates in Ireland. Having acquired considerable wealth by marriage, by the death of an uncle, and by the decease of his father in 1695, he came into parliament for the borough of Taunton, and appeared as a patriotic member and writer. He was a zealous opponent of a standing army; and soon after the peace of Ryfwick in 1697, which rendered needless such a force, he published a pamphlet, entitled "An Argument shewing that a Standing Army is inconsistent with a free Government, and absolutely destructive to the Constitution of the English Monarchy." This was followed, in 1698, by "A short History of Standing Armies in England." These pamphlets are supposed to have occasioned the king's sending away his Dutch guards, and the army's being reduced to a very low establishment. In many subsequent years, Mr. Trenchard continued to write occasionally in favour of liberty; and having taken Thomas Gordon, a person of similar sentiments, into his house, they began in 1720 to publish periodically a series of papers, entitled "Cato's Letters," for the professed purpose of promoting civil and religious liberty. Trenchard died in 1723, at the age of fifty-four; and Gordon published his eulogy in the "Independent Whig." *Biog. Brit.*

TRENCHÉ, in *Heraldry*. See **TRANCHÉ**.

TRENCHÉ's Island, in *Geography*, an island near the coast of South Carolina; 25 miles in circumference. N. lat. 32° 13'. W. long. 80° 58'.

TRENCHING, in *Agriculture*, the operation and practice of working over land in trenches by the spade. It is had recourse to in bringing some kinds of waste lands into cultivation, in some cases and particular situations, as in the northern parts of the island, where labour is cheap; but in others it is mostly too expensive.

It, however, answers sometimes in cases where it could hardly have been expected, on account of its being so very complete, as scarcely to require any thing being done afterwards to the ground.

The term also signifies the laying up land in the ridge form, either by the spade or plough.

TRENCHMORE, the name of an old English dance; of which nothing certain is now known, but that it was a lively movement.

TRENCK, FREDERIC, *Baron von*, in *Biography*, an adventurer, was descended from a noble Prussian family, and born at Königsberg in 1726. Having been too much indulged in his youth, and losing his father when he was twelve years of age, he became ungovernable, and the sport of his own impetuous passions. In 1742, at the age of sixteen years, he entered into the Prussian guards, then quartered at Potsdam. In 1744, at the commencement of the second Silesian war, he attended the king as an aid-de-camp; but being suspected of a traitorous correspondence, he was arrested, and confined in the prison of Glatz, and failing in his first attempt to make his escape from prison, he at length succeeded

ceeded by bribery, and got safe to Bohemia, and afterwards to Elbing, in Polish Prussia, in March 1747. After various adventures he arrived at Moscow, where he insinuated himself into the good graces of the lady of the grand-chancellor Bestuchef, the favourite of Elizabeth. From Moscow he made a circuitous tour to Vienna, with a view of recovering some contested property; and dissatisfied with the reception he found at the Austrian court, he determined to return again to Russia; but in passing through Dantzic, he was arrested at the request of the Prussian resident, and committed to prison at Magdeburg, where he remained ten years. Here he amused himself, during a tedious and rigorous imprisonment, in writing verses; which, long after his release in 1763, he published at Frankfort on the Mayne, in 1769. He published some other works at Aix-la-Chapelle, where he became editor of a gazette, and married a lady of respectable character and connections. Finding the occupation of a gazette-writer tiresome and not lucrative, he began business as a wine-merchant; but the wine-trade not answering his expectations, he disappeared about the year 1783. In 1792 he edited a journal at Hamburg and Altona, and from the latter place he removed to France, where he lost his life by the guillotine in the month of July 1794. The Memoirs of his own Life appeared at Berlin in 1787, in two parts, 8vo. Of the authenticity of the facts stated in these memoirs, great doubts have been entertained. His life, translated into French by himself, was published at Paris in 1789, 3 vols. 8vo. A new edition of his "Macedonian Hero" was printed in 1788, Frankfort and Leipzig, 8vo. Gen. Biog.

TRENC SIN, in *Geography*, a town and castle of Hungary, near the river Waag, situated on a rock, and defended by a very strong castle. Near it are some hot baths; 20 miles N.N.W. of Topoltzan.

TREND, that part of the stock of an anchor from which the size is taken.

TRENDING, in *Rural Economy*, the operation or practice of freeing wool from filth of different kinds. It is usually done by persons who are called trenders, and who are appointed and sworn for the purpose. In most sheep-districts, the best wool is always understood to have gone through this process, and then to be worth two or three shillings the tod more than other untrended wool. The fleeces in such cases are neatly rolled together, and bound with osier or with bands in some places. It is sometimes termed trendering. See **SHEEP** and **WOOL**.

TRENDLE, a term signifying the wheel of a barrow, or any thing which turns round in that manner when of the low wheel kind.

TRENNO, in *Geography*, a town of Italy, in the department of the Olona; 4 miles N.W. of Milan.

TRENSDORF, a town of Bavaria, in the bishopric of Bamberg; 4 miles S. of Bamberg.

TRENT, a city of the county of Tyrol; in Latin *Tridentum*, called by the Italians *Trento*, and by the Germans *Trient*; and situated upon the Adige or Etsch, in a very fruitful valley, surrounded with high hills. It was built by the Cenomani Gauls, who were dispossessed by the Romans. The Goths became masters of it when they came into Italy, and after them the Lombards. Afterwards it was possessed by the German emperors, until 1377, when Wenceslaus, son to Charles IV., gave it to the church of Rome. Afterwards its bishops, being made princes of the empire, became temporal as well as spiritual lords of the city. Some authors affirm that the name *Tridentum* is derived from Neptune's sceptre, or trident, to whom they say the city was once consecrated. This opinion took its rise

from an ancient marble being found there, on which was a Neptune holding his trident. Others derive the name from three rivers and torrents that fall into the Adige, a little above and below the city. Others say it owes its name to three high rocks in the neighbourhood, which appear like three teeth, *tres dentes*. The bishop was a prince of the empire, and temporal as well as spiritual lord of his diocese, which is of very considerable extent; but notwithstanding the sovereignty of the bishop, the city of Trent has its own distinct privileges, and magistrates to preserve them: these consist of two burgo-masters, who preside by turns, and twelve counsellors. Trent contains no streets exactly regular, and the houses are in general old. The palace is large, but in the antique style. Besides the cathedral, there are three parish-churches, a college, and some convents; 55 miles N. of Mantua. N. lat. 46°. E. long. 11° 5'.

TRENT, a princely bishopric of Germany, situated in the Tyrol, in which this ancient bishopric was gradually increased by the liberality of the ancient Roman emperors. Though the bishop of Trent, after the stipulation ratified in the recess of the empire, at Augsberg, in the year 1548, held of the archducal house of Austria, as a land state, yet he enjoyed, as an immediate prince of the empire, both a seat and voice at the diets, in the college of princes of the empire, and likewise actually sent deputies to the diet of the empire. This prelate was also a state of the circle of Austria. Among the indemnities agreed to at Ratisbon, in 1802, the bishopric was given to the grand duke of Tuscany, as archduke of Austria. It was afterwards ceded to Bavaria.

TRENT, a town of the island of Rugen; 11 miles N.W. of Bergen.

TRENT, a river of England, which rises in the north-west part of Staffordshire, on the borders of Cheshire, about six miles south-west from Leek: taking a south-east direction, it crosses the county to the borders of Leicestershire and Derbyshire; it then takes a north-east direction, and crosses the county of Derby and Nottingham to Newark, from whence its direction becomes nearly due south, till after passing a small part in the north of Lincolnshire, it joins the Ouse, and the two streams form the Humber. Canals are made or making, to open a communication between this river and various parts of the kingdom, *viz.* from the mouth of the Idle, below Gainsborough, to Redford and Chesterfield; to Lincoln, and from thence to Tatterfall, Horncastle, Seaford, Boston, and the sea; from near Nottingham, to Cromford and Winster; from the mouth of the Derwent, one branch through the counties of Derby, Stafford, and Chester, to the Mersey, which is joined with another branch to Coventry and Braunston, where it meets with the canal from Brentford: other branches join the Thames at Lechlade, the Avon at Warwick, the Severn at Worcester, and many others. The Trent is of itself navigable from Burton in Staffordshire.

TRENT, a river of Canada, which runs from Rice lake to Lake Ontario.—Also, a river of North Carolina, which runs into the Neuse, at Newbern.

TRENT, *Council of*, in *Ecclesiastical History*, denotes the council assembled by Paul III. in 1545, and continued by 25 sessions till the year 1563, under Julius III. and Pius IV., in order to correct, illustrate, and fix with perspicuity, the doctrine of the church, to restore the vigour of its discipline, and to reform the lives of its ministers. But it has been a matter of complaint by many, both in and out of the communion of the church of Rome, that this assembly, instead of reforming ancient abuses, rather gave rise to new enormities. It is alleged, that opinions of the scholastic doctors on intricate

intricate points, which had been left undecided, were by this council absurdly adopted as articles of faith, and imposed with violence upon the consciences of the people, under pain of excommunication: that there is an ambiguity in the decrees and declarations of this council, which renders the disputes and dissensions, that had rent the church, more intricate and perplexed, and which really multiplies and propagates, instead of lessening and suppressing them: that matters were decided in this assembly, according to the despotic will of the Roman pontiff, without regard to the dictates of truth, or the authority of Scripture: and that the few wise and pious regulations that were made in this council, were never supported by the authority of the church, but suffered to degenerate into a mere lifeless form or shadow of law, which was treated with indifference, and transgressed with impunity. It will not, therefore, appear surprising, that there are certain doctors in the Romish church, who, instead of submitting to the decisions of the council of Trent, as an ultimate rule of faith, maintain that these decisions are to be explained by the dictates of Scripture and the language of tradition: nor can we wonder that this council has not every where the same degree of credit and authority, even in those countries that profess the Roman Catholic religion. Some countries, indeed, such as Germany, Poland, and Italy, have adopted implicitly and absolutely the decrees of this council, without the least restriction. But in other places it has been received and acknowledged on certain conditions, which modify, not a little, its pretended authority. Among these latter we may reckon the Spanish dominions, which, during many years, disputed the authority of this council, and at length acknowledged it only so far as it could be adopted without any prejudice to the rights and prerogatives of the king of Spain. In other countries, such as France and Hungary, it has never been solemnly received or publicly acknowledged. Indeed in the former of these kingdoms, those decrees of Trent that relate to points of religious doctrine, tacitly and imperceptibly through the power of custom, acquired the force and authority of a rule of faith; but those which regard external discipline, spiritual power, and ecclesiastical government, have been constantly rejected, both in a public and private manner, as inconsistent with the authority and prerogatives of the throne, and prejudicial to the rights and liberties of the Gallican church.

Notwithstanding the preceding remarks, the decrees of the council of Trent, together with the creed of pope Pius IV., contain a summary of the principal heads of the Roman Catholic religion. See *POPERY*.

However, in these decrees and confession of faith, many things are expressed in a vague and ambiguous manner, from a view to the intestine divisions then prevalent in the church: and several tenets are omitted in both, which no Roman Catholic is allowed to deny, or even to question. But it must be acknowledged, that in these decrees, and in this confession, several doctrines and rules of worship particularly pertaining to the doctrine of purgatory, the invocation of saints, and the worship of images and relics, are inculcated in a much more rational and decent manner than that in which they appear in the daily service of the church, and in the public practice of its members: and it is to be observed, that in deducing a just notion of the doctrine of Rome from the decrees of the council of Trent, regard ought to be had, not so much to the terms made use of in these decrees, as to the real signification of these terms, which must be drawn from the customs, institutions, and observances, that are, every where, in use in the Romish church. *Mosh. Eccl. Hist. vol. iii. Eng. ed. 8vo.*

TRENT, *Council of, congregation for interpreting the decrees of the*, is a congregation, the plan of which was formed by Pius IV. and afterwards instituted and confirmed by Sixtus V. It was authorized to examine and decide, in the name of the pope, all matters of small moment relating to ecclesiastical discipline; while every debate of any consequence, and particularly all disquisitions concerning points of faith and doctrine, were left to the decision of the pontiff alone, as the great oracle of the church. Hence it was, that the approbation of Innocent XI. was refused to the artful and insidious work of Bossuet, bishop of Meaux, entitled "An Exposition of the Doctrine of the Catholic Church," until the author had suppressed entirely the first edition of that work; and made corrections and alterations in the second. See *POPERY*.

But though the court of Rome, and all those who favour the despotic pretensions of its pontiff, maintain, that he alone who governs the church as Christ's vicegerent, is entitled to explain and determine the sense of scripture and tradition in matters pertaining to salvation, and that a devout and unlimited obedience is due to his decisions; yet it has been impossible to persuade the wiser part of the Roman Catholic body to acknowledge this exclusive authority in their head. And accordingly, the greater part of the Gallican church, and a considerable number of learned men of the popish religion in other countries, think very differently from the court of Rome on this subject. They maintain, that all bishops and doctors have a right to consult the sacred fountains of scripture and tradition, and to draw from thence the rules of faith and manners for themselves and their flock; and that all difficult points and debates of consequence are to be referred to the cognizance and decision of general councils. *Mosh. Eccl. Hist. vol. iii. See INFALLIBLE.*

TRENTAL, TRIGINTAL, or TRICENNAL, a Romish office for the dead, consisting of thirty masses, rehearsed for thirty days successively after the party's death.

The trental is thus called from the Italian, *trenta, triginta, thirty*. It is mentioned anno primo Edw. VI.

TRENTON, in *Geography*, a town of New Jersey, in the county of Hunterdon, on the E. side of the Delaware. Here the legislature stately meet, the supreme court sit, and most of the public offices are kept. The court-house is a handsome building. There is a flourishing academy, and the number of inhabitants is about 3002; 24 miles N.N.E. of Philadelphia. N. lat. 40° 13'. W. long. 74° 48'.—Also, a post-town of the province of Maine, in the county of Hancock, containing 501 inhabitants; 31 miles N.E. of Penobscot.—Also, a town of North Carolina, on the river Trent; 20 miles S.S.W. of Newbern.—Also, a post-township of New York, in Oneida county, 12 miles N. of Utica; bounded northerly by Steuben and Remsen, easterly by West Canada creek or Herkemer county, S. by Deerfield, and W. by Floyd. The town is well watered by small streams, and by springs. The soil is good: the forest woods are elm, linden or bass-wood, butternut, beech, maple, &c. The inhabitants are principally of New England descent, though some are of the ancient Dutch from Holland, and their industry is well rewarded by the products of agriculture. There are some very remarkable falls in West Canada creek, on the eastern border of this town. This stream affords numerous scites for mills in Trenton. The population is 1548; the senatorial electors are 127. The largest compact settlement in this township contains from 70 to 80 buildings, and is distant 13 miles from Utica and 107 from Albany.

TREO, a town on the E. coast of the island of Paros. TRE.

TREOGAN, a town of France, in the department of the North Coasts; 9 miles W.S.W. of Rostrenen.

TREOGAT, a town of France, in the department of the Finistère; 9 miles S.W. of Quimper.

TREPAN, in *Surgery*, a circular saw, by means of which the skull is perforated in the operation called trepanning. It bears a considerable resemblance to the well-known instrument named a wimple, and is worked in the same manner. A representation of it is given in *Plate VIII. fig. 6.* of the surgical plates. Formerly, the saw was sometimes made of a conical shape (see *fig. 5.*); but this construction rendered the action of the instrument difficult; and as the fear of a cylindrical saw penetrating too suddenly, so as to injure the brain, was found by experience to be an insufficient reason for the conical shape of the saw, the cylindrical trepan at length came into general use. In this country, the trepan is now superseded by the instrument called a *trephine*, which has a different kind of handle from that of the trepan, and is not worked in the same way. (See *TREPINE.*) On the continent, however, the trepan still has the preference. Mr. Rodman's trepan (*fig. 1.*) is objectionable, because with it you cannot increase and diminish the pressure on any particular point of the circular groove in the bone, as occasion requires. You must continue to saw every part of the circle. Hence, if the bone be sawn through in one place, and not in another, as generally happens before the operation is finished, the further action of Mr. Rodman's saw will inevitably do mischief to the dura mater, and is not well calculated for completing the division of the bone. See the following article.

TREPANNING, or TREPINING. From what has been said in some preceding articles of this work, (see particularly *HEAD, Injuries of, EXTRAVASATION, &c.*) the operation of trepanning or trepining, or that of sawing out a portion of the skull, is, in several affections of the brain from compression or irritation, the only means of preserving life, and of all other remedies the most urgent and effectual. It should be performed in good time, and the repetition made according to the exigency of the case. In the records of surgery, innumerable facts may be consulted, where the prudent and judicious employment of the trepan has effected wonderful cures, and been the only thing by which the patients' lives could possibly have been saved. The benefit which the operation brings about, is also sometimes so sudden and astonishing, that in no instance does the interposition of the surgical art display itself to greater advantage. The immediate restoration of sight by the depression or extraction of an opaque substance from the eye, is not more beautiful and striking, than the instantaneous communication of the intellectual faculties, and of the powers of speech, of feeling, &c. together with voluntary motion, to a person lying in an apparently lifeless state from an injury of the head. The utility of the trepan is occasionally manifested even in this degree. In the valuable essay of Mr. Abernethy on injuries of the head, a case may be seen, in which the patient, who had been in a condition almost bereft of animation, rose up and spoke the instant the extravasated blood was removed from the surface of the brain. And among the wounded at the battle of Waterloo, there was a soldier of the 44th regiment, whose case is of equal interest. He had been struck with a musket-ball on the right parietal bone, which was exposed, and had no appearance of being fractured. As, however, the symptoms of compression were urgent, and the patient was in nearly a lifeless state, the writer of the present article conceived it right to apply the trephine to the part on which the violence had acted. He had not sawn long before the external table came away in the hollow of

the trephine, leaving the inner table behind, which was not only splintered, but driven at one point more than half an inch into the membranes and substance of the brain. No sooner were the fragments taken out with a pair of forceps, than the man instantly sat up in his bed, looked round, and began to speak with the utmost rationality. It is a most extraordinary fact, that this patient got up and dressed himself the same day without leave from the medical officers, and never had a bad symptom afterwards. Immediately the operation was finished, the temporal arteries were opened, and some purgative medicines exhibited.

Let not the young surgeon, however, draw from these dazzling cases of success an immoderate solicitude to perform the operation; for it should never be undertaken but in the most pressing circumstances, and when the symptoms unequivocally shew, that a dangerous degree of pressure on the brain exists. We recollect an unfortunate example, in which an hospital surgeon of this metropolis ventured to saw out a portion of the frontal bone for a mere long-continued pain in the part: the patient was attacked with inflammation of the dura mater, and perished in three or four days. We may therefore conclude, that the operation is not itself exempt from danger; and it is certain that it ought never to be resolved on without deep consideration. "Gravis tamen fatis est operatio, ut nunquam, nisi indicationes sufficientes adsint, institui debet." Callisen Syst. Chir. Hodiern. tom. i. p. 658.

The trepan or trephine is never necessary in injuries of the head, except for the purpose of relieving the brain from pressure. Such pressure may be caused by a depressed portion of the cranium, or it may be produced by an extravasation of blood, or the lodgment of matter, betwixt the skull and the dura mater. The chief danger of concussion, when the accident is not directly or soon fatal from the disorganization and mischief done to the brain, depends upon the consequent inflammation of this organ, and therefore can be little likely to be benefited by the use of the trepan. If the operation becomes proper in such a case, it is when an abscess has formed under the cranium, and when the confined matter itself creates bad symptoms by its pressure on the brain. This state of things, however, cannot come on till after the inflammation of the brain and its membranes has prevailed a certain time, and it is always accompanied with a detachment of the pericranium and a puffy tumour of the scalp; or, if there be a wound of the latter part immediately over the abscess, the lips of the injury acquire suddenly an unfavourable appearance, and lose their vermilion colour. The patient has also had much preceding febrile disorder, pain and tension over the whole head, redness and turgescence of the eyes, and generally more or less delirium. When the matter is forming, there are usually some rigors, and as soon as it is formed, the patient falls into a comatose state, and paralytic symptoms shew themselves. Here the urgency for the prompt application of the trephine is very great, and the patient's chance of living is almost essentially connected with the immediate performance of the operation. This important case has been particularly dwelt upon in the writings of Mr. Pott.

In the articles *HEAD, Injuries of, EXTRAVASATION, &c.* we have laid down the most remarkable symptoms of concussion and compression of the brain, a subject which every surgeon should study with earnest attention, before he ever presumes to employ the trepan. For sometimes these accidents are extremely difficult to be discriminated; sometimes they exist together in the same individual, a complication which is peculiarly embarrassing; and in every instance where the symptoms are those of concussion, the oper-

TREPANNING.

operation, so far from being indicated, would be a step of all others the most likely to do harm, by increasing the irritation and inflammation of the brain and its membranes. A fall upon the back, or upon the head, occasions a direct concussion of the brain, and the shock, not being materially weakened by the intervention of any yielding elastic structure, is the more dangerous. When a person has fallen from a certain height, and pitched upon his head, his back, the buttocks, the knees, or even the soles of the feet; when he has been instantly deprived of his senses, and then by degrees recovered them and come to himself again; the fact of his having suffered concussion of the brain is clear and indisputable. Concussion has likewise taken place, though in a slighter degree, when the patient has been only stunned by the fall, and experienced a sensation of sparks. But a multitude of degrees separate this feeble concussion from that, in which the substance of the brain is instantaneously disorganized, so that the patient has not the possibility of recovery.

The symptoms of concussion of the brain are attended with coma, and the compression of this organ by an extravasation is also accompanied with lethargic heaviness. How, then, is the surgeon to ascertain, whether the comatose disorder arises from one or the other of these affections?

Here, in order to avoid repetitions, we beg leave to refer to the observations already made in the articles quoted above. But there is one criterion of such first-rate importance, that it may prevent innumerable fatal mistakes, and, indeed, without the continual recollection of it, no man ought to be rash enough to interfere with this dark and abstruse part of surgery. On this account we shall mention it here, notwithstanding we have already noticed it elsewhere. If the patient is knocked down and stunned directly by the blow, and remains in a state of insensibility, these primary symptoms are ascribable to the concussion. On the contrary, when the coma and loss of sense do not take place till an hour or two after the blow, they are to be imputed to an extravasation.

The shock given to the brain by concussion, must, like every other impulse communicated, continue to diminish until it ceases altogether. If, at the very time of the blow, the shock has not been forcible enough to produce alarming symptoms, such symptoms will not afterwards come on when their cause is weakened. Hence the reason may be discerned, why compression may be distinguished from concussion of the brain, when there has been an interval of sense between the receipt of the blow, and the occurrence of the bad symptoms. But the distinction of the symptoms into primary and consecutive, cannot be made when concussion and extravasation exist together.

Having made these few remarks on concussion and compression of the brain, remarks which seemed necessary before we entered into a description of the operation of the trepan, we shall next premise some observations relative to contusions and fractures of the skull, cases on which the most erroneous opinions have been entertained. It is true, that we have in another place (see *HEAD, Injuries of,*) considered the subject; but we think it better to recapitulate certain points here, because they have such immediate connection with the application of the trephine.

Contusions of the head not unfrequently occasion a small kind of tumour, which is soft in the centre, but hard and resisting at the circumference, especially when the violence has been considerable. Now the ease with which the centre or seat of the extravasated fluid admits of being depressed, while the circumference remains hard and elevated, is ex-

remely apt to give rise to the belief, that a fracture with depression has happened. The true nature of this accident was first clearly explained by the eminent M. J. L. Petit, and since his time the proper cautions, not to fall into a mistake concerning it, have been laid down by the generality of surgical writers.

Often nothing is more obscure than the diagnosis of fractures of the cranium: their existence indeed can only be made out with certainty, when they can be felt or seen. Thus a fracture of the skull, attended with a wound of the scalp, and exposure of the bone, shews itself in the form of a fissure more or less wide and extensive, and taking various directions. The accident may also be known by the touch, even when the soft parts continue entire, particularly if the fracture is accompanied with splinters, or the edges of the fissure are materially separated. When there are many splinters, entirely detached, a crepitus will likewise serve to explain the nature of the accident; but, unassisted by these symptoms, imparted to him by the sight, the hearing, or the touch, the practitioner cannot at once offer a decided opinion as to whether a fracture exists or not.

In order to procure more positive information, would it be right and judicious to make several incisions, and uncover the bone? But here the surgeon would be embarrassed in the very commencement of his proceedings; for how would he be able to judge where the knife should be applied? Why also should he resort to an useless and painful operation, which (to say the best of it) could only render the patient's cure more distant.

The symptoms indicating compression of the brain, can alone justify an examination of the fracture. These symptoms also must be urgent and alarming; for when they prevail in a slight degree, bleeding and evacuations promise more benefit than any operation on the skull, and consequently all examination of the part supposed to be broken must be unnecessary. The precept, too commonly given, to cut through the scalp for the purpose of bringing the fracture into view, will no longer be matter of surprize, when it is known that, with some surgeons, the operation of the trepan is a thing of course in all fractures of the cranium.

Even when the cranium has been denuded, so that the sight can convey the information respecting the solution of continuity in the bone, care must be taken not to be deceived by a suture, or by the groove of a vessel. In cases of doubt, a modern surgical author advises us to scrape the outside of the bone; and he tells us, that if, after the removal of the external table, the fissure yet appear, and a thread of blood be seen at its outer part, no doubt exists of its being a real fissure. As, however, making this examination can answer no purpose, except with a view to determining the place where the trepan should be applied, we cannot recommend the plan, except where the symptoms are such as to render this information desirable. On the contrary, it appears to us, that all examinations of the bone, made seemingly from mere curiosity, and without any true surgical object, should be deprecated as rash and hurtful.

The danger of fractures of the skull does not depend upon the simple solution of continuity: it bears altogether a relation to the concussion and compression of the brain, with which the injury of the bone may be complicated. The pressure, which is caused by depressed splinters of bone, is less alarming, inasmuch as the cause of the compression is easy of removal. The pressure arising from extravasated fluid is far more serious, in consequence of the difficulty of ascertaining positively the existence and precise situation of such extravasation.

The seat of the extravasation is sometimes between the skull and the dura mater, which has been detached from the bone. More frequently it occurs either between the dura mater and tunica arachnoïdes, in the substance of the brain, or else in the ventricles. The quantity of extravasated fluid is generally less in those extravasations which are situated between the dura mater and the skull. The extravasations, which are formed in the substance of the brain itself, are not only more considerable, but also, as they mostly depend upon concussion, are more alarming, than effusions on the surface of the dura mater. It is indeed extremely difficult, if not impossible, to ascertain the situation of the extravasated fluid. In such cases, the trepan is likewise of no use; while concussion, when so violent as to produce internal extravasation, is invariably fatal. In extravasations between the dura mater and the skull, which are almost the only cases of the kind to which surgery can administer relief, when the effused fluid lies under a part of the skull accessible to the trepan, the extravasated fluid is almost always small in quantity. The danger, however, is not the less: ten or twelve drops of fluid are sometimes enough to produce a fatal compression. When the extravasation has happened in the substance of the brain, the compression is far more perilous; in short, it may be said to prove, with very few exceptions, certainly mortal. The danger is not so great, when the extravasation is situated between the skull and dura mater.

The lethargy, the degrees of which increase from mere drowsiness unto the most perfect coma, and the paralysis of the opposite side of the body to the seat of the extravasation, are the characteristic symptoms of this accident, in cases of injury of the head. Having explained elsewhere (see *HEAD, Injuries of, CONCUSSION, EXTRAVASATION, &c.*) some other symptoms, such as stertorous respiration, dilated pupils, &c. which usually indicate pressure on the brain, we need not here dwell upon them. The subsequent increase of the coma and paralytic affections, and the gradual augmentation of their intensity, serve to render these symptoms distinguishable from others, which are suddenly brought on by concussion. But there are instances, as every man of experience knows, in which the concussion ruptures the blood-vessels, and produces an extravasation of blood. In this circumstance, it is obvious that the symptoms of compression are blended with those of concussion. The symptoms, proceeding from the latter cause, always diminish in proportion to the time which has elapsed from the moment of the injury; while those of compression succeed, and, on the contrary, increase in intensity, in proportion as the quantity of extravasated fluid becomes more considerable. Notwithstanding these distinctions, however, it must be acknowledged that there are many cases, in which the surgeon is obliged to remain in doubt with regard to the particular cause of the symptoms. This indecision is the more embarrassing, because the operation of the trepan is necessary in cases of extravasation, but useless in those of concussion. Even when extravasation is known to exist, the practitioner requires more information; for he ought to know the precise situation of the effused fluid. It is true, indeed, that paralysis of one side of the body indicates the pressure to be upon the opposite hemisphere of the brain. But what surgeon would venture to follow the practice advised by Van Swieten, and apply to the suspected side of the head three crowns of the trepan? Possibly not one of them might fall on the situation of the extravasated fluid. When the skull is broken, the extravasation exists on the same side as the fracture. When it is the effect of concussion, or when the breach of continuity in the skull is what

is termed a counter-fissure, the effusion is generally on the side of the head most remote from the blow. If the pressure is caused by a detachment of the internal table of the skull, the nature of the case cannot be ascertained, before the operation of the trepan has been performed on the part of the skull upon which the violence has acted. When there are two extravasations; one depending upon a fracture, and situated immediately under it, between the dura mater and the skull; the other arising from concussion, and situated at some point directly opposite, either between the dura mater and tunica arachnoïdes, or within the substance of the brain itself; paralysis may occur on the same side as the fracture; and hence it may be inferred, that the palsy does not always take place on the side opposite to the extravasation. But an examination of the body quickly proves, that the case does not deviate from the common rule. The extravasation produced by concussion, being almost invariably more considerable than that caused by a fracture, accounts for the extension of the palsy to the same side of the body. Sometimes the side which is not paralyzed is affected with convulsions; the pulse is full and hard, and the respiration stertorous: in short, the symptoms are analogous to those caused by apoplexy.

The evacuating plan, recommended for the treatment of concussion, (see *CONCUSSION, and HEAD, Injuries of,*) is all that can be done, when every thing is uncertain relative to the situation of the extravasation. It is all that can be done in those frequent instances, where the effusion has taken place in the substance of the brain, so that it cannot possibly be voided. The trepan then is indicated only when there is an extravasation between the dura mater and the bone, the fracture being situated in a part of the skull accessible to instruments, and not at the base. We will not here dwell upon the doubtful example, where the fluid lies between the dura mater and the arachnoïdes. But are the cases, which we have just been describing, as frequent as they are supposed to be? Cannot the effused blood be generally discharged through the interspaces of the broken pieces of bone? Is the trepan usually necessary for the relief of injuries of the head, as Quesnay, Pott, and the French Academy of Surgery maintained?—We think not. The operation is often useless, and sometimes dangerous. We believe that it should be limited to a small number of cases. The exact determination of the cases in which it is absolutely indispensable, is one of the greatest desiderata in modern surgery.

Richerand contends, that extravasations between the skull and the dura mater, so considerable as to produce compression of the brain, and render the trepan necessary, are much less common than many surgeons think. Even when they do occur, the dura mater is always detached to a certain extent; and, according to this writer, if the bone is much broken, the interspaces of the fragments are quite sufficient for the evacuation of the effused fluid. The following case is quoted in proof of this observation. A woman injured her head, by falling from a height of fifteen feet. The fracture reached the whole breadth of the skull, so that when the os frontis was taken hold of with one hand, and the os occipitis with the other, the two halves of the cranium admitted of being manifestly moved and separated. Blood issued from the fissure, the edges of which were kept apart by a small wedge of wood, in such a manner that the pulsations of the brain were visible. On the sixth day, as nothing was discharged from the fissure, the bit of wood was removed; and on the fifty-second, the wound had completely healed without any exfoliation. On the seventy-second, the patient was discharged from the Hôtel-Dieu, perfectly

perfectly cured. *Nofographie Chirurgicale*, tom. ii. p. 292. edit. 3.

Thus we see that the trepan is often unnecessary in injuries of the head, with fracture of the skull, notwithstanding the co-existence of an extravasation between the bone and the dura mater. This doctrine is very different from what is taught in the memoirs of M. Quesnay, in the first volume of those of the French Academy of Surgery. Default, in the last years of his practice, abandoned the operation of the trepan altogether. It has been remarked for many years, that in the Hôtel-Dieu this operation has had very little success; a circumstance which has excited a suspicion, that the foul air of the wards of that establishment may have had a share in bringing on the unfavourable event. We shall not here expatiate on the bad effect of the atmospheric air on the membranes of the brain; a thing of which B. Bell seems to have convinced M. Richerand.

When the skull is fractured by a blow or fall, and the case is a simple fissure, the trepan ought to be applied upon the solution of continuity, *if the symptoms indicate a dangerous degree of pressure on the brain*, and the edges of the fracture are not sufficiently separated to let the extravasated fluid escape.

When the detached portions of bone are depressed, so as to compress the brain, the operation is still requisite, if they cannot be elevated by other means. But Richerand maintains, that a positive indication for trepanning is not frequent, either because it is difficult to judge of the existence and situation of extravasations, or because extravasated fluids readily escape through the interspaces of the fragments, when there is a splintered fracture. Such facility is also increased, when one of the portions of broken bone is totally detached, so that it can be removed, leaving an aperture equivalent to what would be produced by the application of the trepan.

When the indications render it necessary, there is no point of the external surface of the cranium to which the trepan, or trephine, may not be applied. The region of the frontal spine and sinuses, however, and the situation of the spines and inequalities of the occiput, the lower part of the squamous portion of the temporal bone, and the track of the meningeal artery running under the anterior inferior angle of the parietal bone, are places to which the instrument ought never to be applied without urgent necessity. The surgeon may trepan upon the sutures, and over the sinuses of the dura mater, with perfect safety. A wound of the longitudinal sinus has not only been found to be free from danger, but actually beneficial, by the evacuation of blood that has followed. The experience of Pott, Callisen, &c. confirms this fact; and they have even purposely opened the vessel with a lancet. Callisen, *Syst. Chir. Hodiernæ*, tom. i. p. 659. edit. 1798.

The manner in which the two tables of the skull recede from each other at the frontal sinuses, would make the operation difficult. Besides, here the spine of the *os frontis* projects inward, so that the whole of the bone could not be sawn through, without the dura mater being lacerated. In an urgent case, however, the surgeon might trepan exactly on the frontal sinus, by removing the outer table of that cavity with a large trephine, and applying a small one to the inner table. Perhaps also, in these pressing examples, it would be proper to trepan on the centre of the *os frontis*, and use a chisel for breaking the inner spine of that part of the bone. In the same way, although a surgeon would always prefer avoiding the meningeal artery, he ought not, in urgent cases, to be afraid of it. The best modern surgeons well know that the hæmorrhage from that vessel is capable

of being easily suppressed, by the introduction of a small plug into its orifice.

The practitioner can never be too careful not to place the trepan on a loose part of the fractured bone, as it would be apt to be pressed inward, so as to do mischief to the brain.

When the cranium has been perforated with the trepan, and nothing is found between the skull and the dura mater, or underneath this membrane, in the situation where an extravasation may be suspected to exist, additional perforations are to be made elsewhere, if the symptoms should indicate such practice. The repetition of the trepan is particularly requisite in cases where the fissure runs across a suture. The intimate adhesion of the dura mater to the future, explains why this membrane often continues undetached in that situation, while on each side it is separated from the bone, and blood effused upon it. There are then two distinct extravasations, and two perforations of the bone are absolutely necessary for the discharge of the blood.

Foreign surgeons invariably prefer, for the accomplishment of the operation, an instrument called the trepan, which much resembles a wimble, a tool extensively employed by coopers, and, like it, consists of a handle, to which is adapted a circular saw, or, as it is termed, the crown of the trepan. The diameter of the crowns varies from six to ten lines, and they are about one inch in height.

In England, the trepan (*Plate VIII. Surgery*) has gone into disuse, the trephine being generally preferred, though perhaps without great reason. The trephine differs from the trepan in having its crown fixed upon and worked with a common transverse handle, instead of being turned with a handle like that of a wimble. On the continent it is objected, that the trephine which the English surgeons make use of, requires a stronger hand and greater pressure than the trepan, so that at the moment of finishing the division of the bone, one runs a risk of forcing the instrument too deeply, and lacerating the brain and its membranes. We must confess, however, that we have never seen this accident occur, and the trephine is now made in so excellent a manner, that it will cut the bone fast enough without any occasion for immoderate pressure. If some badly made trephines cut with too much difficulty, the trepan may be accused of dividing the bone with too much celerity. A man of ordinary skill may use either instrument, and an awkward practitioner will be apt to do mischief let him employ which he will. See TREPHINE.

The first object in the performance of trepanning, is to expose the exact part of the bone on which it is intended to apply the instrument. In some cases, the scalp is so torn and injured, that a sufficient extent of the skull is already uncovered, and it is unnecessary to employ a scalpel. But in the majority of instances, the use of the knife must precede that of the saw. Incisions of a crucial form, or shaped like the letter T or V, are found to be the most eligible, because they allow their edges to be brought together again with ease, and they enable the surgeon to denude a larger surface of bone than could be managed with an incision of a different figure, but of equal size. The old surgeons ignorantly made circular wounds, and without consideration cut large portions of the scalp away before they applied the trepan. The consequence was, that the patient was sure of being permanently disfigured, and the edges of the perforation, remaining for a long while uncovered, frequently exfoliated.

The generality of surgical authors next advise us to be careful to scrape away the pericranium from the part to which the trepan, or trephine, is to be applied, so as to let the saw act with more facility. We have never found this

proceeding necessary, and conceive that, as more of the pericranium must always be removed than what is absolutely intended, it may sometimes be the cause of exfoliations. We advise it, therefore, to be rejected, as well as the old plan of scraping the periosteum off the bones which are to be sawn in amputations. The ruginé, which is kept in most cases of trephining instruments for the purpose of scraping off the pericranium, would be no real loss if omitted.

Now, on first beginning to work either with the trephine or trepan, the practitioner would find that it would slip about and not steadily divide the bone, were it not for a particular contrivance. This is the centre-pin, which admits of being pushed down a little below the level of the teeth, and being very sharply pointed, immediately fixes itself in the mid-point of the circle of bone which is to be removed. As soon, however, as the teeth of the trephine have made a sufficient furrow, the centre-pin should be withdrawn, as it would otherwise wound the dura mater before the sawing of the bone were completed.

In making the incision through the scalp, when there is a fracture, the knife must be used with some degree of caution, lest it should depress the fragments of bone against the cerebrum, or be carried too deeply, so as to injure the dura mater. In certain instances, it will be advisable to make the requisite incision with a director and curved bistoury.

The trephine is worked by being rotated backward and forward; the trepan is turned round continually in one direction. In trepanning upon a simple fracture, or fissure, the crown of the instrument should be so placed as to include an equal portion of the bone on each side. But when there are portions of bone depressed and moveable, it is customary to apply the trepan upon an adjacent solid part of the cranium, which will serve after the operation as a fulcrum for the elevation or extraction of the depressed fragments. We must observe, however, that this method, if practised indiscriminately, will often lead to an unnecessary removal of bone; a circumstance which it is always desirous to avoid. Loose depressed pieces of bone should constantly be taken away with a pair of forceps, whenever it can be done; and then no trepanning will be needed. Also, when the fracture is shaped somewhat like the letter V, or when it is of an oblong form, the depressed piece of bone may frequently be entirely removed by sawing through the part which connects it with the rest of the cranium, and no circle of bone will stand in need of being sawn out. For the performance of such operation, Mr. Hey's saws (represented in the surgical plates) will be found exceedingly advantageous.

The surgeon should not press too heavily with the trephine, or trepan, when he is in the act of sawing the bone; but execute the business with as light a hand as possible. As soon as a sufficient groove is formed for the teeth of the crown, the centre-pin is to be taken out. The first part of the sawing may be done briskly. Afterwards, the operation is to proceed slowly and cautiously. With a bit of quill, the surgeon must examine the depth of the circular groove, in order to be sure that he has not sawn through at any particular point. When one side seems to be more cut than another, the saw must not be allowed to act upon it so much; and if there be any part of the circle which is completely sawn through, the instrument must not be applied to that point any longer. While the surgeon examines the depth of the groove with a piece of quill, an assistant takes care to clean the teeth of the saw with a small brush made for the purpose, by which means the action of the instrument will not be obstructed by the particles of bone.

When these become tinged with blood, the teeth of the saw are known to have reached the diploe; but the practitioner must remember, that the diploe is not a criterion which will be met with in every instance, as in some subjects it is so inconsiderable, that it does not give any tinge of blood to the bone-dust. It is of importance to be aware of this fact; for were a surgeon to saw boldly on in all cases until he sees marks of his having arrived at the diploe, he would frequently be apt to injure the dura mater and brain. When he knows that he is sawing the internal table, he is to proceed with great slowness and circumspection, making repeated examinations of the groove with the pointed quill. When the portion of bone to be taken out appears to be connected with the rest of the skull principally on one side of the groove, the trephine is to be inclined to that side. Immediately the circle is loose enough, it is to be taken out with a pair of forceps constructed for this object, or with the elevator. (See surgical plates.) But rather than run a hazard of sawing too deeply with the trephine, we would always recommend the surgeon to prefer breaking the few last fibres of bone which impede the circle from being taken out.

When there are any inequalities round the margin of the perforation, they must be carefully removed by means of the lenticular knife. (See plates.) In doing this part of the operation, care must be taken not to let the lenticular knife make improper pressure upon the dura mater, a thing which might have the worst consequences.

The circle of bone having been sawn out, the surgeon is to keep in mind the grand object of the operation; *viz.* that of relieving the brain from the pressure, which is the cause of the alarming symptoms. All depressed fragments of bone are to be raised, and, if quite detached, they ought to be entirely removed. All spiculæ of bone, penetrating the dura mater and substance of the brain, are to be extracted without delay. If there be blood or matter upon the surface of the dura mater, it now escapes, being expelled by the pulsatory movement of the cerebrum.

When the extravasation is under the dura mater, a puncture may be cautiously made through this membrane with the point of a bistoury, or lancet. There must be, however, a manifest elevation and tension of the dura mater, arising from the lodgment of a fluid below it, to justify the preceding practice. If blood should be found in the suspected situation, the puncture may be enlarged into a crucial incision.

According to surgical writers, if, after dividing the dura mater, the surface of the brain appears smooth and slabby, with a fluctuation, there is an abscess in its substance. They then sanction the method of carrying the point of the bistoury to the depth of an inch, if circumstances render so deep a puncture necessary. But, says Richerand, prudence forbids us to go further. Cutting the surface of the brain causes no pain, and it produces less danger than one could presume to expect; but experience and observation have proved, that the essential parts of this organ are situated near its base, and that its surface may be removed without danger or pain. *Nosogr. Chir. t. ii. p. 301. edit. 3.*

After the operation of trephining, the divided scalp is to be placed as nearly as possible in its natural situation, and lightly dressed with a simple pledget of any common unirritating ointment. In applying the dressings, the surgeon should invariably keep in view these objects; namely, to let whatever is put on the wound be as light as possible, not apt to make pressure on the brain, and of a nature which cannot excite irritation. All stimulants are to be strictly avoided; nor will any bandage be better than an ordinary

ordinary night-cap of sufficient size to be put on with facility. It may be secured with bits of tape, which are to be tied under the jaw.

The aperture in the skull usually becomes closed with soft granulations, which slowly acquire a hard consistence. These almost constantly grow from the edge of the perforation, and seldom from the surface of the dura mater. While the cicatrix is soft, it should be protected from external injury with a thin piece of horn or metal. Exfoliations from the margin of the perforation sometimes retard the healing of the wound; but now that the practice of dressing with drying spirituous applications has been exploded, and the removal of any part of the scalp is condemned by all the best surgeons, these unpleasant consequences are rendered much less frequent than in former days.

TREPANNING, in *Sheep*, the operation of extracting the bags or cysts that contain a watery fluid from the heads of these animals, which are the cause of disease. See STURDY.

TREPASSER'S BAY, or *Trepassi Bay*, in *Geography*, a bay on the south coast of Newfoundland. N. lat. $46^{\circ} 50'$. W. long. 53° .

TREPEIA, a town of Servia; 5 miles N.E. of Novibasar.

TREPINE, in *Surgery*. The operation of trepanning is now frequently called the operation of trephining, from its being generally performed in this country with a trephine, which is a more modern instrument than the trepan. The trephine consists of a simple cylindrical saw, with a handle placed transversely, like that of a gimlet; and from the centre of the circle, which the teeth of the saw describe, a sharp little perforator projects, named the centre-pin. The upper part of the centre-pin is made to screw into a corresponding hole at the inside of the top of the saw, and is capable of being taken out or put in at the surgeon's option, by means of a little key for the purpose. Its use is to fix and steady the trephine, when the instrument first begins to work, that is, before the teeth of the saw have made a sufficient circular groove, in which they can securely move. But as soon as an adequate groove is formed, the centre-pin must always be taken out; because it is now unnecessary, and, if not removed, it would not only retard the progress of the operation, but inevitably penetrate the dura mater and brain, when the teeth of the saw had cut to a certain depth through the cranium. Some trephines contain centre-pins, which are contrived to slide up or down, and to admit of being fixed in either situation, by turning a little screw. This method seems to us both ingenious and convenient.

The cylindrical part of the trephine is often termed the *crown* of the instrument. The surgeon should always have at least two or three cylindrical saws of various sizes; for it is a commendable rule never to saw away any more of the cranium, or indeed of any other bone, than is absolutely requisite for the accomplishment of some assignable object. There is no occasion, however, for having more than one handle, which may be made to fit any of the saws.

The trepan is worked in the manner of a wimble, the instrument turning round and round upon its own axis; but the trephine only performs semicircular movements, which the surgeon imparts to it by the pronation and supination of his hand. As its teeth are arranged perpendicularly, they cut whether the instrument is turned from the left to the right, or from the right to the left.

Certainly cases do frequently present themselves, in which trephining is absolutely necessary; and yet there is no occasion for removing a complete circular portion of the cranium; the taking away of a piece of smaller size, and

different shape, would sometimes be much more advantageous. A very good instrument for effecting this purpose is a common trephine, terminating only in a semicircular saw, instead of a circular one. With this the surgeon can cut across the base of certain depressed portions of bone, and take them away, without any occasion for removing also a circle of the cranium.

The saws, however, which Mr. Hey has described, should constantly be kept in every case of trephining instruments. This practical writer remarks, that "the purposes for which any portion of the cranium is removed, are, to enable the surgeon to extract broken fragments of bone, to elevate what is depressed, and to afford a proper issue to blood or matter that is, or may be confined, &c.

"When a broken fragment of bone is driven beneath the sound contiguous part of the cranium, it frequently happens that the extraction cannot be executed without removing some of the unbroken part under which the fragment is depressed. This might generally be effected with very little loss of sound bone, if a narrow portion of that which lies over the broken fragment could be removed. But such a portion cannot be removed by the trephine. This instrument can only saw out a circular piece. And as, in executing this, the central pin of the saw must be placed upon the uninjured bone, it is evident that a portion of the sound bone, greater than half the area of the trephine, must be removed at every operation. When the broken and depressed fragment is large, a repeated application of the trephine is often necessary, and a great destruction of sound bone must be the consequence.

"When the injury consists merely of a fissure with depression, a small enlargement of the fissure would enable the surgeon to introduce the point of the elevator, so as to raise the depressed bone. But a small enlargement of the fissure cannot be made with the trephine. When it is necessary to apply the elevator to different parts of the depressed bone, a great deal of the sound cranium must be removed, where a very narrow aperture would have been sufficient.

"The same reasoning will apply to the case of openings made for the purpose of giving a discharge to extravasated blood or matter.

"If a saw could be contrived, which might be worked with safety in a straight, or gently curvilinear direction, it would be a great acquisition to the practical surgeon. Such a saw I can now with confidence recommend, after a trial of twenty years, during which time I have rarely used the trephine in fractures of the skull. Its use has been adopted by my colleagues at the General Infirmary in Leeds; and will be adopted, I hope, by every surgeon who has once made trial of it." Mr. Hey next informs us, that the instrument was first shewn to him by Dr. Cockell of Pontefract; but that there is a saw, formed on the same principle, in Scultetus's *Armamentarium Chirurgicum*. The saws alluded to are very short ones, fixed at the end of a longish straight handle; their edges are made either straight, or semicircular. The latter construction qualifies the instrument for cutting in a curvilinear direction, which is often proper. The edge of the saw should always be made a little thicker than the rest of the blade, by which means it will work in the groove, which is cut, with more facility.

Saws made on the principle just described, are also of infinite use in cutting away diseased portions of other bones, besides the skull, exostoses, &c. In cases of necrosis, when a dead part of a bone is quite wedged in the substance of the surrounding new bony matter, Mr. Hey's saws may often be advantageously employed for cutting away the parts which mechanically prevent the detachment of the dead

dead piece. Hey's Practical Observations, and Cooper's Dictionary of Surgery.

TREPIDATION, in *Medicine*. See PALSY.

The first symptom of madness in dogs, is a trepidation of the limbs.

TREPIDATION, in the *Ancient Astronomy*, denotes what they called a libration of the eighth sphere; or a motion which the Ptolemaic system attributed to the firmament, to account for certain almost insensible changes and motions observed in the axis of the world; by means of which the latitudes of the fixed stars come to be gradually changed, and the ecliptic seems to approach reciprocally, first towards one pole, then towards the other.

This motion is also called the motion of the first libration.

TREPIGNER, in the *Manege*, the action of a horse who beats the dust with his fore-feet in maneing, without embracing the volt; and who makes his motions and times short, and near the ground, without being put upon his haunches. This is generally the fault of such horses as have not their shoulders supple, and at liberty, and withal have scarcely any motion with them. A horse may trepigner in going upon a straight line.

TREPONTE, in *Geography*, a town of Italy, in the Cadurin; 5 miles N. of Cadora.

TREPOINT, LE, a sea-port town of France, in the department of the Lower Seine, situated on the English Channel, at the mouth of the Bresle. This place is the harbour for the town of Eu; from which it is distant about half a league. N. lat. $50^{\circ} 4'$. E. long. $1^{\circ} 26'$.

TREPT le Grand, a town of France, in the department of the Iere; 21 miles E. of Lyons.

TREPTOW, a town of Anterior Pomerania; 50 miles S. of Stralsund. N. lat. $53^{\circ} 39'$. E. long. $13^{\circ} 10'$.

TREPTOW am Rega, or *New Treptow*, a town of Hinder Pomerania, on the river Rega, which is here made navigable; 16 miles N.E. of Cammin. N. lat. $54^{\circ} 2'$. E. long. $15^{\circ} 13'$.

TREPUZZI, a town of Naples, in the province of Otranto; 22 miles W.N.W. of Lecce.

TRERO, a river of the Popedom, in the Campagna di Roma, which runs into the Garigliano, near Isoletta.

TRETERUS, in *Ancient Geography*, a country in the environs of Macedonia, in Pieria and Dardania. Pliny.—Also, a river of Italy, in Aunonia, which, according to Strabo, watered the town of Fabrateria, situated in Latium.

TRES HERMANOS, in *Geography*, three small islands in the bay of Honduras, near the coast. N. lat. $19^{\circ} 20'$. W. long. $88^{\circ} 50'$.

TRES Taberna, *Three Taverns*, in *Ancient Geography*, a place of Italy, near the Appian way. Zosimus says that it was the place where the emperor Severus was put to death by Maxentius. The Itin. of Anton. marks its situation in the Appian way, between Aricia and Appii Forum.

TRESA, a river of the northern part of Italy, which ran among the Lepontii, into the lake Verbanus.

TRESANTI, in *Geography*, a town of Naples, in Capitanata; 13 miles S. of Manfredonia.

TRESANTON, in *Ancient Geography*, a river of Albion, probably the river Test, which falls into Southampton bay.

TRESAYLE, in *Law*, the name of a writ (now obsolete) to be sued, on ouster, by abatement, on the death of the grandfather's grandfather.

TREBES, in *Geography*, a town of France, in the department of the Aude, near the Aude river; 3 miles E. of Carcaffonne. N. lat. $43^{\circ} 13'$. E. long. $2^{\circ} 32'$.

TRESCHEN, a town of Germany, in the principality of Culmbach; 4 miles S.S.E. of Culmbach.

TRESCO, or ST. NICHOLAS, one of the Scilly islands. N. lat. 50° . W. long. $6^{\circ} 45'$.

TRESHANISH ISLANDS, a range of four small islands among the Western islands of Scotland, between Mull and Coll. They lie in a line, nearly from north to south. They are small, but the soil is generally fertile. N. lat. $56^{\circ} 30'$. E. long. $6^{\circ} 25'$.

TRESNEL, a town of France, in the department of the Aube; 3 miles from Pont-sur-Seine.—Also, a town of France, in the department of the Sarthe; 7 miles W. of St. Calais.

TRESPASS, in *Law*, signifies any transgression of the law, under treason, felony, or misprison of either.

TRESPASS, however, is most commonly used either for that wrong or damage which is done to the king in his forest, or by one private man to another.

In this sense, it is of two sorts: *trespass general*, otherwise called *trespass vi et armis*, where force or violence is used; to which belong threats, assault, battery, mayhem, &c.: and *trespass special*, otherwise called *trespass upon the case*; which should be that done without force, or where the injury is only consequential. See ACTION on the case.

But the two species are sometimes confounded.

Trespass on lands denotes an outcry on another man's ground without lawful authority, and doing some damage, however inconsiderable, to his real property. Every such unwarrantable entry on another's soil, the law entitles a trespass by *breaking his close*. But in order to be able to maintain an action of trespass, a man must have property in the soil, and actual possession by entry; or at least it is requisite that the party have a lease and possession of the vesture and herbage of the land. But before entry and actual possession, one cannot maintain an action of trespass, though he hath the freehold in law. However, by 4 Geo. II. c. 28. and 11 Geo. II. c. 19. in case after the determination of any term of life, lives, or years, any person shall willfully hold over the same, the lessor is entitled to recover by action of debt, either a rent of double the annual value of the premises, in case he himself hath demanded and given notice in writing to deliver the possession; or else double the usual rent, in case the notice of quitting proceeds from any tenant having power to determine his lease, and he afterwards neglects to carry it into due execution.

A man is answerable not only for his own trespass, but that of his cattle also. See DAMAGE *feasant*.

In some cases trespass is justifiable; or, rather, entry on another's land and house shall not in those cases be accounted trespass; as if a man comes there to demand or pay money, there payable; or to execute, in a legal manner, the process of the law. A man may also justify entering into an inn or public-house, without the leave of the owner: a landlord may justify entering to distrain for rent: a commoner to attend his cattle, commoning on another's land; and a reversioner to see if any waste be committed on the estate. It hath also been said, that by the common law and custom of England, the poor are allowed to enter and glean upon another's ground after the harvest, without being guilty of trespass; which humane provision seems borrowed from the Mosaic law, Lev. chap. xix. ver. 9. chap. xxiii. ver. 22. Deut. chap. xxiv. ver. 19. In like manner, the common law warrants the hunting of ravenous beasts of prey, as badgers and foxes, in another man's land. But in cases where a man makes an ill use of the authority with which the law entrusts him, he shall be accounted a trespasser *ab initio*; as if one comes into a tavern and will not go out in reasonable

reasonable time: so if a landlord distrained for rent, and wilfully killed the distress, this made him a trespasser *ab initio*: and so would any other irregularity have done, till the statute 11 Geo. II. c. 19. which enacts that no subsequent irregularity of the landlord shall make his first entry a trespass; but the party injured shall have a special action on the case for the real specific injury sustained, unless tender of amends hath been made. But still, if a reversioner, who enters on pretence of seeing waste, breaks the house, or stays there all night; or if the commoner, who tends his cattle, cuts down a tree; in these and similar cases the law judges that he entered for this unlawful purpose; and therefore, as the act which demonstrates such his purpose is a trespass, he shall be deemed a trespasser *ab initio*. So also in the case of hunting the fox or the badger, a man cannot justify breaking the soil, and digging him out of his earth.

A man may justify an action of trespass, on account of the freehold and right of entry being in himself; and this defence brings the title of the estate in question.—And this is one of the ways devised, since the disuse of real actions, to try the property of estates: though not so usual as that by ejectment, which being a mixed action, gives damages for the ejectment, and possession of the land: whereas in trespass, which is a personal suit, the right can be only ascertained, but no possession delivered; nothing being recovered but damages for the wrong committed.

In an action of trespass, the plaintiff always sues for damages, or the value of the hurt done him by the defendant.

In order to prevent trifling and vexatious actions of trespass, as well as other personal actions, it is (*inter alia*) enacted by statutes 43 Eliz. c. 6. and 21 Jac. I. c. 16. and 22 & 23 Car. II. c. 9. that where the jury who try an action of trespass give less damages than 40s. the plaintiff shall be allowed no more costs than damages; unless the judge shall certify under his hand, that the freehold or title of the land came chiefly in question, or that an actual battery, and not assault only, was proved. And by statute 4 & 5 W. & M. c. 23. and 8 & 9 W. III. c. 11. if the trespass were committed in hunting or sporting by an inferior tradesman, or if it appear to be wilfully and maliciously committed, the plaintiff shall have full costs, though his damages, as assessed by the jury, amount to less than 40s. Blackst. Comm. vol. iii.

Trespass is also divided into *local* and *transitory*.

TRESPASS, *Local*, is that which is so annexed to the place certain, that if the defendant join issue upon a place, and traverse the place mentioned in the declaration, and aver it, it is enough to defeat the action.

TRESPASS, *Transitory*, is that which cannot be defeated by the defendant's traverse of the place, because the place is not material.

The action of trespass, *quare clausum fregit*, ought to be local.

TRESSEL or TRESTLE-Trees, in a *Ship*, two strong bars of oak-timber resting on the cheeks of lower-masts, or hounds of top-masts. To lower-masts they are secured by being scored and bolted horizontally on the opposite sides of the mast, fore and aft, and further supported by two bibs or brackets, as shoulders under them. Topmast trestle-trees are supported by the hounds only. See *MAST-Making*.

TRESSNESS, in *Geography*, a cape on the south coast of the island of Sanday. N. lat. 59° 5'. W. long. 2° 25'

TRESSON, a town of France, in the department of the Sarthe; 15 miles S.E. of Le Mans.

TRESSURE, in *Heraldry*, a diminutive of an orle, usually supposed to be half the breadth of it.

It is usually borne flory and counter-flory; sometimes double, and sometimes triple.

TRESTIANA, in *Geography*, a town of European Turkey, in Moldavia; 24 miles S.E. of Jassy.

TRESTLE, TRESSEL, or *Truffel*, is explained, by Minshieu, to be a three-footed stool; or, more particularly, a wooden frame or stand to bear up tables, scaffolds, or the like.

TRESUND, in *Geography*, a small island in the gulf of Bothnia. N. lat. 69° 13'.

TRET, or TRETT, in *Commerce*, an allowance made for the waste, or the dust, that may be mixed with any commodity, which is always four pounds in every 104 pounds weight. See *TARE*.

This allowance, which is said to be for dust or sand, or for the waste or wear of the commodity, was formerly made on most foreign articles sold by the pound avoirdupois; but it is now nearly discontinued by merchants, or allowed in the price. It is wholly abolished at the East India warehouses in London; and neither trett nor draft is allowed at the Custom-house. The weight which trett is allowed is called the "futtle weight."

TRETA, in *Ancient Geography*, a town of the island of Cyprus, in the S.W. part of the island, very near Pape-Paphos, to the S. Strabo places it between Boofura and the promontory from which those were precipitated who had touched the altar of Apollo.

TRETE, an island of the Red sea, upon the coast of Arabia. Ptolemy.

TRETS, in *Geography*, a town of France, in the department of the Mouths of the Rhone; 12 miles E.S.E. of Aix.

TRETUM, in *Ancient Geography*, a small town of the Argolide, nearly N. of Argos. In the mountains near this town was a cavern, which was the abode of a very fierce lion, which is said to have been slain by Hercules, and which formed among the poets one of his labours. It was called the lion of the forest of Nemæa, situated near the town, to the W. of it.

TRETUM, or *Tritum*, a promontory of Africa propria, on the coast of the gulf of Numidia.

TRETUR, in *Geography*, a small village of South Wales, in the county of Brecknock; 3 miles N.W. of Crickhowel.

TREVA, in *Ancient Geography*, a town in the northern part of Germany. Ptolemy.—Also, a town of Italy, in Flaminia, watered by the river Clytumnus.

TREVANNION'S ISLAND, in *Geography*, an island in the South Pacific ocean, and one of the cluster called Queen Charlotte's islands, discovered by captain Carteret in 1767, near the coast of Egmont island, or New Guernsey, in a bay called Trevannion's Lagoon. S. lat. 10° 43'. E. long. 163° 43'.

TREUCHTLINGEN, a town of Germany, in the margravate of Anspach, on the Altmühl; 28 miles S.S.E. of Anspach.

TREUEN, or DREYEN, a town of Saxony, in the Vogtland; 9 miles E.N.E. of Plauen.

TREUENBRIETZEN, a town of the Middle Mark of Brandenburg. This town was surrounded with walls in the year 1296. It was at first simply called Brietzen, but for its fidelity to the margrave Louis the Roman, was honoured

noted with the epithet of Treuen, or faithful. In the year 1641, this town was laid waste by the Swedes; 20 miles S. of Brandenburg. N. lat. $52^{\circ} 8'$. E. long. $12^{\circ} 47'$.

TREVENEN'S ISLAND, or *Rooapōa*, a small island in the Pacific ocean, discovered by lieutenant Hergest, in the *Dædalus* store-ship, in 1792. S. lat. $9^{\circ} 4'$. E. long. $220^{\circ} 21'$.

TREVERI, or TREVIRI, in *Ancient Geography*, a people who occupied an extensive territory of Germany, from the Meuse to the Rhine. Of Treveri Cæsar says, "hæc civitas Rhenum tangit;" and the bridge constructed over the Rhine secures the bank on which this city was situated. The present Treves answers to the ancient position of Treveri. See TREVES.

TREVES, in *Geography*, lately an archbishopric and electorate of Germany, bounded on the N. by the electorate of Cologne; on the E. by the estates of the elector palatine, and of the house of Nassau; on the S. by France; and on the W. by the duchy of Luxemburg: about eighty miles in length, but of very uncertain breadth. The country is in general mountainous and woody, containing, indeed, good pasturage for cattle, and in many places also fruitful arable land, but yet stands in need of the importation of corn: on the contrary, the growth of wine on the Mosel is very considerable, with plenty of game. There are likewise mineral springs, and mines of coal, calamy, iron, copper, lead, tin, silver, and gold. The electoral subjects are Roman Catholics, but in some other places which the elector of Treves is possessed of in common with other houses, there are likewise Protestants. The ancient Teviri, from whom the principal town here, and the country also, had its name, were, till the fourth century, subject to the Romans, and afterwards to the Franks. In the divisions which the sons and posterity of the emperor Louis I. had made, this country was added, in the year 855, to the kingdom of Lorraine, and in 870, fell to the share of Louis, the German king, ever since which time it has continued annexed to Germany. The church of Treves, however, is held to be the most ancient in Germany. An archbishop of Treves was elected by the chapter there, and swore to a capitulation proposed by them. The pope confirmed such election in the usual manner, empowering one of the new elected bishops, allotted for that purpose, to consecrate him. The archbishop of Treves was in rank the second spiritual elector. At the election of an emperor, he delivered the formula of the election-oath to the elector of Mentz, to be sworn to by him; and he had also the first voice. As elector, the archbishop of Treves enjoyed both seat and voice in the electoral council at the diets of the empire. The suffragans of the archbishop of Treves were the bishops of Metz, Toul, and Verdun. The chapter of Treves consisted of forty canons, among whom were sixteen capitulars, and twenty-four domiellii. The archbishopric had regular troops, and a land militia. The former of these consisted, in times of peace and ordinarily, only of the circle troops, which the elector of Treves was bound to maintain, and which amounted to between 1100 and 1200 men. The elector also kept up a life-guard of forty persons. By the treaty of Luneburg, the archbishopric and the electorate are no more: and that part of the territories which lay on the left bank of the Rhine is annexed to France, composing chiefly the department of the Sarre. The principal part of the electorate lying on the right side of the Rhine was, in 1802, given as an indemnity to the prince of Nassau-Weilburg.

TREVES, or *Triers*, a city of France, and capital of the

department of the Sarre: late capital of an electoral principality, and archbishopric of the circle of the Lower Rhine, lying between two mountains on the Moselle, over which it has a stone bridge. This town is very old. Long before the birth of Christ, Treves was a town of note of the Treviri. Afterwards the ancient Roman emperors had a residence here; and it is also the head town of the first Belgium, and so early as the days of Constantine the Great, was the capital of all Gaul. About the year 458, from the Romans it fell under the power of the Franks. Under the Austrasian monarchs, a royal court had its seat here; in which, as well under the Frankish kings as for a long time after, resided pfalzgraves. The archiepiscopal court, or palace near the cathedral church, was rebuilt by the elector Francis George. The cathedral church of St. Peter here stands on a hill, being a large building. Exclusive of this church, there are likewise here three collegiate and five parish-churches, together with three colleges, and thirteen monasteries and nunneries, as also a house of the Teutonic order, and a mansion belonging to that of St. John. For the establishment of the university here, papal privileges were issued so early as the year 1454, but these were brought duly to bear only in 1472, in 1535 renewed, and in 1722 improved. This town, according to the common opinion, was formerly imperial, and had a particular matricular evaluation of its own: but by a sentence of the electors pitched upon for the decision of this matter, in conjunction with the imperial aulic counsellors, nominated by the emperor, it was declared to be subject to the superiority of the elector of Treves, which was also immediately after effectually exercised by him over it. In the beginning of August 1794, the French republicans entered the city, which had been hastily evacuated by the German troops. The magistrates met them in their robes at the gates with the keys, congratulated them on their success, and declared they were glad to receive them. The good conduct of this army deserves commendation; and an English writer, speaking of it, observes, "they had no sooner entered Treves than they established a municipality; they broke in upon no property whatever, and left the different corporations, and all civil and religious institutions, as they found them:" 68 miles S.S.W. of Cologne. N. lat. $49^{\circ} 48'$. E. long. $6^{\circ} 48'$.—Also, a town of France, in the department of the Gard; 12 miles E. of Le Vigan.

TREVI, a town of Italy, in the duchy of Spoleto, anciently called *Mutusca* and afterwards *Trebula*; 6 miles N. of Spoleto.—Also, a town of the Popedom, in the Campagna di Roma; anciently the see of a bishop, erected about the year 1000, but in the year 1260 united to Anagni; 32 miles E. of Rome.

TREVICO, a town of Naples, in Principato Ultra; the see of a bishop, suffragan of Benevento; 14 miles N. of Conza. N. lat. $41^{\circ} 6'$. E. long. $15^{\circ} 14'$.

TREVIE'RES, a town of France, in the department of the Calvados; 12 miles E. of Carentan.

TREVIGIO, or TREVISO, a city of Italy, capital of the Trevisan, situated at the conflux of the Sile and the Piavefella; the see of a bishop, suffragan of Udina. An university was founded here, and afterwards removed to Padua. The town is three miles in circumference, and contains 2500 houses and 22,000 inhabitants; whom the culture of silk, the silk and woollen manufactories, and particularly the annual fair in the month of October, supply with abundant means of subsistence. Besides the cathedral, the town contains 16 parochial churches, 11 monasteries, 10 nunneries, 4 hospitals, and a pawn-bank. The streets and public squares are in
general

general irregularly laid out, but well paved, and furrounded with piazzas. Totila, king of the Goths, was a native of this town; 15 miles N.N.W. of Venice. N. lat. $45^{\circ} 42'$. E. $12^{\circ} 9'$.

TREVIGLIO, a town of Italy, in the department of the Adda; 11 miles N.N.W. of Crema.

TREVIGNO, a town of Spain, in the province of Alava; 12 miles S.W. of Vittoria.

TREVISAN, or TREVIGIANO, a province of Italy, bounded on the north by the Bellunese, on the north-east by Friuli, on the south-east by the gulf of Venice, on the south-west by the Paduan, and on the west by the Vicentin; about twenty-four miles in length, and nearly as much in breadth. The whole country is exceedingly fertile, and appears like a continued garden. When annexed to the Lombards, it was erected into a marca or marquisate. However, many considerable parts were detached from this marca in the progress of time; and only that part of it situated between the Friuli and the Paduan remained in the possession of the city of Treviso, when the republic of Venice acquired the dominion both of the city and adjacent district, by the peace of 1338. In the year 1344, a solemn embassy, sent by the inhabitants of Treviso to Venice, confirmed this acquisition. The marca Trevisana was divided into four principal districts; viz. the territory of Treviso, of Belluna, of Feltri, and the territory of Ceneda. Of the territory of Treviso, a small portion is mountainous, but the rest is even and very fertile. It produces all sorts of grain, wine, and fruit, in great plenty. There is also a vast number of sheep, black cattle, hares, common fowls, turkeys, fieldfares, quails, partridges, snipes, and other game; fish of every description, as trout, lampreys, pike, eels, craw-fish, &c. Excellent cheese is made; and, next to corn, silk and wool are the most important natural productions. The woods are very considerable. The principal rivers are the Piave, the Sile, and the Musone. The number of inhabitants amounts to 280,000. It is now annexed to the new kingdom of Italy.

TREVISANI, FRANCESCO, in *Biography*, a native of Treviso, was initiated in the art by Zanchi at Venice, where, in contradistinction of Angiolo, his relative, he was called Roman. At Rome he formed himself on the best styles of the day, but an unbounded talent for mimicking every manner, from Correggio to Cignani, never suffered him to persist long in the imitation of one model. Rome is gorged with his pictures: they often possess elegance of choice, a finished pencil, and a general strength of tone. His S. Joseph, in the church of the Collegio Romano, is a distinguished performance. He died in 1746, aged 90. Fufeli's Pilkington.

TREVISANI, ANGIOLO, was born and resided at Venice. His inventive power is proved at the Carita and other churches of that capital, but his real merit lay in portrait. By persevering in that study, he acquired a style not sublime indeed, but natural, select, and adapted to the times. The diligence and dexterity of his tool greatly assisted him in the management of his chiaro-scuro. He was living in 1753.

TREVOIL, in *Geography*, a town of France, in the department of Mont Blanc; 10 miles N.W. of Chambery.

TREVOSE HEAD, a cape of England, on the north-west coast of Cornwall; 5 miles S.W. from the mouth of the river Alan or Camel. N. lat. $50^{\circ} 33'$. W. long. $5^{\circ} 1'$.

TREVOUX, a town of France, and principal place of a district, in the department of the Ain, on the Saône. Before the revolution, the capital of the principality of Dombes, and residence of a governor, a parliament, &c. It is but small, having suffered much in the wars between the dukes of Bourbon and Savoy, particularly in the year 1431; 10 miles N. of Lyons. N. lat. $45^{\circ} 57'$. E. long. $4^{\circ} 51'$.

TREW, CHRISTOPHER JAMES, in *Biography*, a physician and naturalist, was born at Lauffen, in Franconia, in 1695, and settled at Nuremberg, where he gained medical and literary reputation, so as to be made director of the academy "Naturæ Curiosorum." He also contributed much towards establishing a society under the title of "Commercium Litterarium Noricum ad Rei Medicæ et Scientiæ Naturalis Incrementum institutum," which published its memoirs. To these societies he communicated several papers, and he also published several splendid works in anatomy and botany. Among others, we may enumerate the following: "De Differentiis quibusdam inter Hominem natum et nascendum intercedentibus," 1736, 4to.; "Epistola ad Alb. Hallerum de Vasis Linguae salivalibus et fanguiferis," 1734, 4to.; "Tabulæ Osteologicæ Corporis Humani," fol. max. with coloured plates, 1767. In 1750 he commenced his publication of one of the most splendid of the imitations of Flora, under the title of "Plantæ selectæ, quarum Imagines pinxit G. Dionysius Ehret." To the incomparable designs of Ehret, Trew added descriptions and remarks; and the work appeared in decades, seven of which were completed. In the same year he began a similar publication of garden flowers, intitled "Amœnissimæ Florum Imagines," which was carried on to six decades. He also published an improved edition of Blackwell's Herbal, in English and German, with an addition of some plants. Being in possession of Gesner's wooden plates, he gave an impression of 216 figures of plants from them, intitled "Icones posthumæ Gesnerianæ," 1748. Trew died in 1769. Haller. Eloy.

TREWARDRETH BAY, in *Geography*, a bay in the English Channel, on the south coast of Cornwall; 3 miles W. of Fowey. N. lat. $50^{\circ} 18'$. W. long. $4^{\circ} 42'$.

TREWIA, in *Botany*, was so named by Linnæus, at the end of his *Genera Plantarum*, in honour of Christopher James Trew, an opulent physician at Nuremberg, who has distinguished himself as the editor of some of Ehret's figures, in the most splendid style, with learned descriptions and explanations of his own, under the title of *Plantæ Selectæ*. Of a similar character are his *Florum Imagines*, in six decades. His improved edition of Mrs. Blackwell's Herbal, in German, with valuable additions, has proved acceptable to his countrymen; as have his numerous botanical and physiological essays, published chiefly in the *Commercium Litterarium* at Nuremberg, between the years 1730 and 1746, to the scientific world in general. He is charged by Ludwig, in a letter to Haller, with undertaking more than he could accomplish; nor does he stand in the highest rank of correct and philosophical botanists. He died in 1769, aged 74. (See TREW.)—Linn. Gen. 580. Schreb. 354. Willd. Sp. Pl. v. 4. 834. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 5. 406. Juss. 442. Lamarck Illustr. t. 466. (Tetragastris; Gärtner. t. 109. Rottlera; Willd. in the Goettingen Journ. of Nat. Hist. v. 1. 8. Mallotus; Loureir. Cochinch. v. 2. 635.)—Class and order, *Dioclea Polyandria*. Nat. Ord. *Tricocca*, Linn. *Euphorbia*, Juss.

Gen. Ch. Male, *Cal.* Perianth of three ovate, reflexed, coloured, equal leaves. *Cor.* none. *Stam.* Filaments numerous, capillary, about the length of the calyx, inserted into the receptacle; anthers roundish, of two distinct lobes.

Female, *Cal.* Perianth inferior, of one leaf in three or four segments. *Cor.* none. *Pist.* Germen superior, roundish; style short; stigmas three, very long, feathery on the upper side. *Peric.* Capsule turbinate, somewhat globular, of three or four lobes and as many cells, with twice as many valves. *Seeds* solitary, pendulous, angular on one side, convex on the other.

Ess. Ch. Male, *Calyx* of three leaves. *Corolla* none.

Female, Calyx of three leaves. Corolla none. Style one. Stigmas several, feathery. Capsule of three cells, and six valves. Seeds solitary.

Obf. We believe the several genera, cited above, are here very properly united; see *MALLOTUS* and *TETRAGASTRIS*. The natural number in every part of the female fructification is probably three, though varying to four in the original species. Linnæus was but ill acquainted with this genus, nor does it appear that he ever examined a specimen.

1. *T. nudiflora*. Smooth-leaved Trewia. Linn. Sp. Pl. 1661. Willd. n. 1. Ait. n. 1. (*Rottlera indica*; Willd. as above t. 3. Canfchi; Rheede Hort. Malab. v. 1. 76. t. 42.)—Leaves ovate, undivided, entire, smooth on both sides.—Native of the East Indies, in sandy ground. It has been introduced into the stoves at Kew, but has never yet flowered. This is a tall tree, whose trunk is two or three feet in diameter; its branches numerous, round, smooth, with a filamentous bark. Leaves alternate, on long smooth stalks, broadly ovate, taper-pointed, three or four inches long, with three principal nerves, and many smaller ones, connected by fine transverse parallel veins, and numerous minute reticulations. Male flowers numerous, in axillary aggregate clusters, three or four inches long, greenish-white; sometimes, according to Rheede, four-cleft. Calyx externally downy, about two lines long. Female flowers on a separate tree, likewise axillary, but rarely more than two together, on a long stalk. Their calyx is either very small, or soon deciduous. Germen not so large as a pepper-corn, hoary. Style about as long as the germen, thick, hoary. Stigmas three or four, spreading, an inch long, densely covered along their upper side with feathery glands. Capsule rather depressed, slightly lobed, smoothish, of three or four cells.

2. *T. tricuspidata*. Three-pointed Trewia. Willd. n. 2. (*Mallotus cochinchinensis*; Loureir. Cochinch. 635.)—Leaves ovate, downy and toothed; generally three-pointed.—For the history of this species we refer the reader to *MALLOTUS*.

3. *T. pubescens*. Downy Trewia.—Leaves ovate, undivided, entire, downy on both sides. Female flowers somewhat capitate, with ovate pointed bractæas.—A female specimen of this was sent us by the late Dr. Roxburgh, as an unknown tree from Amboyna. The shape and reticulations of the leaves, with the general habit of the plant, are so like the first species, that we feel confident of their being of the same genus. The branches and footstalks however, and the under side of the leaves, are densely clothed with soft velvet-like pubescence; the upper side of the latter is less downy. Near the base of each footstalk is a pair of awl-shaped, very downy, deciduous stipulas. Female flowers on simple, axillary, solitary, downy stalks, rather longer than the footstalks, composing small roundish heads, accompanied by four or five somewhat alternate, ovate, pointed, slightly toothed, downy bractæas, an inch long. Each flower appears to have a short partial stalk, which is very hairy, and the germen is no less bristly; inasmuch that we can but imperfectly develop the structure of the flower. The stigmas however are large and conspicuous, exactly those of a *Trewia*; but there is some appearance of their being solitary. Possibly some may have fallen off. We are unacquainted with the male of this species.

4. *T. discolor*. White-leaved Trewia.—Leaves ovate, entire; densely downy and white beneath.—Communicated by Lamarck to the younger Linnæus, along with several other plants from the East Indies, but without any name, or indication of its native country. We presume it to be the male of a nondescript species of *Trewia*. The form and veins of the leaves strongly indicate this; but their under

side differs from that of the rest, in being covered with the finest depressed, mealy or scaly, snow-white pubescence; while the upper is very smooth to the touch, appearing minutely granulated under a magnifier only. The branches and all the stalks are finely hoary, and, in the dried specimen at least, have a rusty hue. Panicle terminal, composed of numerous, alternate, racemose, many-flowered branches. Unexpanded male flowers about the size of a mustard-seed, downy, on short partial stalks.—It is evident we can have no certainty at present of the genus of this plant, but there is the greatest probability of its being rightly placed here.

TREYA, in *Geography*, a town of Denmark, in the duchy of Sleswick; 9 miles W. of Sleswick.

TREYSA, a town of Westphalia, in the principality of Hesse. In the year 1646, this town was burned down by the Imperialists; 26 miles S. of Cassel. N. lat. 50° 54'. E. long. 9° 10'.

TRIA PRIMA, among *Chemists*, the three hypostatical principles, viz. salt, sulphur, and mercury; of which they hold all bodies to be primarily made, and into which they are all held resolvable by fire.

TRIAD, TRIAS, τριὰς. See *TERNARY*, *TRIAS*, and *TRINITY*.

TRIADICA, in *Botany*, from τριὰς, τριῶδος, ternary, alluding to the prevalence of the number three in the fructification; which however is not very remarkable.—Loureir. Cochinch. 610.—Class and order, *Dioecia Diandria*. Nat. Ord. *Amentaceæ*, Linn. Juss.

Gen. Ch. Male, Cal. Catkin elongated, thread-shaped, naked, separated into many-flowered tubercles. Perianth minute, bell-shaped, three-cleft. Cor. none. Stam. Filaments two, flat, very short; anthers flattish, of two lobes, which burst laterally.

Female, on a separate plant, Cal. Catkin and Perianth as in the male. Cor. none. Pist. Germen superior, roundish; style short and thick; stigmas three, oblong, erect. Peric. Berry roundish, dry, three-lobed, three-celled. Seeds solitary, roundish.

Ess. Ch. Male, Calyx three-cleft. Corolla none. Stigmas three. Berry superior, of three cells. Seeds solitary.

1. *T. cochinchinensis*. Câi Soi tià, or Câi Cha dam, of the Cochinchinese.—Leaves ovate, obtuse.—Found in the woods of Cochinchina. A large tree, with spreading branches. Leaves alternate, ovate, entire, smooth, on long red footstalks. Flowers nearly terminal. Berries small, of a brownish green.

2. *T. sinensis*. Ū Khau mǒ of the Chinese.—Leaves roundish, pointed.—Wild about Canton in China. A large tree, with spreading branches. Leaves alternate, stalked, smooth, entire. Calyx, of the male as well as female flowers, four-cleft. Seeds tunicated. Of this last circumstance nothing is said in the generic character.—We are not acquainted with any plants answering to the above description. *ANTIDESMA* perhaps (see that article and *STILAGO*) comes the nearest, especially when we contemplate the *Stilago diandra* of Roxburgh. If allowance be made for some occasional abortion in the cells of the fruit, or if we ourselves have misconceived Loureiro's ambiguous description, "*bacca trilocularis, monosperma*," *Triadica* may be no other than *Antidesma*.

TRIÆNA, τριῶνα, a trident, alluding to the very peculiar three-pointed awn.—Kunth Nov. Gen. et Sp. Plant. v. 1. 178.—Class and order, *Triandria Digynia*. Nat. Ord. *Gramina*.

Gen. Ch. Cal. a glume of two unequal, lanceolate, keeled,

keeled, pointed, membranous valves, containing one floret; the outer valve full half the size of the inner, with a rough dorsal awn, about its own length, united to it half way up. *Cor.* of two unequal, lanceolate, keeled, pointed, membranous valves; the outermost largest, three-ribbed, awnless; innermost narrower, with two keels, and a rough dorsal awn, twice its own length, of three equal points, and a common stalk the length of the glume, slightly connected therewith at the base only. *Stam.* Filaments three, capillary, shorter than the glumes; anthers hanging out of the flower, linear, notched at each end. *Pist.* Germen superior, ovate; styles two, thread-shaped, short; stigmas oblong, feathery. *Peric.* none, except the unconnected corolla. *Seed* one, ovate.

Eff. Ch. Calyx single-flowered, of two valves, with a dorsal awn. Corolla of two valves, unconnected with the seed, and a dorsal awn of three points.

1. *T. racemosa.* Cluster-flowered Trident-grass. Kunth as above, 179. t. 61.—Gathered by Humboldt and Bonpland, in dry cultivated ground in Mexico, between Guanajuato and Villalpando, flowering in September. This is an annual, upright, branching grass, about eighteen inches high, with a round, smooth, slender, jointed stem. Leaves linear, narrow, sheathing, flat, striated, rough on both sides, and somewhat hairy on the inner: their sheaths striated, smooth. *Stipula* very short, fringed. *Clusters* terminal, solitary, simple, erect, from one and a half to four inches long. *Flowers* alternate, two-ranked, on short, slender stalks.—We have presumed to alter the original description, chiefly with respect to the three-pointed awn, which Mr. Kunth considers as an abortive floret. The analogy of TRIATHERA (see that article) will surely authorize this alteration.

TRIAL, in *Law*, the examination of any cause, civil or criminal, according to the laws of the realm, before a proper judge.

Of this there are divers kinds: both in civil and in criminal cases. In civil cases there are seven species of trial; viz. by *record*: by *inspection* or *examination*, when, for the greater expedition of a cause, in some point or issue being either the principal question, or arising collaterally out of it, but being evidently the object of sense, the judges of the court, upon the testimony of their own senses, shall decide the point in dispute; as in case of a suit to reverse a fine for non-age of the cognitor, or to set aside a statute or recognition entered into by an infant, the king's justices determine, by view of the age of the party; also if a defendant pleads in abatement of the suit that the plaintiff is dead, and a person, calling himself the plaintiff, appears, the judges shall determine by inspection whether he be the plaintiff or not; likewise in the case of an idiot; in the appeal of mayhem; and in determining circumstances relative to a day past by inspection of an almanac: by *certificate*, as for matters without the realm, and also within the realm: the customs of the city of London are tried by the certificate of the mayor and aldermen, certified by the mouth of their recorder: marriage, bastardy, excommunication and orders, and other such matters, are tried by the bishop's certificate: ability of a clerk presented, admission, institution and deprivation of a clerk, shall be tried by certificate from the ordinary or metropolitan; and the customs of courts by certificate from the proper officers, &c.: by *witnesses*: by *wager of battle*: by *wager of law*: and by *jury*. In criminal matters, there was formerly the trial by *ordeal* and by *corfned*: these two methods of trial were chiefly in use among our Saxon ancestors, and are now antiquated; the next, which still remains in force, though very rarely in use,

was introduced among us by the princes of the Norman line, and is the trial by *battle*, *duel*, or *single combat*: the fourth method of trial used in criminal cases is that by the peers of Great Britain, in the court of parliament, or the court of the lord high steward, when a peer is capitally indicted: but that which most commonly occurs is the trial by *jury*, or the country, secured to every Englishman, as the great bulwark of his liberties, by the Great Charter. Blackst. Comm. vol. iii. &c. vol. iv. &c.

Before trial, in a criminal case, it is usual to ask the criminal how he will be tried? which was anciently a very pertinent question, though not so now; in regard there were formerly several ways of trial; viz. by *battle*, *ordeal*, and *jury*.

When the criminal answered, By God and his country, it shewed he made choice to be tried by a *jury*. But there is now no other way of trial. This is also called trying *per pais*, or *per patriam*.

TRIAL, *New*, is a re-hearing of the cause before another jury, with as little prejudice to either party, as if it had never been heard before. The causes of granting a new trial are such as these: want of notice of trial; or any flagrant misbehaviour of the party prevailing towards the jury, which may have influenced their verdict; or any gross misbehaviour of the jury among themselves: also if it appears by the judge's report, certified to the court, that the jury have brought in a verdict without or contrary to evidence, so that he is reasonably dissatisfied therewith; or if they have given exorbitant damages; and if the judge himself has misdirected the jury, so that they found an unjustifiable verdict: for these, and other reasons of the like kind, it is the practice of the court to award a new, or second trial. But if two juries agree in the same or a similar verdict, a third trial is seldom awarded; for the law will not readily suppose, that the verdict of any one subsequent jury can countervail the oaths of two preceding ones. There are instances of new trials in the year-books of the reign of Edward III., Henry IV., and Henry VII., &c. Blackst. Comm. vol. iii. &c.

TRIAL, JEAN CLAUDE, in *Biography*, director of the royal academy of music at Paris, and master of the prince of Conti's band, was born in 1734, in the Contat, that country so agreeable and fertile in excellent artists. The fine arts are generally inhabitants of beautiful nature.

At twelve years old, Trial quitted Avignon, in order to acquire knowledge from different masters whom he intended to visit. His talents were so extraordinary for his age, that at fifteen he was appointed director of the concert and opera of Montpellier. The passion which he had for the arts drove him to Paris, where he no sooner arrived, than he was placed at the head of the orchestra at what was then called the Italian theatre, or comic opera. From this orchestra he passed to that of the prince of Conti, of which he was appointed director; and his conduct and manners were such in that office, that on his death the prince deigned to say that he had lost a friend.

The protection with which he was honoured, procured him the important place of director of the Academie Royale. Permit us here to define the office of director of the academy of music, or serious opera. The management of the opera is a painful and embarrassing administration. It is necessary for the director of this complicated machine to attend to all the springs, to dissipate all impediments to their action, flatter the taste and sometimes the caprice of the inconstant public, unite to a point of concord very rarely attainable, a crowd of various and often rival talents, excite emulation without awakening jealousy, distribute rewards with justice

justice and delicacy, censure and punish with address, limit the unbounded demands of some by flattery, check the independence of others by apparent concessions, and try to establish in the interior government of this republic as much harmony as reigns in the orchestra. It is manifest that nothing but the most subtle, artful, and pliant character can hope to accomplish such Herculean labours.

The time necessary for such a ministry, did not allow Trial leisure for pursuing composition with the ardour and application with which he began his career. During his regency at the opera he composed but little, and that was generally in partnership with others.

In 1770 he was found dead in his bed, without any previous illness or warning. He married, in 1769, Mademoiselle Victoire, well known for her wit and talents, with whom he lived in the utmost harmony. A good son, a good husband, a good brother, and good friend.

His funeral manifested how much he was beloved; every one who attended it was in tears: no funeral oration is equal to such tears; for they are never shed but for objects worthy of them. Flattery lies, but never weeps.

TRIAL Point, in *Geography*, a cape on the south-east coast of the island of Jura. N. lat. $55^{\circ} 54'$. W. long. $5^{\circ} 52'$.

TRIALETE, a town of the principality of Georgia, in the province of Carduel; 40 miles S.W. of Gori.

TRIAMBO, in *Hindoo Mythology*, a name of the Hindoo god Siva, who corresponds in many points with the primary deities of the Pantheon of Greece and Rome. The name of Triambo seems to connect him with Dionysius or Bacchus; for after the conquest of India, we are told by Diodorus that the Greek deity assumed the title of Thriambus. One of the names of Siva is Baghesa; resembling that of the conqueror of India sufficiently nearly for etymological hypothesis to found an argument on, especially when points of character and attributes also correspond. (Of these see under our articles KARTIKYA and SIVA.) The signification of the title Triambo is not evident. Siva has several names allusive to his triple attributes and energies. Trilokan and Trinetra, for instance, mean with three eyes; Trifuli, with the trident; Trikala, or omnipresent; that is, existing in all times, the past, the present, and the future. See those articles, and TRIMURTI.

TRIANA, in *Geography*, one of the fauxbourgs of the city of Seville.

TRIANDRIA, in *Botany*, the third class in the sexual, or artificial, system of Linnæus, derives its name from having three unconnected stamens, in the same flower with the pistil, or pistils. This class is chiefly composed of what are termed monocotyledonous plants, the number three, or its double quantity, six, prevailing as much in that tribe, as the number five does in the dicotyledonous families. See PENTANDRIA.

The orders of this third class are three. 1. *Monogynia*, opening with the dicotyledonous and ambiguous genus *Valeriana*, some of whose species have but one stamen, though most have three. The sword-leaved plants (see ENSATEÆ) follow; and then the *Calamariæ*, or grass-like genera of *Schoenus*, *Cyperus*, *Scirpus*, and their allies. 2. *Digynia* consists of the true grasses; see GRAMINA. Some of these, indeed many of them occasionally, have abortive or male flowers interspersed with the perfect ones, and are for that reason placed by Linnæus in his class *Polygamia*. This measure, as we have often had occasion to observe, is attended with much inconvenience in various cases, though in none more than the present. 3. *Trigynia*, a small order, is made up, for the most part, of very limited genera of the

pink tribe, *Caryophylleæ*, a tribe which, by its close relationship to the *Atriplicæ* and *Amaranthi* of Jussieu, tends, as that great writer candidly observes, to invalidate the distinction between his apetalous and polypetalous classes. It at least causes too great a separation in his system between orders nearly akin.

TRIANDRIA is moreover the title of a few orders of the Linnæan system; as the first of the *Monadelphia*, consisting chiefly of sword-leaved genera; the third of *Gynandria*, which perhaps has scarcely any real existence; the third of *Monoecia*, containing *Carex* and *Sparganium*, with some tricoecous genera; and the third of *Dioecia*, formed of some rushy, and some anomalous plants.

TRIANGLE, in *Geometry*, a figure comprehended under three lines or sides, and which, of consequence, has three angles.

If the three lines or sides of the triangle be all right, it is said to be a *plane* or *rectilinear* triangle.

If all the three sides of the triangle be equal (as A B C, *Plate XV. Geometry, fig. 5.*) it is said to be *equilateral*.

If only two of the sides of the triangle be equal (as in D E F, *Plate VIII. fig. 105.*) it is called an *isosceles* or *equicrural* triangle.

If all the sides of the triangle be unequal to each other, (as in A C B, *Plate XV. Geometry, fig. 6.*) the triangle is said to be *scaleneus*.

If one of the angles, as K (*fig. 7.*) of a triangle K M L be a right angle, the triangle is said to be *rectangular*.

If one of the angles, as N (*fig. 8.*) be obtuse, the triangle is said to be *obtusangular*, or *amblygonous*.

If all the angles be acute, (as in A C B, *Plate XV. Geometry, fig. 5.*) the triangle is said to be *acutangular*, or *oxygonous*.

If the three lines of the triangle be all curves, the triangle is said to be *curvilinear*.

If some of the sides be right, and others curve, the triangle is said to be *mixtilinear*.

If the sides be all arcs of great circles of the sphere, the triangle is said to be *spherical*.

TRIANGLES, *Similar*. See SIMILAR.

TRIANGLE, *Characteristic*, of a curve. See CURVE.

TRIANGLE, *Base, Canon, Hypothenuse, Legs, and Resistance of a*. See the several articles.

TRIANGLES, *Construction of*. 1. Two sides, as A B and A C (*Plate XV. Geometry, fig. 9.*) being given in numbers, or otherwise, together with the quantity of the angle intercepted between them, A; to construct a triangle. Assume A B as a base; and in A make the given angle: on the other leg set off the other given line A C; lastly, draw B C: then will A B C be the triangle required.

Hence, two sides with the intercepted angle being determined, the whole triangle is determined. Wherefore, if in two triangles A C B and *a c b*; *a = A*; and *a b : a c :: A B : A C*, the triangles are determined in the same manner, and are therefore similar; consequently *c = C*, and *b = B*, *a b : b c :: A B : B C*, &c.

2. Three sides, A B, B C, and C A (*Plate XV. Geometry, fig. 5.*) being given, any two of which, as A C, A B, taken together, are greater than the third: to construct a triangle. Assume A B for a base; and from A, with the interval A C, describe an arc *y*; and from B, with the interval B C, describe another arc *x*: draw the right lines A C and B C. Thus is the triangle constructed.—Hence, as of any three given right lines, only one triangle can be constructed; by determining the three sides, the whole triangle is determined.

Wherefore,

TRIANGLE.

Wherefore, if in two triangles ACB and acb (*Plate XV. Geometry, fig. 9.*) $AC : AB :: ac : ab$; $AC : CB :: ac : bc$; the triangles are determined in the same manner, and consequently are similar, and therefore mutually equiangular.

3. A right line, as AB , and two adjacent angles A and B , which, taken together, are less than two right ones, being given; to describe the triangle ABC . On the given line AB , make the two given angles A and B : continue the sides AC and BC , till they meet in C . Then will ABC be the triangle required.

Hence, one side and two angles being given, the whole triangle is determined. Wherefore, if in two triangles $A = a$ and $B = b$, the triangles are determined after the same manner, and therefore are similar.

TRIANGLES, Mensuration of. To find the area of a triangle, multiply the base AB (*fig. 10.*) by the altitude Cd ; half the product is the area of the triangle ABC .

Or thus; multiply half the base AB by the altitude Cd ; or the whole base by half the altitude; the product is the area of the triangle.

$E. gr.$ $AB = 342$ $Cd = 234$ <hr style="width: 100%;"/> 1368 1026 684 <hr style="width: 100%;"/> $2)80028$	$AB = 342$ $\frac{1}{2}Cd = 117$ <hr style="width: 100%;"/> 2394 342 342 <hr style="width: 100%;"/> 40014	$\frac{1}{2}AB = 171$ $Cd = 234$ <hr style="width: 100%;"/> 684 513 342 <hr style="width: 100%;"/> 40014 area
--	--	--

See QUADRATURE.

Or, the area of any triangle is had by adding all the three sides together, and taking half the sum; and from that half sum subtracting each side severally, and multiplying that half sum and the remainder continually into one another, and extracting the square root of the product.

Hence, 1. If between the base and half the altitude, or between the altitude and half the base, be found a mean proportional; it will be the side of a square equal to the triangle. 2. If the area of a triangle be divided by half the base, the quotient is the altitude.

TRIANGLES, Properties of Plane. 1. If in two triangles ABC and abc (*fig. 9.*) the angle A be a ; and the sides $AB = ab$, and $AC = ac$; then will the side $BC = bc$, and the angles $C = c$, and $B = b$; and therefore the whole triangles will be equal and similar.

2. If one side of a triangle ABC (*fig. 11.*) be continued to D , the external angle DAB will be greater than either of the internal opposite ones B or C .

3. In every triangle, the greatest side is opposed to the greatest angle, and the least to the least.

4. In every triangle, any two sides taken together are greater than the third.

5. In two triangles, if the several sides of the one be respectively equal to the sides of the other, the angles will likewise be respectively equal; and consequently the whole triangles will be equal and similar.

6. If any side, as BC (*fig. 12.*) of a triangle ACB be continued to D , the external angle DOA will be equal to the two internal opposite ones y and z taken together.

7. In every triangle, as ABC , the three angles A , B , C , taken together, are equal to two right ones, or 180° .

Hence, 1. If the triangle be rectangular, as MKL (*fig. 7.*) the two oblique angles M and L , taken together, make a right angle, or 90° ; and therefore are half right,

if the triangle be isosceles. 2. If one angle of a triangle be oblique, the other two taken together are oblique likewise. 3. In an equilateral triangle, each angle is 60° .

4. If one angle of a triangle be subtracted from 180° , the remainder is the sum of the other two; and if the sum of two be subtracted from 180° , the remainder is the third.

5. If two angles of one triangle be equal to two of another, either together or separately, the third of the one must be likewise equal to the third of the other. 6. Since in an isosceles triangle DFE (*Plate VIII. fig. 105.*) the angles at the base y and u are equal; if the angle at the vertex be subtracted from 180° , and the remainder be divided by 2, the quotient is the quantity of each of the equal angles: in like manner, if the double of one of the angles at the base y be subtracted from 180° , the remainder is the quantity of the angle at the vertex. See ISOSCELES Triangle.

8. If in two triangles ABC and abc (*Plate XV. Geometry, fig. 9.*) $AB = ab$, $A = a$, and $B = b$; then will $AC = ac$, $BC = bc$, $C = c$, and the triangle ACB equal and similar to the triangle abc . Hence, if in two triangles ACB and acb , $A = a$, $B = b$, and $BC = bc$; then will $C = c$; consequently $AC = ac$, $AB = ab$; and the triangle $ACB = acb$.

9. If in a triangle DFE , the angles at the base y and u (*Plate VIII. Geometry, fig. 105.*) be equal, the triangle is isosceles: consequently, if the three angles be equal, it is equilateral.

10. If in a triangle ABC (*Plate XV. fig. 14.*) a right line DE be drawn parallel to the base AC , then will $BA : BC :: BD : BE :: AD : EC$; and $BA : AC :: BD : DE$; consequently the triangle BDE similar to BAC . And, *vice versa*, a right line, which divides two sides of a triangle proportionally, is parallel to the remaining side. Moreover, if another right line FG be also drawn parallel to the base AC , the intercepted parts, DF , EG , are in the same ratio with the whole sides AB , CB ; *i. e.* $DF : EG :: AB : BC$. And if any number of lines be drawn parallel to the base, cutting the sides of a triangle, every two corresponding segments will have the same ratio.

11. Every triangle may be inscribed in a circle.

12. The side of an equilateral hexagon, inscribed in a circle, is equal to the radius.

13. Triangles on the same base, and having the same height, that is, being between the same parallel lines, are always equal. See PARALLELOGRAM.

14. Every triangle, as CAD , (*Plate X. Geometry, fig. 14.*) is one-half of a parallelogram $ACDB$ on the same, or an equal base CD , and of the same altitude, or between the same parallels: or a triangle is equal to a parallelogram upon the same base, but half the altitude; or half the base, and the same altitude. See PARALLELOGRAM.

15. In every triangle, as well plane as spherical, the sides or sines of the sides are proportional to the sines of the opposite angles.

16. In every plane triangle, as the sum of two sides is to their difference, so is the tangent of half the sum of the opposite angles, to the tangent of half their difference. See TANGENT.

17. If a perpendicular be let fall upon the base of an oblique-angled triangle, the difference of the squares, or, the rectangle under the sum and difference, of the sides is equal to double the rectangle under the base, and the distance of the perpendicular from the middle of the base.

18. The double of the square of a line drawn from the vertex to the middle of the base of any triangle, together with

with double of the square of the semi-base, is equal to the squares of both the sides taken together.

19. A whole triangle is to a triangle cut off by a right line, as the rectangle under the sides cut off is to the rectangle of the other two sides.

20. In a right-angled plane triangle ADE (*Plate X. Geometry, fig. 17.*) a line DB drawn from the right angle or the vertex, perpendicular to the hypotenuse, divides the triangle into two other right-angled triangles, ADB , DBE , which are similar to the first triangle, and also to one another.

Hence it follows: 1. That $EB : BD :: BD : BA$; and $AE : ED :: ED : EB$; and $AE : AD :: AD : AB$. (See *PROPORTIONAL.*) Whence, 2. As the angle in a semicircle is a right angle, it follows that, if from any point D in the periphery of a semicircle ADE , a perpendicular DB be let fall upon the diameter AE , and from the same point D , to the extremities of that diameter, two chords DA , DE , be drawn; the square of that perpendicular will be equal to a rectangle under the two segments of the diameter; and the square of each chord equal to a rectangle under the whole diameter and its adjacent segment: *i. e.* $BD^2 = EB \times BA$; $ED^2 = E B \times EA$; and $AD^2 = AB \times EA$.

21. In every right-angled triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides. See *HYPOTHENUSE* and *SUBTENSE*.

22. If any angle of a triangle be bisected, the bisecting line will divide the opposite side, in the same proportion as the legs of the angle are to one another.

23. If the vertical angle of any triangle be bisected, the difference of the rectangles, made by the sides and the segments of the base, is equal to the square of the line that bisects the angle. Thus, if a right line BE (*Plate XV. Geometry, fig. 15.*) bisect an angle ABC of a triangle, the square of the said line $BE = AB \times BC - AE \times EC$.

24. To divide a triangle into any given number of equal parts; divide the base CD (*fig. 16.*) into as many equal parts as the figure is to be divided into; and draw the lines $A1$, $A2$, &c.

25. If in similar triangles from any two equal angles to the opposite sides two right lines be drawn, making equal angles with the homologous sides; those right lines will have the same ratio as the sides on which they fall, and also divide those sides proportionally.

26. If in two triangles having one side common to both, from any point in that side, two lines respectively parallel to two contiguous sides be drawn, terminating in the two remaining sides, those lines will have the same ratio as the sides to which they are parallel. Hence, if these sides are equal, those lines will be also equal.

27. If through any point within a triangle three right lines be drawn, from the angular points to cut the opposite sides, the segments of any one side will be to each other, as the rectangles under the segments of the other sides taken alternately. Hence if the former segments be equal, the forementioned rectangles will be equal, and therefore the sides of the triangle cut proportionally, and a line connecting the points of division will be parallel to the base.

28. Triangles having one angle in the one equal to one angle in the other, are in the ratio of the rectangles contained under the sides, including the equal angles. Hence, if the rectangles be equal, or the sides reciprocally proportional, the triangles will be equal.

TRIANGLES, Properties of Spherical. See *SPHERICAL Triangle.*

TRIANGLES, Solution of. See *TRIGONOMETRY.*

TRIANGLE, an iron musical instrument with three sides, which serves as an accompaniment to other instruments in a military band, and in the streets: the performer supports it by a ring at the top with his left hand, and beats it with a small iron rod in his right hand. At the lowest angle iron rings are placed, which by their vibration augment the sound.

TRIANGLE Island, in *Geography*, an island of South America, in the mouth of the Oronoko, where the French settled a factory in the year 1765.—Also, one of the smaller Bahama islands, so called. N. lat. $20^{\circ} 51'$. W. long. $69^{\circ} 53'$.

TRIANGLES, a dangerous shoal in the East Indian sea, near the N. coast of the Pracel, or Prasil.

TRIANGLES, Southern, a reef of rocks and islets in the bay of Honduras. N. lat. $17^{\circ} 45'$. W. long. $88^{\circ} 40'$.

TRIANGULAR Apple-Ladder, in *Rural Economy*, a ladder of this sort for gathering apples from the trees with ease and without bruising them. It is about eighteen feet in height, and has two other branches, which are each of the same length, fastened by iron hoops or rings at its top-part. These parts all diverge from each other when the ladder is in use, and appear somewhat in the manner of the corner rafters of a triangular roof, forming a sort of triangle. At about four feet from the ground, each branch and the ladder part has a hook fixed to it, for the purpose of stretching out a triangular cloth by; in the middle of which is formed a circular funnel of the same material. The cloth has at each corner a leather strap, pierced with a number of holes, in order that an equal degree of tension may constantly be given, whether the ladder and its branches be much extended or not.

In collecting the apples, the gatherer, ascending the ladder, throws the fruit as he strips it from the boughs of the trees into the cloth, whence it rolls down the funnel part into the basket which is placed to receive it below.

So much injury and mischief are done to apple-trees at all periods of their growth, by setting ladders against the boughs of them, and the fruit is so greatly bruised and depreciated, as well as subjected to decay, by gathering it in the usual modes, that both practices should be discontinued, and better ones, such as the above, be had recourse to in such cases.

TRIANGULAR Battalion, in the *Military Art.* See *BATTALION.*

TRIANGULAR Canon. See *CANON* and *SINE.*

TRIANGULAR Compasses, are such as have three legs or feet, by which to take off any triangle at once: these are much used in the construction of maps, globes, &c. See *COMPASSES of three legs.*

TRIANGULAR Fort. See *FORT.*

TRIANGULAR Leaf, in *Botany.* See *LEAF.*

TRIANGULAR Numbers, are a kind of polygonal numbers; being the sums of arithmetic progressions, the difference of whose terms is 1.

Thus, Of arithmetical progress. $1 \ 2 \ 3 \ 4 \ 5 \ 6$
are formed triang. numb. $1 \ 3 \ 6 \ 10 \ 15 \ 21$

For the rationale and management of these numbers, see *Malcolm's Arith. book v. ch. 2.*

TRIANGULAR Quadrant, is a sector furnished with a loose piece, by which to make it an equilateral triangle.

The calendar is graduated on it, with the sun's place, declination, and other useful lines; and by the help of a string and a plumbet, and the divisions graduated on the loose piece, it may be made to serve for a quadrant.

TRIANGULAR Windings-flairs. See *STAIR.*

TRIANGULARIS STERNI, in *Anatomy*, a muscle of the ribs. See **INTERCOSTALES**.

TRIANGULARIS Genæ, the depressor anguli oris, a muscle of the mouth. See **DEGLUTITION**.

TRIANGULARIS Pifcis, in *Ichthyology*, the name of a fish of a very remarkable figure, called in English the *coney-fish*, of which there are two species, the one having two horns, the other wanting that character.

The horned kind is usually six or seven fingers breadth long, and about three fingers broad: the tail ends in a longish fin; the mouth is small, having twelve strong ferated teeth in the upper jaw, and eight larger ones in the lower; the head rises gibbously from the mouth to the horns, and the back is humped in the middle; it has only one small fin near the tail; its eyes are large and placed near the horns; beside the fin near the tail, it has four others; the tail being one, and one more being situated on the back, and two on the belly; it has two horns like cocks' spurs, growing straight out of its forehead, and two others in a contrary direction, out of its belly near the tail; it has no scales, but has a hard skin, white on the belly, and brown every where else, and wonderfully marked with trigonal, tetragonal, pentagonal, and hexagonal figures.

The species which has no horns has a broader belly, a longer tail, and is marked all over its body only with hexangular figures, and innumerable small tubercles: its belly is yellowish, and the rest of its body of a greyish or brownish yellow; the mouth is narrow, and the teeth small, five in the lower and eleven in the upper jaw; the eyes are large and round; it is hollow, and has very little flesh.

Both the species, which belong to the genus ostracion in the Linnæan system, are caught among the rocks, on the shores of the island of Java, and are sometimes eaten by the inhabitants, being first skinned. Cluf. Exot. lib. ii. cap. 27. Willughby's Hist. Pisc. p. 150.

TRIANTHEMA, in *Botany*, so named by Sauvages, Meth. Folior. 127, from τρι, *three*, and ανθος, *a flower*; because of the flowers being situated three together in the bosoms of the leaves.—Linn. Gen. 214. Schreb. 300. Willd. Sp. Pl. v. 2. 635. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 3. 64. Juss. 314. Lamarck Illustr. t. 375. Gært. t. 128.—Class and order, *Decandria Digynia*. Nat. Ord. *Succulente*, Linn. *Portulacæ*, Juss.

Gen. Ch. Cal. Perianth half-inferior, of five oblong leaves, internally coloured, pointed below the summit, permanent. Cor. none, except the calyx, which partakes of the nature of both parts, be considered as such. Stam. Filaments about ten, (from five to twelve,) capillary, the length of the calyx; anthers roundish. Pist. Germen almost entirely superior, oblong, abrupt; styles one or two, thread-shaped, the length of the germen, hispid on one side; stigmas simple. Peric. Capsule oblong, abrupt, bursting all round, of two, transversely interrupted cells. Seeds one or two in each cavity, nearly ovate.

Obs. The number of stamens, as well as of styles, differs in different species.

Eff. Ch. Calyx of five leaves, with dorsal points. Corolla none. Stamens five or ten. Germen abrupt. Capsule bursting all round.

1. *T. monogyna*. Purslane Trianthea. Linn. Mant. 69. Willd. n. 1. Ait. n. 1. "Decand. Pl. Grasses t. 109." (*T. Portulacastrum*; Linn. Sp. Pl. 325. *Portulaca curassavica* procumbens, capparidis folio, flore musculo, capsula bifurcata; Herm. Parad. 213. t. 213. *Kali curassavicum* procumbens, foliis subrotundis; Pluk. Phyt. t. 95. f. 4.)—Stamens more than five. Style one. Leaves elliptic-oblong. Stem with a hairy line along the upper side.—Native

of the West Indies and South America. Sometimes raised, for curiosity's sake, in our stoves, where it flowers in summer. The root is annual. Stems a foot long, much branched, leafy, spreading on the ground in every direction, smooth, except a dense, slender, hairy line along their upper side. Leaves opposite, unequal, stalked, oval or roundish, obtuse with a small point, entire, smooth, red at the edge, from one to two inches long. Stipulas membranous, acute, half the length of the footstalk, to which they are united. Flowers axillary, sessile, about three together, pale and membranous, with a pair of bractes to each. Stamens from six to ten. Germen with two distant horns. Style, according to Linnæus, solitary, rough at one side, with a simple stigma.

2. *T. crystallina*. Crystalline Trianthea. Sm. Spicil. 24. t. 26, unpublished. Vahl. Symb. v. 1. 32. Willd. n. 2. (*Papularia crystallina*; Forfk. Ægypt.-Arab. 69. *Gyrospermum depressum*; Linn. MSS.)—Stamens five. Style one. Leaves elliptic-lanceolate. Stem papillary all over.—Native of the East Indies and of Arabia. We received it from Madras, by the favour of Dr. Roxburgh. Linnæus cultivated it at Upsal, and has left in his herbarium specimens, with a coloured drawing, and a description. He made this plant a new genus by the name of *Gyrospermum*, judging it akin to *Herniaria*. It would have appeared in the third number of our *Spicilegium*, had that work been continued; but the page, though printed, was never published. The root is perennial. Stems herbaceous (not shrubby), depressed, a span long, reddish, branched, leafy, clothed with pellucid papillary granulations, which in the dried specimen become shaggy hairs. Leaves opposite, stalked, like *Polygonum aviculare* in size and figure, with united membranous stipulas, as in the foregoing. Flowers axillary, sessile, one, two or three together, small, whitish with a red germen. Bractes of two opposite scales under each flower. Stamens five, very short. Style one, with a divided stigma. Ripe capsule of one cell, embraced by the base of the calyx. Seeds two, one above the other, black, orbicular, depressed, rough, with concentric furrows. This species surely approaches in many points to *Salsola*, so far at least as to indicate a great affinity between the two genera.

3. *T. pentandra*. Smooth Trianthea. Linn. Mant. 70. Willd. n. 3. (*Rocama*; Forfk. Ægypt.-Arab. 71. *Portulacæ affinis polygonoides*, bliti folio et facie maderaspatis; Pluk. Phyt. t. 120. f. 3.)—Stamens five. Styles two. Leaves obovate. Stipulas pointless. Stem nearly smooth.—Native of Arabia. Annual, cultivated by Linnæus at Upsal, but unknown in our gardens. The size and habit of the plant answer to the first species, but the stem has no hairy line, nor more than a slight papillary roughness, on the young branches only. Leaves nearly uniform, obovate rather than elliptical, on long stalks, to which the membranous stipulas are entirely united, without any separate points. Flowers purplish. Styles recurved. Willdenow copies Reichard's error of *Rocama*, for *Rocama*.

4. *T. fruticososa*. Shrubby Trianthea. Vahl Symb. v. 1. 32. Willd. n. 4. (*Gymnocarpos decandrum*; Forfk. Ægypt.-Arab. 65. Ic. t. 10. Desfont. Atlant. v. 1. 203.)—Stamens ten; five alternate ones imperfect. Style one. Leaves cylindrical, pointed. Stem shrubby, round, smooth.—Native of the sandy deserts east of Cairo, as well as about Tunis. A rigid spreading shrub, about a foot high; its bark grey and weather-beaten. Leaves fleshy, glaucous, smooth, obscurely triangular, about half an inch long, in little tufts. Flowers three to five, in tufts at the ends of the branches, sessile, violet-coloured, a third of an inch broad,

broad, hairy at their base and at their points. *Seed* solitary, according to professor Desfontaines, to whom we are obliged for a specimen. Vahl suspects there may be two *seeds*.

5. *T. humifusa*. Prostrate Cape Trianthema. Thunb. Prodr. 80. Willd. n. 5.—“Style one. Leaves lanceolate. Stem shrubby, round.”—Gathered by Thunberg at the Cape of Good Hope, as well as the next. We have seen no specimen of either.

6. *T. anceps*. Two-edged Trianthema. Thunb. Prodr. 80. Willd. n. 6.—“Style one. Leaves lanceolate. Stem shrubby, two-edged.”—Native likewise of the Cape.

7. *T. decandra*. Trailing Indian Trianthema. Linn. Mant. 70. Willd. n. 7. Ait. n. 2. (*Zaleya decandra*; Burm. Ind. 110. t. 31. f. 3.)—Stamens about ten. Styles two. Leaves obovate. Stipules pointless. Stem nearly smooth.—Native of the East Indies. The herbage of this species bears a great affinity to *T. pentandra*, but the *foot-stalks* are rather shorter. Their *flowers* indeed are very different, those of the present being much larger, on longish stalks, with a fleshy, scarcely membranous, *calyx*.

TRIARATHIA, in *Ancient Geography*, a town of Asia, in the Lesser Armenia, upon the route from Sebaste to Cocuson, between Tonofa and Coduzabala. Anton. Itin.

TRIARI, in the *Roman Militia*, a kind of infantry, armed with a pike, shield, a helmet, and a cuirass: they were thus called, because they made the third line of battle.

The triarii were also called *possignani*, because ranged behind the principes who bore the standard in a legion.

Polybius distinguishes four kinds of forces in the Roman army: the first, called *pilati*, or *velites*, he says, were a raw soldiery, lightly armed. The *hastati*, or spear-men, were a degree older, and more experienced. The third, called *principes*, princes, were still older, and better soldiers than the second. The fourth were the oldest, the most experienced, and the bravest; these were always disposed in the third line, as a corps de reserve, to sustain the other two, and to restore the battle, when the others were broken or defeated. See LEGION.

Hence their name of triarii: and hence the proverb, *Ad triarios ventum est*, to shew that one is at the last and hardest struggle.

TRIAS HARMONICA, Lat.; *Triade Harmonique*, Fr.; *Harmonical Triad*, Engl.; in *Music*. This term has two different senses. In *calculation*, it is the harmonical proportion; in *practice*, it is the perfect major chord resulting from the same proportion, and which is composed of the fundamental sound, its major or sharp 3d, and its 5th. It is called a *triad*, because composed of three sounds; and *harmonic*, because in harmonical proportion; and is the sense of all harmony.

TRIATHERA, in *Botany*, from *τριαι*, *three*, and *αηνη*, *an awn*. Palisot de Beauvois *Agrologr.* 39. t. 9. f. 4.—Class and order, *Triandria Digynia*? Nat. Ord. *Gramina*.

Ess. Ch. Calyx single-flowered, of two valves. Corolla of two valves; the outermost with three bristly teeth; inner with a triple dorsal awn.

1. *T. juncea* of Desvaux is given as the only species, without any account of its native country. By the figure it appears to be a slender grass, with linear *leaves*, and a simple, upright, unilateral *cluster*, rather above an inch long; the *flowers* not a quarter of an inch in length. Nothing is known of the *stamens*, *pistil*, or *seed*. The *awn*, consisting of three rough equal bristles, more than twice the length of the *floret*, and united by a short simple base, is considered by the above author as the rudiment of an abortive floret, which idea is adopted in a similar case by Kunth. (See TRIENA.) We do not doubt that such an *awn* may take

place of a *floret*, by one of those metamorphoses so common in grasses, whose awns are known to be among the least permanent of their distinctions; but it is offering too great violence to language to use one term for the other.

TRIAUCOURT, in *Geography*, a town of France, in the department of the Meuse; 7 miles S. of Clermont en Argonne.

TRIAZEVA, a town of Russia, in the government of Upha; 88 miles N.N.W. of Upha.

TRIAZNUCHA, a town of Russia, in the government of Upha, on the Ural; 140 miles E. of Orenburg.

TRIBALE, LA, a town of France, in the department of the Tarn; 6 miles W.N.W. of La Caune.

TRIBALLI, in *Ancient Geography*, a people of Lower Mæsia, upon the banks of the Danube, called also Serrians.

TRIBAU, or TREBOWE, in *Geography*, a town of Moravia, in the circle of Olmutz; 28 miles N.W. of Olmutz. N. lat. 49° 43'. E. long. 16° 29'.

TRIBE, TRIBUS, in *Antiquity*, a certain quantity or number of persons; when a division is made of a city or people into quarters or districts.

The city of Athens was divided into ten tribes: the Jewish nation into twelve; or, if we separate the family of Joseph, thirteen tribes, the descendants of the twelve sons of Jacob, *viz.* the tribes of Judah, of Reuben, Gad, Asher, Dan, Naphthali, Ephraim, Manasseh, Simeon, Levi, Issachar, Zebulun, and Benjamin; the posterity of Joseph being divided into two tribes, that of Manasseh, and that of Ephraim.

There were ten of these tribes that revolted, and followed Jeroboam. The other two, *viz.* those of Judah and Benjamin, adhered to the house of David, and to the worship of the true God, whilst the other tribes declared for idolatry. This schism, which lasted above 200 years, ended at last in the captivity of the ten tribes, which were carried away by Shalmaneser into Assyria and Media: nor does it appear from history, that they ever returned into their own country, at least all of them, though we find it asserted by some modern Jews and ancient fathers of the church.

Mention indeed is often made in the New Testament of the twelve tribes (see Matt. xix. 28. Luke, xxii. 30. Acts, xxvi. 7. James, i. 1.); and St. James directs his epistle to them; but from these passages we cannot conclude, that they were then gathered together; but we may infer, that they were still in being. Perhaps the whole body of the Jewish nation retained the name of the twelve tribes, according to the ancient division, as we find the disciples called the Twelve, after the death of Judas, and before the election of St. Matthias. (John, xx. 24.) Moreover, there were Jews in a sufficient number of the ten tribes mixed with that of Judah, or dispersed into several parts of the world, to afford occasion for speaking of the twelve tribes, as making but one body with the Jewish nation. Of their dispersion into various parts of the East, we have accounts that cannot be questioned. Whether or not we admit Sir W. Jones's opinion, that the *Afghans* (which see) were descended from them, Dr. Buchanan has recently confirmed the opinion, that the posterity of the Jews still remain in India. A heathen author, quoted by Josephus, (Antiq. l. ix. and l. xi.) affirms, that the Persians had carried several thousands of Jews into Babylon, from whence it is natural to conclude, that a considerable number returned home with the others, when they were set at liberty by Cyrus. See 2 Chron. xxxiv. 9. 1 Chron. ix. 3. Jer. l. 4. Luke, ii. 36.

The tribe of Judah did not continue more faithful to God

God than Samaria, the metropolis of the kingdom of Israel, had done. On this account they were often delivered into the hands of their enemies, and at last all carried away captive by Nebuchadnezzar in the 19th year of his reign. See CAPTIVITY and JEWS.

The Roman people were at first only divided into three tribes; and from this number *three, tres*, it was that the word *tribe, tribus*, took its rise. Livy says (l. vi. c. 5.) that the appellation was derived *a tributo*. This division was accommodated by Romulus to the several nations he had united; the first consisted of the Albans, the second of the Sabines, and the third of a mixture of fugitives, who came to seek an asylum at Rome.

Servius Tullius, fearing this partition might occasion seditions, divided the inhabitants of Rome by cantons, not by nations: accordingly, he distributed the city into four quarters, or tribes: and by reason a great number of citizens had retired into the country about, of those he composed twenty-six other tribes; so that from this time the Roman people consisted of thirty tribes.

Writers are not agreed concerning the precise number. With the four city tribes, and the seventeen rustic tribes of Servius, as some have arranged and denominated them, the Roman people made up the number of thirty-five tribes. However this be, in after-times the number of tribes amounted to thirty-five; but they then ceased to be ranged according to the quarters of the city. The distribution depended on the censors, who formed their list at discretion, frequently confounding the country tribes with those of the city.

A man was never absolutely a Roman citizen, unless he had the *jus tribus, i. e.* till he were intitled to the honours of the magistrature, as also a right of voting in assemblies of the people; and this is what they called *jus quiritium*. Hence the inhabitants of the municipal cities were only imperfect citizens, as being of no tribe.

The freed-men were obliged to purchase this *right of tribe*, which did not otherwise belong to them, though they were citizens of Rome.

The names of the thirty-five tribes were, 1. The Palatina; 2. The Suburrana; 3. The Collina; 4. The Esquilina; 5. The Romilia; 6. The Æmilia; 7. The Cruitumina; 8. The Cornelia; 9. The Fabia; 10. The Galeria; 11. The Lemonia; 12. The Mentian, or Menenia; 13. The Oriculana; 14. The Papiria; 15. The Pollia; 16. The Popilia; 17. The Pupinia; 18. The Sergia; 19. The Veientina; 20. The Voltina; 21. The Claudia; 22. The Stellatina; 23. The Tromentina; 24. The Arnensis; 25. The Sabatina; 26. The Pomptina; 27. The Publilia; 28. The Mæcia; 29. The Scaptia; 30. The Oufentina; 31. The Falerina; 32. The Anienis; 33. The Terentina; 34. The Velina; 35. The Quirina. In ancient authors and inscriptions, we meet with the names of others, *viz.* the Pinaría, Sappinia, Camilla, Cestia, Cluentia, &c.

TRIBES of Plants, in Gardening, the particular kinds or sorts of cultivated garden vegetables of these descriptions, which are arranged and brought together under peculiar heads or names, according to their similar resemblances or appearances; the sameness of their habits of growth; and the general affinities which they bear, in some way or other, to each other. By these means, and in these several ways, a great number of different tribes of these sorts of plants are formed and constituted. Thus the time or duration of the growth of some afford several of these classes or tribes, such as the following: *viz.* the

Annual Tribe: that which contains all sorts of annual
VOL. XXXVI.

plants, or those only of one year's growth or duration, being often simply, on that account, termed *annuals*.

Biennial Tribe: that which includes all kinds of plants which are of two years' duration or length of growth, and which are sometimes called simply *biennials*.

Perennial Tribe: that which comprehends all sorts of plants which are of perennial or many years' growth or duration, and which is applicable to trees as well as herbs, though somewhat more frequently and generally used to herbaceous perennial plants. These are occasionally called *perennials* merely. See ANNUAL, BIENNIAL, and PERENNIAL Plants.

The nature and form of the root have also some influence in the formation of these tribes, as is evident in the following:

Bulbous-rooted Tribe: that which comprises all kinds of plants which have thick or bulbous roots; such as those of the onion, turnip, lily, crocus, narcissus, and several other kinds.

Tuberous-rooted Tribe: that which contains all sorts of plants which have thick, knobby, fleshy roots, such as those of the anemone, potatoe, Jerusalem artichoke, and many other kinds.

Fibrous-rooted Tribe: that which comprehends all sorts of plants which have small string-like fibrous roots, such as that of endive, and many other kinds. See ROOT.

The ligneous or woody nature of plants likewise causes distinctions of this description, such as these:

Ligneous or Woody Tribe: that which includes all sorts of plants of the tree or shrub kind which have woody or solid durable stalks or stems, such as those of the oak, ash, beech, and other similar kinds, as well as such shrubs as the holly, alaternus, althæa, and many other sorts. See TREE and SHRUB.

Arboreous Tribe: that which contains all sorts of plants of the tree kind, which rise with an upright main stem or stalk to a considerable height, as in the ash, beech, &c. See TREE.

Fruticose or Shrubby Tribe: that which takes in all sorts of plants of the shrubby kind, or which have any thing of shrub-like growth, and which rise only to a moderate height, having a divided, low, stemmy, and branching bushy appearance about the bottom and other parts, as in the althæa frutex, syringa, &c. See SHRUB.

The habits of different sorts of plants, in regard to the loss or the retention of their leaves during particular seasons of the year, are a further source of the distinction of them in these modes.

Deciduous Tribe: that which comprises all sorts of both trees, shrubs, and plants, which cast their leaves during the winter season, or before it commences; such as the ash-tree, the syringa shrub, and the fennel, golden-rod, and mint plants.

Sempervirent or Evergreen Tribe: that which comprehends all the various sorts of trees and shrubs, as well as other kinds of plants, which have the property of retaining their green leaves the whole of the year round, such as the holly, yew, box, laurel, and many others. See DECIDUOUS and EVERGREEN Trees.

Herbaceous Tribe: that which contains all the different sorts of the herbaceous or herb kind of plants, which most commonly rise furnished with leaves immediately from the roots, and with soft herbaceous stems or stalks, without any sort of woodiness; but which, for the most part, decay and die about the close of the same year in which they were produced, such as the pea, bean, lettuce, mustard, cresses, and numerous others. See HERBACEOUS Plants.

There are others which are arranged in this manner from their juicy or succulent properties, as the following tribes.

Succulent Tribe: this is that which includes all the sorts of plants which have fleshy, moist, juicy leaves, which are sometimes of considerable thickness, but in other cases not, such as the sedum or house-leak, the cactus or melon-thistle, creeping cereus, &c., the aloe, the agave, and several others. See **SUCCULENT**.

The manner of feeding, and the economical uses to which plants are put, are further causes of their arrangement and distinction in this way.

Leguminous Tribe: that in which all the different plants that it embraces have the sort of seed-vessel which is usually denominated a legume, or pod, as in all the pea, bean, kidney-bean, and other papilionaceous-flowered plants.

Oleraceous Tribe: that in which the various plants that it contains are of the esculent or eatable kind for the table, or for being preserved and made use of for other culinary or domestic intentions. See **LEGUMINOUS** and **ESCULENT Plants**.

The forms of the leaves and plants, the manners of their flowering, the shapes of their flowers, the methods of seeding or fruiting, and the particular natures, qualities, and properties of plants, all have a further tendency to the introduction of more tribes of these kinds.

Pinnated Tribe: that in which all the sorts of the trees and plants which it contains have pinnated leaves, or those which are in the shape of wings, as is the case in a great number of different kinds, as in the acacia, the fumach, and many others.

Enfataceous or Sword-leaved Tribe: that which comprises plants that have sword-shaped leaves, as is the case in many sorts, such as the iris or flowering rush, the gladiolus or sword-lily, &c.

Spathaceous Tribe: that which contains all such plants as protrude and produce their flowers out of a spathe or sheath, and which are many in number, such, for instance, as the narcissus, or daffodil and jonquil, the galanthus or snow-drop, and the amaryllis or lily-daffodil, Guernsey lily and the belladonna and jacobæa lily.

Liliaceous Tribe: that which comprehends all the sorts of plants which have papilionaceous or butterfly-shaped flowers, such as those of the pea, bean, and all the leguminous kinds of plants. See **PAPILIONACEOUS Flowers**.

Campanaceous Tribe: that which contains all the various kinds of plants which have campanulated or bell-shaped flowers, as those, for instance, of the campanula or bell-flower, the convolvulus or bind-weed, and bean-kind, and others of the same sort.

Rotaceous Tribe: that which includes all sorts of plants which have rotated or wheel-shaped flowers, such as those of the lysimachia or loose-strife, the anagallis or pimpernel, and some others.

Umbelliferous Tribe: that which contains all such plants as produce their flowers in somewhat the form of an umbel, as in those of the angelica, the anethum or fennel, the paskinaca or parsnip, and some others. See **UMBELLATED Plants**.

Verticillote Tribe: that which comprises those sorts of plants which have their flowers produced in something of the form of a verticillus or whorl, as in those of the thymus or common thyme, the hyssopus or hyssop, the melissa or balm, the origanum or marjoram, the mentha or mint, and several others. See **VERTICILLATED Plants**.

Aggregate Tribe: that which comprehends such plants as produce their flowers in an aggregate form, consisting of

numerous florets or small flowers, each having its own proper calyx or cup, but the whole of which are collected into one close aggregate, or head, as in those of the scabiosa or scabius, the statice, thrift, or sea-pink, the globularia or globular blue daisy, and some others. See **AGGREGATE**, in *Botany*.

Composite or Compound Tribe: that which comprises those sorts of plants which have compound flowers, consisting of a great number of florets contained in one common calyx, or cup, as in those of the sun-flower, the marigold, the alter or star-wort, and many others. See **COMPOUND** in *Botany*.

Amentaceous Tribe: that which contains those plants which produce their flowers in amentums or catkins, as in those of the populus or poplar-tree, the corylus or hazle, the fagus or beech, the betula or birch, and some others. See **AMENTACEOUS**.

Baccaceous Tribe: that which comprehends all those sorts of plants which bear and produce any kind of berry, as the ribes or gooseberry and currant, the raspberry, the yew, and many others.

Coniferous Tribe: that which contains all such sorts of trees and plants as bear that kind of fruit or seed which is denominated a cone, as the various sorts of firs, &c. See **CONE**, in *Botany*.

Fungous Tribe: that which takes in all vegetables of the mushroom and other similar kinds, as the common mushroom or agaricus, &c.

Graminous Tribe: that which comprehends all such sorts of plants as are of the grass or grain kinds, such as the different field grasses, and those of the wheat, rye, barley, oat, and other similar kinds.

Lurid Tribe: that which includes all the sorts of plants which have any thing of an ominous appearance or hurtful or noxious quality about them, as those of the atropaga or deadly nightshade, the datura, thorn-apple or stramonium, the nicotiana or tobacco-plant, the solanum or love-apple, &c. the capsicum or guinea-pepper, the digitalis or fox-glove, and several others.

Nuciferous Tribe: that which comprehends all the sorts of the nut-bearing kinds of plants, as the hazle-nut-tree, the walnut-tree, &c.

Pomaceous Tribe: that which comprehends all such sorts of plants as bear or produce a fruit of the apple kind, as that of the pyrus malus or apple kind, the pyrus communis or pear kind, the pyrus cydonia or quince kind, the amygdalus or almond kind, the prunus or plum kind, the mespilus or medlar kind, the punica or pomegranate kind, and some others.

This sort of classification or arrangement of the different plants which are cultivated in the garden or pleasure-ground for the sake of their culinary uses, or the ornament which is afforded by their flowers, is often of very great utility and convenience, as supplying the means of throwing together those sorts of plants which have many circumstances and practices in their general culture and growth which have much similarity to each other, by which the common gardener has a far greater facility of raising and managing them, as well as of securing their produce in fruit or other ways. He is thereby also better enabled to make use of those of the ornamental kinds in the borders, clumps, and other parts of the grounds in which they are to be set out and placed.

TRIBENSEE, in *Geography*, a town of Austria; 3 miles N. of Tulln.

TRIBERG, a town of the Brisgau; 15 miles N.E. of Friburg. N. lat. 48° 9'. E. long. 8° 17'.

TRIBERL, BOHMISCH, a town of Bohemia, in the circle of Chrudim; 4 miles E.N.E. of Leutmitz.

TRIBISA, a river of Saxony, which runs into the Elbe, near Meissen.

TRIBOCOI, TRIBOCI, or *Triboces*, in *Ancient Geography*, a people of Germany, on this side of the Rhine, situated, according to Strabo and Cæsar, between the Mediomatrici and the Treviri. Cæsar says they formed part of the army of Ariovistus. Their capital was Argentoratum or Strasbourg.

TRIBOLI, in *Geography*, a town of Asiatic Turkey, in the government of Trebisond; 4 miles W.S.W. of Trebisond.

TRIBOMETER, formed of $\tau\rho\iota\beta\omega$, *I rub*, and $\mu\epsilon\tau\rho\omega$, *I measure*, in *Mechanics*, a term applied by Muschenbroeck to an instrument invented by him for estimating the friction of metals. It consists of an axis formed of hard steel, passing through a cylindric piece of wood: the ends of the axis, which are highly polished, are made to rest on the polished femicircular cheeks of various metals, and the degree of friction is estimated by means of a weight suspended by a fine silken string or ribband over the wooden cylinder. For a farther description and figure of this instrument, and the result of various experiments performed with it, see Muschenb. *Int. ad Phil. Nat.* vol. i. p. 151, &c.

TRIBONIANUS, or TRIBONIAN, in *Biography*, an eminent jurist, was a native of Side, in Pamphylia, and richly furnished with Greek and Roman literature, so that he composed works on a great variety of subjects. But as he principally devoted himself to the study of civil law, he excelled in this department, and rose to some of the highest posts in the empire. In the office of questor, to which he was advanced, his avarice led to such a degree of oppression, that in the sedition of Constantinople, A.D. 532, his removal was one of the demands of the people. His influence, however, was such, that he was soon restored, and he continued, on account of his talents and by means of his servile adulation, to enjoy the favour and confidence of his sovereign for twenty years. He was elevated to the dignities of consul and master of the offices, and was consulted on all important occasions. Of his concern in compiling the code of civil law, we have elsewhere given an account. (See *CODE and CIVIL LAW*.) He has been charged with enmity to the Christian faith, and he has been under the inconsistent imputations of Atheism and Paganism. Whether charges of this kind be true or false, he was notorious for his avarice and want of integrity; and from the contrast presented by his heart and his understanding, Gibbon has drawn a parallel between him and our great Bacon. His death is placed about the year 546. *Anc. Un. Hist. Gibbon's Rom. Emp.*

TRIBRACHYS, formed from $\tau\rho\iota\epsilon$, *three*, and $\beta\rho\alpha\chi\upsilon\varsigma$, *short*, in the *Ancient Prosody*, a foot of verse, consisting of three syllables, and those all short; as, *Mélîus*.

Some of the ancients call this foot *trochaus*.

TRIBSEES, in *Geography*, a town of Anterior Pomerania. This town is reckoned a pass to Mecklenburg; 22 miles S.W. of Stralsund. N. lat. $54^{\circ} 5'$. E. long. $12^{\circ} 47'$.

TRIBSTADT, or TRIPSTADT, a town of France, in the department of Mont Tonnerre, late in the duchy of Deux Ponts; 18 miles N.W. of Landau.

TRIBUCH. See TREBUCHET, CUCKING-STOOL, and SCOLDS.

TRIBULOIDES, in *Botany*, Tourn. t. 431. See TRAPA.

TRIBULUS, $\tau\rho\iota\beta\omega\lambda\omicron\varsigma$ of the ancient Greeks, $\tau\rho\iota\beta\epsilon\lambda\iota$

of the moderns, was so called from the likeness of its fruit to the instrument of war denominated in English a caltrop. (See TRAPA.) Whether the name arose from $\tau\rho\iota\beta\omega$, *to tear*, or *injure*; or as some think from $\tau\rho\iota\epsilon$, *three*, and $\beta\omicron\delta\alpha\kappa\epsilon$, *a cast*, or *a wound*, may admit of controversy. The caltrop has four, not exactly three, points; and the seed-vessel of our plant has a much greater number, though the appearance of the whole very much resembles the above war-like, or rather treacherous, instrument.—Linn. *Gen.* 213. *Selreb.* 289. *Willd. Sp. Pl.* v. 2. 566. *Mart. Mill. Dict.* v. 4. *Ait. Hort. Kew.* v. 3. 41. *Sm. Prodr. Fl. Græc. Sibth.* v. 1. 273. *Juss.* 296. *Tourn.* t. 141. *Lamarck Illustr.* t. 346. *Gærtn.* t. 69.—Class and order, *Decandria Monogynia*. *Nat. Ord.* *Gruinales*, Linn. *Rutacæ*, Juss. but not correctly.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, in five deep acute segments, rather shorter than the petals. *Cor.* Petals five, oblong, obtuse, spreading. *Stam.* Filaments ten, small, awl-shaped; anthers incumbent, simple. *Pistl.* Germen roundish, bristly, the length of the stamens; style short and thick; stigma capitate, with five rays. *Peric.* roundish, thorny, of either five or ten capsules, which are gibbous externally, and armed with three or four sharp thorns; angular on the inner edge and crowded together; their cells several, transverse. *Seeds* solitary in each cell, oblong.

Obf. *T. maximus*, Linnæus by mistake says *cistoides*, has ten rugose capsules, almost destitute of lateral spines.

Ess. Ch. Calyx in five deep segments. Petals five, spreading. Style conical. Capsules five or ten, gibbous, spinous, with several seeds.

1. *T. maximus*. Great Caltrop. Linn. *Sp. Pl.* 553. *Willd. n.* 1. *Ait. n.* 1. *Jacq. Coll.* v. 4. 110. *IC. Rar.* t. 462. (*T. n.* 2; *Brown Jam.* 220. t. 21. f. 3. *T. terrestris major*, flore maximo odorato; *Sloane Jam.* v. 1. 209. t. 132. f. 1; the figure at least, and part of the description. *T. terrestris*, fructu turbinato, foliis lanuginosis; *Plum. IC.* 252. t. 254. f. 1.)—Leaflets about four pair; the outer ones largest. Fruit turbinate, wrinkled, slightly spinous, with ten furrows. Style permanent.—Native of dry waste places, or rocky gravelly ground, in most parts of Jamaica. *Sloane*. The root is annual, rather deep. *Stems* several, about two feet long, spreading flat on the ground, branched, round, leafy, striated, rather hairy. *Leaves* opposite, abruptly pinnate, loosely hairy, an inch and a half long, of six pair of half-ovate, entire, acute leaflets; the first pair smallest, the third largest; on a flat stalk. *Stipulas* awl-shaped, pale, hairy. *Flowers* axillary, solitary, inodorous, on simple stalks shorter than the leaves, hairy, and swelling upward. *Calyx* permanent. *Petals* obovate, half an inch long, dirty white, ribbed with dull purple. *Germen* roundish, hairy, crowned with a conical permanent style, exceeding its own length; stigma obtuse, marked with five rays. *Fruit* hairy, composed of ten corrugated tumid capsules, knobbed rather than spinous, and beaked with the thick style. Linnæus certainly alludes to this species, in the observation under his characters of the genus, and not to *T. cistoides*, which has the proper thorny fruit of the rest. It seems to us, that Sloane's definition and description of the flower belong, on the other hand, to *cistoides*, and that hence Linnæus, nevertheless, took his specific name of *maximus*, which is nowise suitable to the plant before us.

2. *T. lanuginosus*. Woolly Caltrop. Linn. *Sp. Pl.* 553. *Willd. n.* 2. (*T. terrestris zeylanicus*, cauliculis villosis, fructu acuminato; *Burm. Zeyl.* 266. t. 106. f. 1.)—Leaflets from five to seven pair, silky, nearly equal. Fruit

Fruit with ten horizontal awl-shaped thorns. Style deciduous.—Native of Ceylon. The *stems* seem woody, and probably perennial. Whole plant, excepting that circumstance, much like *T. terrestris* hereafter described, but the *leaves* are more hairy, or silky. Each of the five combined wrinkled *capsules* is armed with a pair of sharp, tapering, prominent thorns, twice the length of the capsule; but the base is nearly, or quite, destitute of spines. The *flowers* seem to be yellow, the size of the last, with a short, thick, deciduous *style*.

3. *T. terrestris*. Small Caltrops. Linn. Sp. Pl. 554. Willd. n. 3. Ait. n. 2. Sm. Fl. Græc. Sibth. t. 372, unpublished. Camer. Epit. 714. Matth. Valgr. v. 2. 323. Ger. Em. 1246.

Leaflets six pair, rather hairy, nearly equal. Fruit with ten horizontal awl-shaped thorns, and as many deflexed smaller ones. Style deciduous.—Native of the south of Europe, by way sides, as well as in cultivated ground. Dr. Sibthorp observed this species every where in Greece, retaining its ancient name a little altered, *τριβόλι*. This is doubtless the *τριβόλος; χερσαίος*, or Land Caltrop, of Dioscorides. The Turks call it *Demio Dikièni*. We have an East Indian specimen from the late Dr. Roxburgh. The annual *root* produces many long, reddish, hairy, leafy, slightly branched, prostrate *stems*. *Leaflets* smaller, and more numerous, than in our first species; less hairy than in the second; all nearly of equal size, the outer, or terminal, ones being, if any thing, rather the smallest. *Flowers* yellow, on shortish, simple, solitary, axillary stalks. *Style* thick, hardly so long as the germen, deciduous. *Stigma* of five prominent rays. *Capsules* tuberculated, each with four awl-shaped thorns, of which the larger are scarcely half so big as those of *T. lanuginosus*. Those at the base are still smaller, pointing directly downwards, and serve chiefly to distinguish the present species from the last. The herb has been reputed cooling and emollient, ever since the time of Dioscorides. He says the Thracians, who inhabited the banks of the Strymon, fed their horses with the green plant, and made bread for themselves of its seeds.

4. *T. cistoides*. Cistus-flowered Caltrops. Linn. Sp. Pl. 554. Willd. n. 4. Ait. n. 3. Jacq. Hort. Schoenbr. v. 1. 54. t. 103. (*T. terrestris* major coraffavicus; Herm. Parad. 236. t. 236. *T. terrestris* americanus, argemones flore flavo; Pluk. Phyt. t. 67. f. 4.)—Leaflets about eight pair, silky beneath, nearly equal. Petals twice as long as the calyx.—Native of meadows in the West Indies. A stove-plant with us, flowering in June and July, but not in general culture. The *root* is perennial, thick and woody, though Hermann says annual. *Stems* many, herbaceous, diffuse, clothed with handsome *leaves*, whose upper leaflets are smallest. *Flowers* yellow, large and handsome, two inches wide, their stalks longer than the corresponding leaves. *Capsules*, according to Jacquin, each armed with four thorns of nearly equal size.

TRIBULUS *Marinus*, the *caltrop-shell*, in *Natural History*, the name of a peculiar species of the purpura. It is of a whitish colour, and has three rows of spines.

TRIBUNAL, *Judgment-Seat*, the seat of a judge.

The tribunal, in a court of justice, is properly the seat or bench on which the judge, and his associates, are placed, for the administration of justice, &c.

The word is Latin, and takes its origin from a seat raised from the ground, on which the tribune of the Roman people was placed to administer justice.

TRIBUNAL, among the *Ancients*, was also a place from whence the people were harangued.

Among the Romans, it was an eminence in a temple, or

a forum, as that called *pro rostris*, where the people were harangued in tribes.

The French architects likewise use the word *tribune* for a gallery or eminence in a church, or any other place, in which the music is placed for a symphony or concert. Tribune, or tribunal, is also used for a room or hall in which justice is administered; such, e. g. as the courts at Westminster.

TRIBUNES of the People, *Tribunus Plebis*, in *Antiquity*, a Roman magistrate, chosen out of the commons, to protect them against the oppressions of the great, and to defend the liberty of the people against the attempts of the senate and consuls.

The tribunes of the people were first established in the year of Rome 260. The first design of the creation was to shelter the people from the cruelties of usurers, and to engage them to quit the Aventine mount, whither they had retired in displeasure.

Their number, at first, was but two; and the next year, under the consulate of A. Posthumus Aruncius and Cassius Viscellinus, there were three more added; and this number of five was afterwards increased by L. Trebonius to ten.

The appellation tribune was given them, because they were at first chosen out of the tribunes of the army. See the article following.

The tribunes were, as it were, the heads and guardians of the people. They called assemblies of the people when they pleased; and in those assemblies they frequently annulled the decrees of the senate. Nothing could be concluded without their consent, which they expressed by subscribing the letter T at the bottom of the decree. They had it also in their power to prevent the execution of any decree, without giving any reason for it, and merely by subscribing *Veto*. This interposition was called *intercessio*. They sometimes even called the consuls and dictator to account for their conduct before the people. The tribunes of the people, by virtue of their office, claimed and exercised a power of summoning the senate at any time, whenever the affairs of the people required it, though the consuls themselves were in the city. It has been taken for granted, on the authority of Valerius Maximus, that the tribunes of the people, on their first creation, were not admitted into the senate, but had seats placed for them before the door in the vestibule. But we may reasonably conclude, that a magistrate so ambitious and powerful, who could controul, by his single negative, whatever passed within doors, would not long be content to sit without. Dionys. Halic. x. 31. Middel. of Rom. Senat. p. 129. Val. Max. lib. ii. cap. 27.

A. Gellius says that they were not made senators before the law of Atinius, who is supposed to be C. Atinius Labeo, tribune of the people, A. U. 623; but that cannot possibly be true, since it is evident from the authority of Dionysius, that near four centuries before, the tribunes, by the mere weight and great power of their office, had gained an actual admission into the senate, within two years after their first creation; in which we find them debating and enforcing, with great warmth, the demands of the commons, for a liberty of intermarriages with the nobles, and the choice of a plebeian consul. So that the intent of this Atinian law could not be, as it is commonly understood, that the tribunes should be senators in virtue of their office, for that they had been from the beginning; but that for the future they should always be chosen out of the body of the senate, or, which is the same thing, out of those who had already borne the office of quaestor. A. Gell. xiv. 8. Vide

Pigul.

Pighil. Annales, A. U. 623. Dionys. lib. x. 11. Dionys. xi. 57. Middleton of Rom. Sen. p. 45.

Sylla, the dictator, was the first who presumed to put a stop to the encroachments of the tribunes, A. U. 672; but under Cotta, the consul, they recovered part of their power, A. U. 679; and in 683, Pompey the Great re-established them in the possession of their ancient privileges. Their power subsisted till the time of Julius Cæsar. And in the year of Rome 731, the senate by a decree transferred the whole authority of tribunes of the people to Augustus and his successors, so that they had little more than the name and form of magistrates; whence the emperors were said to be *tribunitia potestate donati*. Accordingly, Augustus himself was tribune for thirty-seven years; Tiberius assumed the same quality; as likewise did his successor; signifying the year of their tribunate on their medals and coins; but their design in it was only to possess themselves of all the authority, that there might be nobody to oppose them.

In the time of the emperors Nerva and Trajan, the dignity of tribune of the people was a mere title, without office and honour; and thus it continued till the reign of Constantine the Great, after which there occurs no mention of this magistrate.

TRIBUNE of the Soldiers, *Tribunus Militum*, or *Militaris*, an officer in the Roman army, who commanded in chief over a body of forces, particularly a division of a legion; and was much the same with our colonel, or the French *mestre de camp*.

There is a distinction of the tribunes into *laticlavii* and *angusticlavii*: those born of noble families were allowed, after they were made tribunes of a legion, to take the *latus clavus*. The rest were only to wear the *angusticlavus*; whence Suetonius takes care to inform us, that his father was *tribunus laticlavus* of the thirteenth legion. Over these tribunes of legions and cohorts, there were other tribunes who commanded in the absence of the consuls, and who were invested with a consular authority. Budeus will have these to be much the same as the marshals of France, or, at least, as our lieutenants-general.

Romulus likewise established a tribune of the cavalry, *tribunus equitum*, who was the same with the *magister equitum* under the dictators, the first officer after the kings.

The tribunes of the soldiery were of an elder standing than those of the people; those latter being elected out of the former. Varro will have it they were called tribunes, because, at first, they were only three in number in each legion, when the legion consisted of three thousand men, taken out of the three tribes then on foot. In proportion as the legion was increased, the number of tribunes was likewise increased to the number of six.

At first, the nomination lay in the general of the army; but in the year of Rome 391, it was appointed, that the people should nominate one part, and the general another; the latter were called *Rufuli*, from Rutilius Rufus, who passed that law.

Those chosen by the people in the comitia, were called *comitiati*; they were indifferently either patricians or plebeians; and they had the same marks of honour as the consuls themselves. The tribune of the pretorian cohorts was the captain of the guards.

TRIBUNE was also an appellation given to various other officers; as the *tribuni ærarii*, tribunes of the treasury. *Tribune of the celeres*, or Roman light-horse, the officer who commanded them. *Tribuni fabricarum*, those who had the direction of the making of arms. *Tribuni marinorum*, *tribuni nolanorum*, and *tribuni voluptatum*, mentioned in the Theo-

dofian Code, as intendants of the public shows, and other diversions.

The title of *tribune*, *tribunus*, was also given to the chief of each tribe.

TRIBUNITIAN, *TRIBUNITIUS*, a term among antiquaries and medallists. The *tribunitian power* was the dignity, office, or authority of a tribune of the people.

This power was assumed by the emperors, and makes one of the chief titles they bear on their medals: the quality was first introduced by Augustus, to keep the sovereign authority over the other magistrates without either taking that of dictator or king. Indeed, it was offered to Julius Cæsar, but he despised it. Augustus is the first who used it, and his successors followed his example. They reckoned the years of their empire on their medals by those of their tribunitian power.

This power was sometimes given them for a certain number of years, and sometimes for ever. Sometimes the emperors would communicate the power to such as they associated, or as they intended to succeed them: and Tiberius held it fifteen years with Augustus. But this practice only obtained till the time of Valerian and Gallienus. After them we only find TR. P. II. in Claudius; TR. P. V. in Aurelian; and TR. P. in Probus. This, however, is only to be understood of medals; for in inscriptions we find it after that time.

Cardinal Noris and F. Pagi have disputed about this tribunitian power, in which it consisted. The first maintains, that it did not at all differ from that of the ordinary tribunes, which consisted in three things: 1. In the right of opposing all the acts and resolutions of the other magistrates. 2. In that it rendered their persons sacred and inviolable. 3. In a power of making edicts and laws.

F. Pagi asserts, that it made an addition to the power of the tribunes; that the privilege it conferred of making edicts, was more ample than that of the ordinary tribunes; besides, that it carried with it a power of convening the senate at pleasure.

M. Spanheim is of F. Pagi's opinion; he believes that the tribunitian power had much the advantage of the tribunes: 1. In that it was peculiar to the patricians, and did not reduce the person who held it to the degree of a plebeian. 2. In that it was not confined to the city of Rome alone, like the other; but that it extended throughout the empire, as well as the proconsular power, which was usually annexed to it. 3. That the dignity of the tribunes was inferior to that of the pretors; whereas the tribunitian power of the Cæsars conferred, according to Tacitus, a sovereign authority over all magistrates, and rendered such as it was communicated to, equal to the emperors, and even made them their colleagues in the empire; besides the power of opposing the enterprizes of all the other magistrates; and that it rendered their persons sacred, and gave them a right to assemble and dismiss the senate; which were privileges the tribunitian power had in common with the tribunes.

F. Hardouin thinks we should distinguish two tribunitian powers; the one civil, the other military; but the proof he brings of them is very weak. M. Spanheim says, his distinction is only founded on vain conjectures, none of which deserve notice.

The learned are greatly divided as to the month and day on which the tribunitian power commenced: Sigonius and Petavium will have it begin on the 1st of January; others, as Perizonius, on the fifth of the calends of July: M. Toirard, on the fourth of the ides of December: Onuphrius, cardinal Noris, F. Pagi, &c. on the day of the emperor's accession

accession to the empire; with this difference, that F. Pagi takes it to be on the fifth of the calends of the month in which the emperor was proclaimed; and that this day was, for this reason, held sacred among the Romans.

F. Hardouin thinks, that on medals the tribunitian power commences on the anniversary of the building of Rome, viz. the eleventh of the calends of May, excepting on the Greek medals, where it begins in September, in regard this month, which began the Greek year, was near the time when the tribunitian power was first conferred.

Of all these sentiments, the most probable is that of Onuphrius, &c. setting aside the restriction of F. Pagi. See M. Spanheim, Differt. xii. tom. ii. p. 429.

TRIBUTA COMITIA. See COMITIA.

TRIBUTARY, TRIBUTARIUS, one who pays tribute to another, in order to live in peace with him, or to share in his protection.

The republic of Ragusa is tributary to the grand Turk; so also is the cham of Little Tartary, &c.

TRIBUTE, TRIBUTUM, a tax, or impost, which one prince or state is obliged to pay to another, as a token of dependence; or in virtue of a treaty, and as a purchase of peace.

The Romans made all the nations they subdued pay them tribute. Mahomet laid it down as a fundamental of his law, that all the world should pay him tribute.

In the states of the grand signor, Christian children are taken, by way of tribute, to make agemogians, janizaries, &c.

TRIBUTE is sometimes also used for a personal contribution, which princes levy on their subjects by way of capitation, or poll-money.

In this it differs from an impost, which is properly what is laid on merchandizes.

TRICADIBA, in *Ancient Geography*, an isle of India, upon the coast, on this side of the Ganges, in passing from the gulf of Canticolpe to the Colchic gulf, and to the S. of the isle of Heptanesia. Ptolemy.

TRICÆ, in *Botany*, so called from τριξ, τριχος, a hair, because they seem composed of a horse-hair rolled, or partly folded, into a little round black head, are the peculiar fructification of the genus of Lichens named GYROPHORA. See that article; as well as LICHENES, their eighth kind of receptacle.

TRICALA, in *Geography*, a town of European Turkey, in Macedonia, on the Strimon; 50 miles E.N.E. of Saloniki.—Also, a town of European Turkey, in Thessaly; 21 miles S.W. of Larissa.

TRICALORE, a town of Hindoostan, in the Carnatic; 38 miles W. of Pondicherry. N. lat. 11° 58'. E. long. 79° 21'.—Also, a town of Hindoostan, in the Carnatic; 17 miles S. of Tanjore.

TRICARICO, a town of Naples, in Basilicata, the see of a bishop, suffragan of Acerenza; 13 miles S.E. of Acerenza. N. lat. 40° 43'. E. long. 16° 8'.

TRICARIUM, in *Botany*, a genus of Loureiro's, the name of which alludes to the three nuts of the fruit, being derived from τρις, three, and καρρον, a nut.—Loureir. Cochinch. 557.—Class and order, *Monoecia Tetrandria*. Nat. Ord. *Rhamnii*, or possibly *Eleagni*, of Jussieu?

Gen. Ch. Male, *Cal.* Perianth of four ovate, slightly spreading, coloured leaves, converging at the points. *Cor.* Petals none. Nectary of four ovate depressed glands. *Stam.* Filaments four, shorter than the calyx; anthers roundish.

Female, interspersed with the male, *Cal.* Perianth inferior, minute, in four deep ovate divisions. *Cor.* none. *Pist.* Germen superior, roundish; style none; stigma lacinated,

Peric. Drupa roundish, fleshy, of three cells. *Seeds.* Nuts solitary in each cell, roundish, with three furrows:

Effl. Ch. Male, Calyx of four leaves. Petals none. Nectary of four glands.

Female, Calyx in four deep segments. Corolla none. Stigma lacinated. Drupa with three nuts.

1. T. *cochinchinense*.—Found in the woods of Cochinchina, where it is known by the name of *Cây Trâm ung*. A tree of a middling stature, with ascending branches. Leaves alternate, small, ovate, entire, smooth. Flowers red, in long, simple, slender, aggregate, nearly terminal spikes or clusters. Drupa of a moderate size, yellow, smooth, eatable.—We cannot refer this plant to any described genus, nor are we certain whether it belongs to either of the above natural orders, or to the *Euphorbia*, or perhaps the *Terebinthaceæ*, of Jussieu. Difficulties attend each supposition.

TRICASSES, in *Ancient Geography*. See TRECASSES.

TRICASTINI, or TRICASTENI, a people of Gallia Narbonensis. Hannibal passed through this country in his way to the Alps. Mention is made of these people at the time of the march of the Gauls into Italy, under the conduct of Bellovæsius; and Pliny as well as Ptolemy take notice of them, the former specifying Augusta as their capital. It is certain that they inhabited the left bank of the Rhone, in a small country called Tricastin.

TRICCA, a town of Greece, in Thessaly, in the Estiœotide territory. A modern place, named "Tricala," gives its just position, and answers to Strabo's account of the situation of this town. Venus was worshipped in this city, and the inhabitants offered to her sacrifices of swine.

TRICCIANA, a town of Pannonia, on the route from Sirmium to Carnuntum, between Pons Manfuetianus and Cimbriane. Anton. Itin.

TRICE, in *Geography*, one of the Nicobar islands. N. lat. 7° 30'. E. long. 94° 5'.

TRICENNAL. See TRENTAL.

TRICEPS, in *Anatomy*, a name given to a large muscle of the arm, and to one of the thigh, from the circumstance of their arising by three distinct portions.

TRICEPS *adductor cruris*, (triceps femoris; fous-pubo-, fous-pubi-, and ischii femoriens; adductor longus, adductor brevis, and adductor magnus; long, short, and great heads of the triceps). This muscle is placed at the upper and inner part of the thigh, consisting of three flattened portions, distinct from each other, making up the large mass of muscle on the inside of the limb, and extending from the pelvis to the linea aspera of the thigh-bone.

The long head of the triceps, adductor longus or primus, the first in order of the three portions towards the front, is elongated and flattened, narrow above, and considerably wider below, and extends from the front of the pubes to the middle of the linea aspera. It arises by a narrow but strong tendon from the pubes, close to the symphysis; the muscle descends, passing at the same time obliquely outwards and backwards, and increasing greatly in breadth: it terminates below in a broad and flat aponeurosis, fixed to the middle of the linea aspera, in an extent of about three inches. Some fibres join the tendon of the adductor magnus, while others unite with the vastus externus. The fascia lata, the sartorius, and the crural artery, cover it in front: it covers behind the two other adductors. Its outer edge is parallel to the inner margin of the pectinalis, and connected to it by a cellular line: its inner margin is much longer, and covered, in nearly its whole extent, by the gracilis.

The short head, adductor brevis or secundus, is also of a flattened figure, placed at the upper and inner part of the thigh, and extending from the pubis to the upper part of the linea

linea aspera. It arises, principally by fleshy fibres, from the anterior surface of the body and ramus of the pubes; it passes obliquely downwards and outwards, with a little obliquity backwards, becoming broader and thinner, and having an attachment of about three inches to the linea aspera, from the little trochanter downwards. Here it is closely connected to the two other adductors, and to the pectinalis. The perforating arteries go through its fibres. The pectinalis and adductor longus cover it in front; the adductor magnus behind. The inner edge is partly covered by the gracilis, partly concealed between the first and third adductors: the outer corresponds to the obturator externus and the tendon of the psoas magnus.

The adductor magnus or tertius, or the great head, is a broad and thick mass, flattened, nearly triangular, placed at the inside of the thigh, where it reaches from the ischium to the whole length of the linea aspera, and to the tubercle of the internal condyle. It arises, by a strong aponeurosis and by fleshy fibres, from the external surface, and from the margin of the ramus and tuberosity of the ischium. From this point the muscular fibres spread out into a great breadth, and take very different directions; the superior going nearly transversely, the middle obliquely, and the inferior almost perpendicularly downwards. The general direction of the muscle is from above downwards, and from within outwards. Its attachment begins at the upper end of the linea aspera, just below that of the quadratus: it is fixed to the whole length of that line, being connected to the two preceding muscles. When the linea aspera bifurcates at its termination, the adductor magnus divides into two portions; an external or posterior, which ends in a point between the vastus internus and the short head of the biceps; and an internal or anterior, which is connected to the edge of the vastus, and descends with it to the internal condyle. These two portions have between them an interval, occupied by the femoral artery and vein: this interval is covered in front by an aponeurosis, extended from the adductor to the triceps, and passing over the femoral artery. There are other openings in the aponeurosis for the passage of the perforating arteries. The adductor magnus is fixed to the linea aspera by short aponeuroses; and to the tubercle of the internal condyle by a strong tendon, which is expanded above into a broad aponeurosis. The muscular fibres pass between the tendon and aponeuroses, which fix the muscle to the ischium, and those which are connected to the femur. The internal fibres are very long, and directed obliquely downwards and outwards: the middle ones are shorter, and directed more outwards, and the external or upper are the shortest, and nearly transverse.

The first and second adductors, the sartorius, and the crural artery, cover it in front: the semi-tendinosus, semi-membranosus, biceps, gluteus magnus, and sciatic nerve, cover it behind. The inner edge is covered by the gracilis, sartorius, and fascia: the outer edge is the insertion in the linea aspera. The upper margin, or the base of the triangle, is parallel and close to the under edge of the quadratus; the lower extremity, or apex, is the tendinous attachment to the condyle.

The triceps will move the thigh in the direction of adduction, or towards the opposite limb: it will carry one thigh across the other, as in sitting cross-kneed: it will press the thighs against any thing between them, as the sides of the horse in riding. The first and second heads will bend the hip: the third will extend it, when it has been previously bent. All three will rotate the thigh outwards. By drawing the thighs inwards, the triceps muscles keep them perpendicularly under the pelvis, so that they support it, and

through it the whole upper parts of the body. When we stand on one leg, the triceps will regulate the degree of inclination of the pelvis over the thigh, and prevent it from falling over on that side.

TRICEPS *extensor cubiti*, (triceps brachialis; anconeus longus, externus, and internus, Winslow; scapulo-humero-olecranian,) a large thick muscle, of an elongated figure, covering the back of the arm, and extending from the scapula and humerus to the olecranon. Its long head arises from the inferior edge of the scapula, just below the glenoid cavity, by a flat tendon, about three-quarters of an inch broad: the second or external head commences, in a pointed form, from the back of the humerus, a little below its head; and the third, internal, or shortest head, begins on the inner and posterior part of the humerus, an inch below the second. The two latter are separated from each other by an interval, in which the profunda humeri major artery runs, accompanied by the radial or muscular spiral nerve: this vessel and nerve continue their course, from the inner to the outer sides of the limb, between the muscle and the bone. Below the points mentioned already, as the origins of the second and third heads, these portions arise by fleshy fibres from the whole posterior surface of the humerus, except where the radial nerve and the profunda humeri pass, and from the inter-muscular aponeuroses fixed to the lateral ridges of the bone. The long or middle head continues distinct from the others for some distance, passes behind the shoulder-joint, between the teres major and minor muscles, and in front of the latissimus dorsi; it then soon joins the two others. It is first thin and flattened; then increases in size. The two other heads are pointed and thin above, and increase gradually: they all then join about the middle of the humerus, which is the thickest part of the muscle; for below it again decreases. From the aponeurosis of the middle head, and from the back of the humerus, the fibres are continued obliquely downwards and backwards into a broad and flat tendon, which covers the lower and posterior part of the muscle, becomes narrower and thicker as it descends, passes behind the elbow-joint, closely adhering to its synovial membrane, and is inserted into the upper and posterior rough extremity of the olecranon. Several fibres are detached from it to the fascia of the fore-arm, and particularly to that part of the fascia which covers the anconeus.

The posterior surface of this muscle is convex; covered above by the teres minor and deltoid, and in the rest of its extent, merely by the fascia and skin. The anterior surface is in contact above with the subscapularis, teres major, and latissimus dorsi; with the whole back of the humerus; and with the synovial membrane at the back of the elbow. The outer edge is fixed to the external ridge of the bone, and to the external intermuscular aponeurosis, the attachment being interrupted only at the passage of the radial nerve. The internal edge is fixed to the corresponding parts on the inside: the ulnar nerve lies on it. The upper extremity is divided into three portions, forming the three heads already described: the lower extremity is single.

The triceps extends the elbow-joint, by moving either the bones of the fore-arm on the arm, or *vice versa*. Its long head may carry the arm backwards.

TRICEPS, in *Mythology*, a surname given to Mercury, because he exercises his functions in heaven, on earth, and in the infernal regions, and is exhibited under three different forms, according to the three different places in which he is employed.

TRICERA, in *Botany*, from τρις, *three*, and κερας, *a horn*, because of the three horns, originating in the permanent

ment styles, which crown the seed-vessel. Dr. Swartz had originally called this genus *Crantzia*, but another having been so named by Schreber, he adopted the above, which is very expressive.—Swartz Ind. Oec. 331. t. 7. Schreb. Gen. 630. Willd. Sp. Pl. v. 4. 338. Mart. Mill. Dict. v. 4. (*Crantzia*; Swartz Prodr. 38.)—Class and order, *Monoecia Tetrandria*. Nat. Ord. *Tricocca*, Linn. *Euphorbia*, Juss.

Gen. Ch. Male, *Cal.* Perianth of one leaf, deeply divided into four lanceolate, acute, erect, coloured segments. *Cor.* none. *Stam.* Filaments four, fleshy, cylindrical, inclining to ovate, erect, longer than the calyx; anthers terminal, ovato-lanceolate, acute, erect, furrowed along one side, recurved after flowering.

Female, in the same tuft, or cluster, *Cal.* Perianth of five ovate, acute, erect, coloured, permanent leaves. *Cor.* none. *Pist.* Germen superior, somewhat triangular; styles three, short, somewhat conical, separable at length into two parts; stigmas linear, longer than the styles, spreading, recurved, channelled, permanent. *Peric.* Capsule turbinate, triangular, with three cells, three valves, and three recurved horns, each horn splitting, by the opening of the elastic capsule, into two parts. *Seeds* two in each cell, oblong, triangular, polished, each enveloped in a whitish membranous lax tunic.

Eff. Ch. Male, Calyx in four deep segments. Corolla none. Stamens fleshy.

Female, Calyx of five leaves, inferior. Corolla none. Styles three. Capsule with three cells, three elastic valves, and three horns. Seeds in pairs, with a membranous tunic.

1. *T. levigata*. Smooth *Tricera*. Swartz Ind. Oec. 333. Willd. n. 1. (*Crantzia levigata*; Sw. Prodr. 38. Vahl Symb. v. 2. 99.)—Leaves ovato-lanceolate, triple-ribbed; veinless beneath. Umbels axillary.—Native of bushy hills, in the western part of Jamaica, flowering in spring. Swartz. Vahl received it from Santa Cruz.—A branching shrub, two or three feet high; its branches long and spreading, smooth, leafy, obscurely quadrangular. Leaves stalked, opposite, two-ranked, an inch long, acute, convex, entire, very smooth, rather rigid. Footstalks short, round. Flowers whitish, in small, axillary, opposite, stalked umbels; the males from four to eight, with little white opposite bractees on their partial stalks; female solitary in the centre, rather larger, sessile, conspicuous for its long spreading stigmas. Capsule the size of a large pea, with three taper horns, exceeding its own length. Seeds black, and shining, in a loose white tunic. Dr. Swartz justly indicates the affinity of this plant to *Buxus*, from which it is principally distinguished by the want of a corolla, the form of the filaments and stigmas, and the tunic of its seeds.

2. *T. citrifolia*. Lemon-leaved *Tricera*. Willd. n. 3.—“Leaves ovate-oblong, pointed, triple-ribbed, veiny on both sides. Clusters axillary.”—Gathered by M. Bredermeyer in the Caraccas. A shrub fifteen feet high, resembling the Coffee-tree, branched, with a pale-grey bark, and hard yellow wood. Leaves rigid and shining, four inches long, and two broad, on short stalks. Clusters about an inch in length, of about ten white male flowers, on short, alternate partial stalks, with minute, acute bractees, and one solitary, sessile, terminal female flower. Filaments a little compressed, most tumid in the upper part. Fruit much as in the foregoing.

3. *T. cordifolia*. Heart-leaved *Tricera*. Willd. n. 3.—“Leaves elliptical, obtuse, veiny; somewhat heart-shaped at the base. Flowers in lateral tufts.”—Native of the West Indies.—A shrub, with round grey branches; the

young ones somewhat quadrangular, smooth. Leaves opposite, stalked, half an inch long, coriaceous, entire, finely veined on both sides, sometimes emarginate; shining above; paler beneath. Flowers small, on the last year's branches. Willdenow.

TRICEROS, a genus of Loureiro's, has precisely the same derivation as TRICERA. (See that article.) The latter being a clear and well-established genus, we cannot allow one whose history is obscure, and which may possibly be already known to systematic botanists, under some other denomination, to “exalt its horns” against its brother. As to priority of date, there is little to consider, they having been published within a year of each other, the author of each thinking his the original name. We shall, notwithstanding, here give the characters of the *Triceros*, for the information of those who may wish to inquire what it is.—Loureir. Cochinch. 184.—Class and order, *Pentandria Trigynia*. Nat. Ord.

Gen. Ch. *Cal.* Perianth inferior, of five acute, spreading, permanent leaves. *Cor.* Petals five, oblong, spreading, longer than the calyx. *Stam.* Filaments five, capillary, about the length of the petals; anthers ovate, of two cells. *Pist.* Germen superior, roundish, unequal; styles three, short, distant from each other at the base; stigmas simple. *Peric.* Berry coriaceous, round at the base, with three horns at the top, of three cells. Seeds roundish, pointed, two in each cell.

Eff. Ch. Calyx of five leaves. Petals five, oblong. Berry superior, of three cells. Seeds two in each cell.

Obs. Loureiro says “*bacca disperma*,” by which, according to his frequent mode of expression, he means there are two seeds in each of the three cells; at least, so we feel ourselves obliged here to understand him.

1. *T. cochinchinensis*. Cây áu rừng of the natives of Cochinchina, where this plant grows wild on the hills. It is a tree of a middling stature, with spreading branches. Leaves bipinnate, with two pair of ovate, pointed, serrated, rigid leaflets, besides a terminal one, in each subdivision. Flowers white, in loose, nearly terminal, clusters. Berries small, usefess.

TRICETO, in *Geography*, a town of Naples, in Calabria Citra; 14 miles E.S.E. of Scalea.

TRICHECHUS, in *Zoology*, a genus of the order of Bruta, and class of Mammalia, in the Linnæan system: the characters of which are, that it has no fore-teeth in the full-grown animal, either above or below; that it has solitary tusks in the upper jaw; that the grinders on both sides are formed of a rugged bony substance; that the lips are geminated or doubled; and the hinder feet, at the extremity of the body, united into a fin.

This genus is altogether marine, comprehending few species. Gmelin, in his edition of the Linnæan System, enumerates the three following

Species and Varieties.

ROSMARUS, the *Rosmarus* of Johnston, the *Morse* of Buffon, the *Sea-horse* of Ray and Ellis, and the *Arctic Walrus* of Pennant and Cook's last voyage. It is characterized by its distant, exerted tusks. It inhabits the Northern seas, and chiefly within the arctic circle. It grows to a large size, having been found 18 feet long, and 12 feet in girth round the neck. Its form is elegant; having a small head, short neck, thick body, and short legs; the lips thick, and the upper one cleft into two large rounded lobes, the surface having numerous semi-transparent bristles of a yellowish tinge, and about the size of a straw in diameter, and three inches long, pointed at their extremities; the eyes

eyes small; round orifices instead of ears; the skin thick and wrinkled, and scattered over with short brownish hairs; with five toes on each foot, connected by webs; the hind-feet broader than the fore-feet, and the tail very short. In the upper jaw are two long tusks, sometimes two feet but generally about one foot in length, without cutting teeth, and with four roundish grinders. These animals are found about the northern parts of America, in the gulf of St. Lawrence between 47° and 48° lat., in Davis's Straits, and within Hudson's bay in lat. 62°; in great numbers about Spitzbergen, also on the coast of Greenland and of Nova Zembla, and on the headlands extending towards the north pole. They are gregarious, produce their young, one at a time, early in the spring, and feed on sea-plants, shell-fish, &c.

Unprovoked the walrus is harmless, otherwise furious and vindictive. The female, when surprised on the ice, flings its young into the sea, plunges after it, and having carried it to a safe distance, returns with great rage to revenge the injury. They sometimes fasten their teeth in the boats, to sink them, or crawl under them, to overfet them, indicating, by gnashing their teeth and roaring frightfully, great tokens of rage. Their attachment to one another is very strong; for a wounded walrus plunges to the bottom, and rises again suddenly with a number of attendants to attack the boat whence they received insult. They are said to lie on the ice in herds of many hundreds, loudly roaring, and giving notice of ice in the night or in a fog, when it could not be seen: some of the herd are always on the watch, who, on the approach of danger, awake the rest. They are soon frightened by a flash in the musket-pan, and plunge into the deep; but the female will defend the young to the last, on the ice or in the water; nor will the young one quit the dam, though she be dead. In the gulf of St. Lawrence, this animal is called a sea-cow, and it is said to resemble a cow much more than a horse, which name may probably be a corruption of the Russian name Morfe. The teeth of the walrus are used for ivory: the animals are killed chiefly for the sake of the oil; and it is said that a very strong and elastic leather may be prepared from the skin.

DUGONG, the *Dugon* of Buffon, and the *Indian Walrus* of Pennant, with approximate, exerted tusks. This animal inhabits the seas about the Cape of Good Hope and the Philippine islands.

MANATUS, the *Manati* or *Sea-cow* of Ray, and *Lamartin* of Buffon; without tusks, or slightly hairy; and with a horizontal tail in place of hind-feet. Found in the larger rivers as well as seas of Guiana, and growing to the length of 16 or 18 feet; the skin being dark-brown, with scattered hairs upon it; the feet with five toes; the body nearly of the same thickness to the tail, when it suddenly narrows; the tail flat, of the shape of a spatula, thicker in the middle, and thinner towards the edges.

The *T. Clusii*, or Clusius's Manati, is supposed to be a variety: it grows to an enormous size in the South American rivers. As an article of food, it is said to be superior to any other animal of this genus, particularly the young. It is taken by means of harpoons. The Indians take great numbers, by making dams across the mouths of the shallow lakes formed by the floods. Dr. Shaw mentions a manati, called by the inhabitants of the country, on account of its gentle nature, "Matum," which, at the time of the arrival of the Spaniards, was kept by a prince of Hispaniola in a lake adjoining to his residence: it hated the Spaniards, but would offer itself to its Indian favourites, and carry over the lake ten at a time, singing and playing on its back. The *T. Hydrophæcus*, or *Sea-ape Manati* of Pennant, is only

known from the description of Steller, who, near the coast of America, saw a singular animal which he named a sea-ape, and which Pennant supposes to belong to this genus. It was an animal that delighted in frolic, and sported like a monkey.

T. Australis, the variety α of *T. manatus*, according to Gmelin's Linnæus, but a distinct species in Shaw's Zoology; hairy, with four-toed unguiculated feet, or with a horizontal tail in place of hind-feet; the *round-tailed Manati* of Pennant; growing to the length of 14 or 15 feet, and found in the rivers of Africa, particularly in the Senegal. The specimen in the Leverian Museum was about six feet and a half long, and three feet eight inches in circumference in the thickest part of the body, and in the thinnest part near the tail about two feet two inches. The flesh of this animal is said to resemble veal; but it is chiefly killed by the Negroes for the sake of its blubber or fat.

T. Borealis, a variety of *T. Manatus* in Gmelin's edition of Linnæus, but a distinct species in Shaw's Zoology; hairless, with feet furnished neither with toes nor nails; or with a horizontal tail in place of hind-feet; the *whale-tailed Manati* of Pennant. It approaches nearly to the whale tribe; it never goes ashore, nor attempts to climb the rocks, like the walrus and the seal. It brings forth in the water, and, like the whale, suckles its young in that element. It inhabits the seas about Bering's and the other Aleutian islands, but never appears off Kantschatka, unless blown thither by a tempest. It is the same species that inhabits near Rodriguez, or Diego Reys, an island east of the Mauritius, and probably extending to New Holland. These animals live perpetually in the water, but in calm weather frequent the mouths of rivers in great numbers, and approach in time of flood so near the land, that they will suffer themselves to be stroaked with the hand; but if hurt, swim out to the sea, presently returning again. They live in families, one near another; each consisting of a male, a female, a half-grown young one, and a very small one. The affection between the male and female is so great, that if the latter is attacked, the former will defend her to the utmost; and if she is killed, will follow her carcase to the shore, and for some days swim near the place where it was landed. They are very voracious, and when full of the fuci that grow in the sea, fall asleep on their backs. The back and sides are generally above water, and gulls are found perching on their backs, in order to pick up the insects which they find upon them. They are taken by harpoons fixed to a strong cord; but when struck, it requires the force of thirty men to draw them on shore. When a manati is struck, its companions swim to its assistance, and make many efforts to overturn the boat, or break the rope of the harpoon, and others will strike at the harpoon with their tails. They make a noise, by loud breathing, like the snorting of a horse. Their size is enormous, some being 28 feet long, and 8000 lbs in weight. The circumference of the body near the shoulders is 12 feet, about the belly 20, near the tail 4 feet 8 inches, the head 31 inches, the neck near seven feet; and hence we may infer the deformity of the animal. Near the shoulders are two feet, or rather fins, two feet two inches long, without fingers or nails; beneath they are concave, and covered with hard bristles; the tail is thick, strong, and horizontal, terminating in a stiff black fin, and resembling the substance of whale-bone; the skin is thick, hard, and black, unequal on its surface, like the bark of oak, so hard as scarcely to be cut with an axe, and without hair; beneath the skin is a thick blubber, tasting like oil of almonds. The flesh is coarser than beef, and will not soon putrefy; that of the young ones has the taste of veal. The

skin is used for shoes, and for covering the sides of boats. The Russians call this animal "Morſkaia Korowa," or sea-cow, and "Kapuſtnik," or eater of herbs. Pennant's *Quadr.* vol. ii. Shaw's *Zoology*, vol. i. pt. 1.

TRICHERIÆ, in *Natural History*, the name of a genus of fossils, of the class of fibrariæ; the characters of which are, that they are not elastic, and are composed of straight and continuous filaments.

The word is derived from the Greek *τριχες*, capillaments or fibres. The bodies of this genus are divided into those which have narrower filaments; and there are six known species of it, all which burn very readily to a fine plaster, like the gypſums; and some of them are found in particular places in such great abundance, that it would be very advantageous to collect and burn them. Hill.

TRICHESTRUM, the name of a genus of fossils, of the class of the selenites, but differing extremely in figure and structure from the common kinds.

The word is derived from the Greek *τριχες*, hairs or filaments, and *αστρα*, a star, and expresses a set of bodies, composed of filaments arranged into the form of a star. The selenitæ of this genus are composed of filaments, scarcely any where visibly arranged into plates or scales, but disposed in form of a radiated star, made up of a number of disjunct striæ.

Of this genus there is only one known species, which is of a pale brown, and is composed of extremely fine and slender filaments. It is formed like the lepastrum in the accidentally open cracks in the septaria, or ludus Helmontii, and is no other way different from the bodies of that genus, than as in all the selenitæ the plates they are composed of are made up of filaments nicely arranged: in this, as in some other of those bodies, the filaments have never arranged themselves into plates at all, but are disposed into the form of a star composed of single threads. This body very readily and regularly splits according to the arrangements of the fibres; and is in some pieces tolerably pellucid.

It is found only in one place, so far as is yet known, which is under the cliffs of Sheppey island, in Kent; where it is very plentiful, and makes a very elegant figure on the broken masses of septaria, which are in immense numbers strewn upon the shore. Hill.

TRICHIA, in *Botany*, first, we believe, received its name from Haller, though he admitted some things into this genus of *Fungi*, which other botanists have rejected, or referred to other places. The above name is formed from *τριξ*, *τριχος*, a hair, or bristle, in allusion to the internal mass of elastic fibres, gradually expanding after the head bursts.—Hall. *Hist.* v. 3. 114. *Perf. Syn. Fung.* 176. Lamarck *Illustr.* t. 890.—Class and order, *Cryptogamia Fungi*. Nat. Ord. *Fungi*.

Ess. Ch. Head at length bursting irregularly, permanent. Internal fibres compact, attached to the base of the head, expanding elastically, and discharging the powdery seeds.

To shew the limits of this genus, as defined by the most eminent botanists in this department, we shall give a compendious view of Perfoon's eleven species.

SECT. 1. *Head turbinata, or pear-shaped.*

1. *T. Botrytis.* "Perf. *Disp. Meth.* 9. and 54." ("T. pyriformis; Hoffm. *Veg. Crypt.* v. 2. 1. t. 1. f. 1.")—Stalked, clustered, opaque, dark red; stalks longer than the heads, combined, somewhat racemose.—Found on decaying trunks of trees in autumn. Several specimens, cohering together, form a sort of tuft. Perfoon mentions a small and simple-stalked variety, with a solitary head, which he suspects may be *T. ferotina* of Schrader's

Journal, v. 2. 67. t. 3. f. 1, (not f. 2, as erroneously cited by the author, and by Perfoon; that being *Stilbum tomentosum*, p. 65.) The figure having been so widely mistaken, may account for the doubt expressed; but we are left in great uncertainty as to what Perfoon intended by his variety.

2. *T. rubiformis.* "Perf. *Disp. Meth.* 54. t. 4. f. 3. and t. 1. f. 3." (T. n. 2167; Hall. *Hist.* v. 3. 115. t. 48. f. 5.)—Stalked, clustered, of a shining blue; stalks combined, spreading at the base, shorter than the heads.—Not rare on the rotten bark of trees in autumn. There is a remarkable variety, of a red or rusty aspect. Perfoon is remarkably incorrect in his citation of Haller, (n. 2162. t. 40. f. 2.)

3. *T. fallax.* Perf. *Obf. Mycol. fasc.* 1. 59. t. 3. f. 4, 5. ("Clathrus stipitatus, reticulo deciduo; Schmid. *IC.* t. 33. f. 1—18." *Sphærocarpus ficoides*; Bull. *Fung.* v. 1. 130. t. 417. f. 3; excluding the synonyms. *Mucor miniatus*; Jacq. *Austr.* t. 299.)—Simple, stalked; at first red; then of a dull grey. Base of the head, and top of the stalk, plated.—Found in autumn, upon soft rotten wood. The head when young is bright red, and roundish; by age it becomes pear-shaped, on a stalk about its own length, and altogether of a dirty slate-colour, cracking and expanding at the top into a kind of cup. Jacquin's figure represents the young, Bulliard's the old, plant.

4. *T. clavata.* Perf. *Obf. Mycol. fasc.* 2. 34.—"Simple, yellow and shining. Stalk rugged, elongated, tapering downwards."—Found on the trunks of trees, either solitary, or composing dense tufts. It is among the larger species. The stalk is slender, of a reddish-yellow. We have seen no specimen nor figure.

5. *T. nigripes.* Perf. n. 5. (T. pyriformis; Perf. *Obf. Mycol. fasc.* 2. 33. Bull. *Fung.* v. 1. 129. t. 417. f. 2?)—Rather scattered. Head pear-shaped, yellowish, longer than the blackish stalk.—On the trunks of trees, but rare. The head is obovate and obtuse. Stalk half a line long, black, standing on a manifest membranous base common to many individuals. Perfoon remarks, that the stalk in Bulliard's plate is thicker than his, besides being of the same colour as the head. He mentions also a smaller more common variety, verging towards an olive hue, and more brittle than the above-described. The following, originally thought distinct, are now reduced by Perfoon to the species before us.

β. *T. cordata.* Perf. *Obf. Mycol. fasc.* 2. 33.—Nearly sessile, small, scattered, yellowish. Heads somewhat compressed, inversely heart-shaped. Stalk very short, blackish.—On trunks of trees.

γ. *T. cylindrica.* *Ibid.*—Rather scattered, ochre-coloured. Heads cylindrical or ovate, contracted in the middle. Stalk blackish, extremely short.—A pretty little fungus, occurring rarely on mosses, or the trunks of trees.

δ. *T. vulgaris.* *Ibid.* 32. (T. turbinata; Sowerb. *Fung.* t. 85?)—Scattered. Head roundish, somewhat turbinate. Stalk blackish, extremely short; sometimes entirely wanting.—Frequent after heavy rains in autumn, upon rotten beech-trees; appearing when young in the form of white granulations, turning afterwards of the colour of yellow ochre, and more opaque. The stalk in an early state is hardly discernible. Mr. Sowerby's synonym seems to us to belong to the following, as he himself supposed.

6. *T. ovata.* Perf. *Obf. Mycol. fasc.* 1. 61. fasc. 2. 35. (T. pyriformis; Villars *Dauph.* v. 3. 1060. T. n. 2168; Hall. *Hist.* v. 3. 116. t. 48. f. 7. *Clathrus turbinatus*; Hudf. 632. Bolt. *Fung.* 94. t. 94. f. 3.)—Crowded, sessile, obovate, opaque, of an ochrey tan-colour.—Frequent in

in autumn, in woods, upon rotten wood, mosses, &c.—It forms dense tufts, each plant the size of garden poppy-feed, and bursting in an irregularly circular manner, near the top. This is one of our most frequent species.

7. *T. olivacea*. Perf. Obs. Mycol. fasc. 1. 62.—Scattered, sessile, roundish, or obovate, abrupt at the base, olive-coloured. Internal hairs compact, yellowish.—Found rarely on the stems of trees. Heads globular, or hemispherical, becoming by mutual pressure, when crowded, oblong, or somewhat cylindrical. Perfoon is doubtful whether this be a distinct species. We have seen no specimen.

Sect. 2. *Head round, or kidney-shaped.*

8. *T. nitens*. Perf. Obs. Mycol. fasc. 1. 62. (“*Lycoperdon favogineum*; Batfeh Elench. Fung. 257. t. 173.”)—Crowded, sessile, globular, of a shining yellow or cinnamon-colour.—Found in autumn, about the decaying trunks of fir-trees, as well as on beeches. In the former case it is more opaque; in the latter more bright and shining. The head is occasionally a little turbinate.

9. *T. varia*. Perf. Obs. Mycol. fasc. 2. 32. (*Lycogala luteum*, omnium minimum, reniforme; Mich. Nov. Gen. 216. t. 95. f. 4.)—Rather crowded, yellowish, partly deflexed. Head kidney-shaped, roundish, or somewhat oblong.—Grows on rotten trees in autumn. Found by Micheli in the celebrated gardens of Boboli, behind the palace Pitti, at Florence. He represents it as forming globular masses, the size of a large pea, each plant smaller than poppy-feed. The lateral ones appear to be deflexed, or forced outward, by those in the middle.

Sect. 3. *Receptacle elongated, thread-shaped, creeping, simple, or interbranching like veins.*

10. *T. Serpula*. “Perf. Disp. Meth. 10.” (*Mucor Serpula*; Scop. Carn. 493. t. 65.)—Thread-shaped, unbranched, very long, somewhat zigzag, yellow.—On the trunks of trees in Carniola, near the roots. *Scopoli*. This is represented as a smooth yellowish thread, creeping like a *Serpula*, or Worm-shell, and resembling a small animal intestine. It bursts and discharges, from every part, tufts of fine hairs besprinkled with yellow powder. *Scopoli*. *T. spongoides*, Villars Dauph. v. 3. 1061, is thought by Perfoon to be a variety of this. But the author’s description of “from three to five little oblong, cylindrical, worm-like bodies, whose yellowish internal woolly substance soon confounds them in one woolly mass,” indicates rather some of the former sections, or perhaps an *Arcyria*.

11. *T. reticulata*. “Perf. Ic. et Descr. Fung. fasc. 2. 46. t. 12. f. 1.” (*Lycoperdon lumbricale*; “Batfeh Elench. Fung. 259. t. 30. f. 174.” Willd. Berol. 414.)—Thread-shaped, branched, reticulated, yellow.—Found in autumn on the trunks and mossy bark of trees, but very rarely. We have never heard of this or the preceding in Britain. The present species is described as spreading to the extent of an inch, consisting of a yellow net-work, bursting here and there, and protruding tufts of yellow hairs, enveloping a powder, or seeds, of the same colour.

It will readily be perceived that the species of this genus, however curious, can, as yet, be but imperfectly defined; nor are we certain how far the *Arcyria*, *Stemonitis*, *Cribraria*, &c. of Perfoon are entitled to rank as generically distinct.

TRICHIASIS, (derived from $\tau\rho\iota\chi\eta$, the hair,) in Surgery, sometimes also named *entropion*, denotes a faulty inclination of the eye-lashes inwards against the globe of the eye. According to Scarpa, the disease presents itself under two distinct forms: the first is, where the cilia are turned inwards, without the natural position and direction of the tarsus being at all changed; the second consists in a morbid inclination of

the tarsus, and consequently of the eye-lash towards the ball of the eye.

The first form of this disease is very rare, nor has it come under the observation of the experienced Scarpa more than once; and in this instance, only some of the hairs had changed their direction. The second species or form of trichiasis, or that which consists in a folding inwards of the tarsus and cilia at the same time, is that which is commonly met with in practice. This may be either complete, affecting the whole of the tarsus; or incomplete, occupying only a certain portion of the edge of the eye-lid, and most frequently near the external angle of the eye. Sometimes the disease is confined to one eye-lid; at other times it affects both; and occasionally the patient is afflicted with it in both eyes.

To these two species of trichiasis, some writers have added a third, which they call *distichiasis*, and which they suppose to be produced by a double and unusual row of hairs. But this third species, as Scarpa observes, is only imaginary, and the reason of such subdivision seems to have arisen from not recollecting what was long ago remarked by Winslow and Albinus, that although the roots of the cilia appear to be disposed in one line only, they nevertheless form two, three, and in the upper eye-lid even four rows of hairs, unequally situated, and as it were confused. Whenever, therefore, in consequence of disease, a certain number of hairs are separated from each other in a contrary direction and disorderly manner, the eye-lash will appear to be composed of a new and unusual row of them, while, in fact, there has been no change, either with respect to their number or natural implantation.

It is not an easy matter to determine precisely, says Scarpa, what are the causes which sometimes make a few of the hairs deviate from their natural direction, while the tarsus continues in its right position. They are commonly referred to cicatrices in consequence of previous ulceration, whereby the cilia fall off, and those which are growing are hindered from taking their proper direction. There must, however, be other causes sometimes concerned; for in the case seen by professor Scarpa, two or three hairs were turned inwards against the eye-ball, although there had been no preceding ulceration, nor cicatrices of any part of the tarsus. Indeed Scarpa is inclined to believe, that the small ulcers and scars which are sometimes formed upon the internal margin of the tarsus, are more likely to produce the second form of the disease, or the inversion of the edge of the eye-lid, and consequently of the cilia towards the globe of the eye. As these ulcers, when neglected, destroy the internal membrane of the eye-lids near the tarsus, it necessarily follows, that in proportion as they heal and diminish, they draw along with them and turn inwards the tarsus, and hairs inserted into it. And since these little ulcerations do not always occupy the whole extent of the internal margin of the eye-lid, but are sometimes confined to a few lines, in the middle or extremity, near the external angle of the eye-lid; so after the cicatrices are formed, the whole of the hairs are not invariably turned inwards, but only a certain number of them, which correspond to the extent of the ulcers previously situated along the internal edge of the tarsus. Indeed, in every case of imperfect trichiasis from a cicatrix of the inner margin of the eye-lid, the tarsus and cilia are every where in their natural situation, except opposite the part where the ulcers formerly existed. Also, if the eye-lid be everted, its internal membrane, near that part of the margin corresponding to the seat of the trichiasis, will be found pale, rigid, and hardened, the inversion of its cartilaginous border and of the cilia being plainly a consequence of the contraction of the cicatrized point.

Besides these causes, there are others which may produce the complaint. Chronic ophthalmies of long continuance sometimes have this injurious effect, in consequence of the skin of the eye-lid being kept for a long time in a state of distention and œdema, terminating in a relaxation of them. The cartilaginous margin of the eye-lid then loses the proper support of the integuments, inclines towards the eye-ball, and afterwards turns inwards, drawing the eye-lashes along with it in the same improper direction. Long-continued puriform discharges from the ciliary glands, likewise spoil the shape and consistence of the cartilage of the eye-lid, and therefore not unfrequently occasion trichiasis. Scarpa doubts, whether a spasmodic contraction of the orbicularis palpebrarum muscle can ever be a cause of the disease, notwithstanding what Mr. B. Bell has asserted upon the subject.

The annoyance which must necessarily result from the hairs perpetually pressing upon the cornea and white of the eye, may be easily imagined, even by those who have little acquaintance with surgery. The evil is rendered still greater, by the hairs which are turned inwards becoming much longer and thicker than those which retain their natural direction. And although the trichiasis be confined to one eye, both the eyes usually suffer from the effects of the disease. Indeed, generally the eye on the sound side cannot be moved without occasioning pain in that which is exposed to the irritation and friction of the inflected hairs. In almost all instances, both the eyes are very irritable, and incapable of bearing the light. As, in cases of incomplete trichiasis, the patient retains some little power of opening the eye-lids for the purpose of seeing, and that most frequently towards the internal angle of the eye, the head and neck are often inclined in an awkward manner, so that in children a distortion of the neck and shoulders is at last produced, which cannot be rectified without difficulty, even after the trichiasis is cured. Unfortunately, also, children are impatient of the uneasiness arising from the inflected hairs, and, therefore, are continually rubbing the eye-lids, which act very much increases all the ill effects of the complaint, such as the varicose chronic ophthalmia, opacity, and ulceration of the cornea.

The cure of the second species of trichiasis, or that which is commonly met with in practice, is accomplished by artificially everting the eye-lid, and fixing it permanently in its natural position, together with the eye-lashes, which so grievously irritate and press against the globe of the eye. According to professor Scarpa, this indication is perfectly fulfilled by the excision of a piece of the skin close to the edge of the eye-lid, of such a breadth and extent, that when the cicatrix is formed, the tarsus and margin of the eye-lid may be turned outwards, and sufficiently separated from the eye-ball, the cicatrix of the integuments affording a point of support fully adequate to keeping the parts in their natural position and direction. Scarpa believes that there are now very few modern surgeons, who, with a view to the radical cure of this disease, place any confidence either in plucking out the inverted eye-lashes, bending them outwards, and retaining them so by means of adhesive plaster, or in plucking them out and destroying their roots with caustic: much less in extirpating the edge of the eye-lid along with the hairs, or dividing the orbicularis muscle on the internal surface of the eye-lid, under an idea that the disease is sometimes produced by a spasmodic contraction of it.

The following is the mode of proceeding recommended by Scarpa: the patient being seated in a chair, if an adult, or, if a child, laid upon a table, with the head raised, and firmly held by an assistant, who must stand behind the patient, the surgeon is to push outward, with the end of a

probe, the hairs which irritate the eye. Then, with a pair of dissecting forceps, or the ends of his fore-finger and thumb, (which answer equally well, and, in many cases, much better than forceps,) the operator should lift up a fold of the skin of the affected eye-lid, taking great care that the piece which is taken hold of, corresponds exactly to the middle of the whole extent of the trichiasis; for, as we have already explained, sometimes the whole, sometimes a half, and, in other instances, only a third of the extent of the tarsus is inverted. The surgeon, with his left-hand, must raise the fold of the skin, more or less, according as the relaxation of the integuments, and the inversion of the tarsus, are more or less considerable. The reason of this is exceedingly evident, *viz.* that the greater the quantity of skin which is raised, the greater is the quantity which will be cut away. Supposing the patient to be an adult, as soon as the fold of skin has been raised in a certain degree, the surgeon must request him to open his eye, and if, in this act, the tarsus and eye-lashes resume their natural place and direction, the portion of skin already raised will be sufficient for the purpose. We must trust to our own judgment with regard to children, as they seldom let us have recourse to the mode of discrimination just related. When the integuments are elevated by means of a pair of dissecting forceps, and care is taken to lay hold of the skin precisely at the middle point of the whole extent of the trichiasis, it necessarily follows, that the consequent section of the skin will form an oval, and that the greatest width of the wound will correspond exactly, or nearly so, to the middle of the eye-lid, and its narrowest parts to the angles, or commissures of the same. This contributes very materially to make the cicatrix correspond to the natural fold of the eye-lid, and hinder the origin of a disease of an opposite nature to the one about to be remedied, towards the angles of the eye, *viz.* an eversion of the commissures of the eye-lids. See ECTROPIUM.

Besides this caution relative to the situation and figure of the fold of the integuments to be cut off, the surgeon must be careful that the division of the skin be made very near the inverted tarsus. Were this circumstance neglected, the operator might have the mortification of finding, after the wound is healed, that although the eye-lid is shortened, on the whole, from the eye-brow to the place of the resection, yet it is not equally so at the space which is between the edge of the eye-lid and the cicatrix of the skin. Hence the tarsus would remain inverted as before, or not be sufficiently turned outward to keep the eye-lashes from rubbing against the eye. This inconvenience would oblige the patient to submit to a second operation, done lower down than the first.

Things being thus arranged, the surgeon, holding up the fold of skin by means of the forceps in his left-hand, is with a pair of probe-pointed, sharp curved scissors, to cut off the whole of the duplicature, being first sure that one of the blades of the instrument is applied close to the edge of the eye-lid. If both eye-lids should be affected, the same operation must immediately be done upon both of them, with such cautions, and in such proportion, as the extent of the disease, and the degree of inversion of each eye-lid may require.

Scarpa next dissuades us from employing any suture to unite the wound, and represents, that it will be sufficient to keep the eye-brow as much downward as possible, if the operation has been done on the upper eye-lid, or, if on the lower, to support it against the inferior arch of the orbit, by pressing it from below upwards, so as to keep the edges of the wound from becoming separated. Then the lips of the

TRICHIASIS.

the wound are to be put into exact contact, by means of strips of adhesive plaster, which should extend from the superior arch of the orbit to the zygoma, and the support of the wound in apposition will be still more securely effected by placing two compresses, one on the eye-brow, and another on the zygoma, together with a bandage.

On taking off the first dressings, the third day after the operation, the surgeon will find that the patient can open his eye with ease, and that the inverted tarsus and eyelashes have resumed their natural position and direction. In the partial or incomplete trichiasis, or that which only occupies a half, or a third of the whole length of the tarsus, and in subjects who have had the skin of the eye-lids very loose, Scarpa has often had the pleasure of finding the wound perfectly united on removing the first dressing.

When, however, only a part of the incision has healed, while the rest seems disposed to heal by suppuration and granulation, the surgeon covers the wound with a small piece of lint, spread with the unguentum cerussæ; and if the sore should become flabby, it must be touched, every now and then, with the *argenteum nitratum*, until the cure is perfected, which commonly happens in the course of a fortnight.

Thus far, Scarpa's observations have related to the radical cure of the second, or most frequent kind of trichiasis.

With regard to the first form of this disease, or that in which the eye-lashes project against the eye-ball, without the natural position of the tarsus being at all altered (a case which is fortunately very rare), the accomplishment of a cure is very difficult, since, as we have already explained, neither the pulling out of the hairs, nor burning the situation of their roots, are means at all to be depended upon for producing a complete cure of the disorder; and since turning the tarsus out of its natural position would make the patient liable to an irremediable flowing of the tears over the cheek, attended with a chronic thickening of the lining of the eyelid. The treatment of this species of trichiasis is still imperfectly understood, and seems to claim more attention than appears hitherto to have been paid to it. In the instance of this form of the disease which Scarpa met with, only two or three of the eye-lashes inclined against the eye-ball. He found, on turning the eye-lid a little out, opposite to the situation of the faulty hairs, that he could not, indeed, completely put them in their natural position; but he saw that he could thus remove them so far from the cornea, that they would not rub against it, without altering the position of the eye-lids so much as to occasion a perpetual discharge of the tears over the cheek. And, as in the patient alluded to, the skin about the eye-lid was very tense, Scarpa deviated from the above rule, by making an incision with the back of a lancet, near the tarsus, three lines long, and he took away a small piece of skin of the same length; but very little more than one line broad. When the cut healed, the operation was found to answer as well as the nature of the case would allow, though the cure was not complete, nor would it have obviated all inconveniences in cases of greater extent.

The trichiasis being cured, something more always remains to be done, for the purpose of correcting the cause of the disease, as well as curing the disorder of the eye, occasioned by the previous friction and irritation of the inverted hairs. The usual indications are, to restore the tone of the vessels of the conjunctiva, to lessen the swollen Meibomian glands, and to remove any cloudiness of the cornea.

Two new methods of performing the operation, for the

cure of trichiasis, have been recently proposed by Dr. Crampton and Mr. Saunders.

The following is the account which Dr. Crampton gives of his plan, which he tried in one instance with complete success. "Let the eye-lid be well turned outwards by an assistant; let the operator then with a lancet divide the broad margin of the tarsus completely through, by two perpendicular incisions, one on each side of the inverted hair or hairs; let him then, by a transverse section of the conjunctiva of the eye-lid, unite the extremities of the perpendicular incisions. The portion of cartilage contained within the incisions, can then, if inverted, with ease be restored to its original situation, and retained there by small strips of adhesive plaster, or perhaps, what is better, by a *suspensorium palpebræ*, adapted to the length of the portion of the tarsus which it is intended to sustain, should one or two hairs be displaced without inversion of the tarsus." *Essay on the Entropion*, p. 55.

Mr. Saunders entertained a favourable opinion of Dr. Crampton's operation for the cure of the disease in its early stage; but he contended, such a vicious bending of the tarsus inward was often the consequence of repeated ophthalmia, attended with ulceration of the conjunctiva and inside of the eye-lid; and that every endeavour to rectify the wrong position of the tarsus, and restore its original direction, would be fruitless. Hence, he believed, that its excision was decidedly indicated; an operation which is said to be followed by no pain nor uneasiness, and which is sure in its effect. No particular shortening of the eye-lid ensues; the deformity is materially lessened; and unless the cornea be already too opaque, perfect vision is re-established.

Mr. Saunders directs a piece of thin horn, or a plate of silver, having a curvature corresponding to that of the eye-lid, to be introduced under this part, with its concavity towards the eye-ball. On this instrument the eye-lid is to be stretched. An incision is to be made through the integuments and orbicularis palpebrarum, down to the tarsus, immediately behind the roots of the cilia. The cut should extend from the *punctum lachrymale* to the external angle. The exterior surface of the tarsus is then to be dissected, until the orbital margin is exposed, when the conjunctiva is to be cut through directly by the side of the tarsus, which must now be disengaged at each extremity. The *punctum lachrymale* must be left uninjured. The operation is described as being exceedingly simple, and if any embarrassment arises, it is from the hæmorrhage of the ciliary artery, the blood sometimes obscuring the *punctum lachrymale*, just when the operator is about to divide the tarsus by the side of it. No dressings are required, it being merely necessary to keep the eye covered for a few days. The skin will continue to be elevated, just as the perfect eye-lid was; and though less completely, yet enough to leave the pupil clear, when the eye is moderately directed upward. In all the cases in which Mr. Saunders operated, a fungus grew from the wound. He recommends the excrescence to be destroyed with caustic, or the knife.

Respecting this operation, we shall merely observe, that it is more severe than that advised by professor Scarpa, and must leave more disfigurement. Unless, therefore, the latter method prove ineffectual, we see no reason for abandoning it.

Inversion of the lower eye-lid is much less common than that of the upper one. The late Mr. Saunders never saw this disease arise from the same causes which induce it in the upper eye-lid, though he acknowledges the possibility of such a case. However, he met with several instances of the affection, in consequence of encysted tumours, which,

as they increased, carried the orbital edge of the tarsus outwards, and, in the same proportion, inclined the ciliary edge towards the globe of the eye.

An inversion of the inferior palpebra is sometimes produced by inflammation and swelling of that part of the conjunctiva which connects the eye-lid with the eye-ball. In cases of ophthalmia, this membrane often forms between the latter parts a distinct fold, which is situated just on the inside of the orbital edge of the tarsus, and pushes it outward; while the contraction of the orbicularis muscle turns the ciliary edge inwards, and inclines it between the swelling of the conjunctiva and the eye. In this particular case, Mr. Saunders assures us, that replacing the eye-lid in the early stage of the disease, and maintaining it so, until the ophthalmia has been lessened by proper means, will be found effectual. But when the conjunctiva is much thickened and indurated, Mr. Saunders recommends cutting such diseased part of it away, and the application of compresses to keep the orbital margin of the tarsus inward.

Albinus has recorded a species of trichiasis, which originated from the growth and inversion of one of the hairs upon the caruncula lachrymalis. The plan of relief consisted in plucking out the irritating hair; but, as Scarpa observes, it should have been mentioned whether the hair grew again, and in what direction. Scarpa on Diseases of the Eyes, ch. 4. Saunders on Diseases of the Eyes, chap. 3. Crampton on Entropion. S. Cooper's Practice of Surgery, p. 308. edit. 3.

TRICHIDES, in *Ichthyology*, a name used by the ancients for a fish of the harengiform kind, probably the pilchard, which they called also *sardinia* and *sardella*.

TRICHILIA, in *Botany*, a name apparently originating with Browne, and which De Theis has derived from *τριχια*, *three-fold*, no otherwise applicable to this fine genus, than as the capsule has three cells and three valves, very conspicuous in Sloane's figure of the original species, which probably the author had under his eye. Professor Martyn leaves this name unexplained.—Browne Jam. 278. Linn. Gen. 211. Schreb. 285. Willd. Sp. Pl. v. 2. 552. Mart. Mill. Dict. v. 4. Ait. Epit. 375. Swartz Ind. Occ. 730. Juss. 265. Poiret in Lamarck Dict. v. 8. 56. Gært. t. 95. (Portesia; Cavan. Diff. 369.)—Class and order, *Decandria Monogynia*. Nat. Ord. *Tribilate*, Linn. *Meliæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, bell-shaped, short, with five small teeth. *Cor.* Petals five, lanceolate, spreading. Nectary cylindrical or conical, tubular, with ten teeth, shorter than the petals, formed, as it were, out of the ten combined filaments. *Stam.* Filaments none; anthers ten, erect, sessile on the margin of the nectary, and rising above it, deciduous. *Pist.* Germen superior, obovate, obscurely three-lobed; style short; stigma capitate, with three notches. *Peric.* Capsule roundish, slightly triangular, of three cells, and three valves at length reflexed, with partitions from the centre of each. *Seeds* solitary, pendulous, ovate, with a pulpy coat, or tunic.

Ess. Ch. Calyx with about five small teeth. Petals five. Nectary cylindrical, bearing the anthers on its teeth. Capsule of three cells, and three valves. Seeds solitary, with a pulpy coat.

Obf. The parts of the flower vary, or differ in different species, from five and ten to four and eight. The cells and valves of the capsule are, in some instances, but two, as in the *Portesia* of Cavanilles. The seeds have truly a more or less pulpy coat, though not a distinct tunic. It is remarkable that Cavanilles has not admitted *Trichilia* into his Dissertations on Monadelphous Plants, where this genus is as much

entitled to a place as any others of Jussieu's *Meliæ*. Probably he was not furnished with any materials to describe or delineate the species. The gardens certainly could not supply him.

1. *T. birta*. Green-flowered *Trichilia*. Linn. Sp. Pl. 550. Willd. n. 1. Swartz Obf. 171. (T. n. 1; Browne Jam. 278? Pruno forte affinis arbor, folio alato, flore herbaceo pentapetalo racemoso; Sloane Jam. v. 2. 128. t. 220. f. 1.)—Leaves pinnate, of about seven elliptical, pointed, smooth leaflets. Clusters dense, stamens combined.—Native of Jamaica, in the meadows about Kingston and other places, on a dry gravelly soil. Browne calls it a *shrub*; Sloane a *tree*, about twenty feet high, with a smooth greyish bark, and sending out at the height of seven feet, or more, several declining *branches*. The *leaves* are scattered, not numerous, pinnate with an odd one; the *leaflets* opposite, an inch and half long, uniform, smooth, entire, dark green, on short partial stalks. *Flowers* greenish-white with purple *anthers*, in axillary compound clusters. Browne says the *seeds* of all the species are enveloped in a scarlet waxy substance. Linnaeus, and perhaps Browne, confounded this with the following. We do not find much reason for the specific name *birta*, which seems more applicable to the following.

2. *T. spondioides*. White-flowered *Trichilia*. Jacq. Amer. 128. Hort. Schoenbr. v. 1. 54. t. 102. Willd. n. 2. Swartz Ind. Occ. 730. (Euonymus caudice non ramoso, folio alato, fructu rotundo tripyreno; Sloane Jam. v. 2. 103. t. 210. f. 2, 3.)—Leaves pinnate, of about fifteen ovato-lanceolate, pointed leaflets; downy at the edges. Clusters rather lax. Stamens distinct.—Native of mountainous woods in Jamaica and Hispaniola, flowering in the spring. Swartz. In the stove at Schoenbrun, according to Jacquin, it blossomed in September and October.—The *stem* is fifteen or twenty feet high, slightly branched at the top. *Leaves* a foot long; their *leaflets* much more numerous than the former, ovato-lanceolate, not elliptical, more or less hairy, especially at the edges. *Clusters* several, less crowded than in the foregoing. *Flowers* yellowish or greenish-white. *Stamens* not united, though closely converging into a cylinder, or cone. *Capsule* roundish, downy, the size of a small cherry. We should conceive this rather to be Browne's plant, which he terms *subbirsuta*, but we have no specimen to determine the point.

3. *T. emetica*. Emetic Arabian *Trichilia*. Vahl Symb. v. 1. 31. Willd. n. 3. (Elcaja; Forst. Ægypt.-Arab. 127.)—"Leaves pinnate; leaflets elliptical, downy beneath, the outer ones largest."—Frequent on the mountains of Yemen. The Arabs call this tree *Roka*. The *flowers* resemble orange-blossoms. The *fruit*, mixed with perfumes, is used by the Arabian women for washing their hair. The ripe *seeds* are made into an ointment with oil of *Sesamum*, against the itch. Forskall found mention of the *fruit*, in an Arabic book, as an emetic, by the name of *Djouz elkai*, whence he took his barbarous generic name above quoted. He describes this species as a large *tree*, with alternate downy *branches*. *Leaves* alternate, pinnate with an odd one, of nine oval-oblong, stalked *leaflets*, the lower ones two inches in length, the upper or outer ones three; all smooth above, but, according to Vahl, downy beneath; their *common stalk*, about a span long, is also downy. *Stipules* none. *Stalks* axillary, corymbose pinnated. *Flowers* twice the size of the last, greenish-yellow. *Stamens* united half way up. *Capsule* obovate, downy, an inch long, with two *seeds* in each cell. Forskall, Vahl.

4. *T. glabra*. Smooth Havannah *Trichilia*. Linn. Syst. Nat. ed. 12. v. 2. 294. Willd. n. 4. (T. havanensis; Jacq. Amer. 129. t. 175. f. 38.)—Leaves pinnate; leaflets obovate, obtuse, smooth; tapering at the base; the outermost

TRICHILIA.

most gradually largest.—Native of mountainous woods about the Havannah. A lofty, branched, spreading tree, exhaling a fetid, very disagreeable scent. *Leaves* of from five to seven smooth and shining leaflets, nearly sessile; on a slightly winged stalk, about five inches long. *Clusters* axillary, very short. *Capsules* globose, greenish. *Jacquin*.

5. *T. pallida*. Pale Trichilia. Swartz Ind. Occ. 733. Willd. n. 5. (Portesia ovata; Cavan. Diff. 369. t. 215.)—Leaves pinnate; leaflets smooth, membranous, elliptic-oblong. Clusters axillary, simple, somewhat aggregate. Flowers four-cleft, octandrous. Capsules of two valves only.—Native of bushy places, in the mountainous parts of Hispaniola, flowering in February and March. A tree, whose trunk is from twelve to fifteen feet high, branched, smooth, with nearly horizontal, smooth, round, subdivided branches. *Leaves* large and handsome, thin, reticulated with innumerable veins. *Leaflets* from two to five inches long, the outermost gradually largest, the partial stalk of the terminal one not longer than the rest. *Clusters* about an inch long, usually two or three together, somewhat downy, or silky. *Flowers* whitish. *Calyx* and *petals* downy. *Nectary*, or eight combined *stamens*, externally smooth, hairy within at the summit. *Capsule* roundish, of two cells and two valves, with two seeds in each cell, one above the other, invested with scarlet viscid pulp.

6. *T. moschata*. Musky Trichilia, or Musk-wood. Swartz Ind. Occ. 735. Willd. n. 6.—Leaves alternately pinnate; leaflets ovate, pointed, smooth. Clusters axillary, compound. Flowers four or five-cleft, monopetalous. Nectary undivided. Capsule with one seed.—Found in old woods of the northern part of Jamaica, flowering in May. The inhabitants know this tree by the name of *Musk-wood*, because every part, the bark, bruised leaves, flowers, and fruit, smell powerfully of musk. The pulp of the seed has a sweet taste. The trunk is twenty feet high, or more. *Leaflets* alternate, veiny; shining on the upper side; on very short partial stalks; their common stalk hoary. *Clusters* solitary, erect, of many small whitish flowers. *Calyx* downy. *Corolla* in four or five deep ovate segments, with a short tube. *Nectary* scarcely longer than the tube of the corolla, undivided, bearing rarely more than eight anthers, though the corolla is generally five-cleft. *Capsule* down, of three or four valves. *Seed* solitary, like a drupa with a brittle skin, and a juicy rich scarlet pulp, including a hard oblong kernel, separable into two parts.

7. *T. odorata*. Sweet-scented Trichilia. Andr. Repof. t. 637. Ait. Epit. 375.—Leaves oppositely pinnate; leaflets elliptic-lanceolate, pointed, smooth. Clusters axillary, compound, dense. Petals four. Nectary in ten double-pointed segments, with a slightly stalked anther between the points.—Native of the West Indies? It was sent by Dr. A. Anderson, from the botanic garden at St. Vincent's to Sir Abraham Hume, about the year 1801, and flowered in his stove at Wormleybury, in 1810. The plant has a musky scent, but appears otherwise different from the last. The leaflets are seven or nine; their common stalk smooth, except when very young. *Flowers* pale green, numerous, in short, dense, compound clusters. We find them, as described in Mr. Andrews's work, with four broad-ovate separate petals, though the nectary consists of ten flat segments, united half way up, deeply forked at the summit, and each bearing from the fork an ovate, inflexed, two-celled anther, on a very short slender stalk, or filament. Nothing is known of the fruit.

8. *T. spectabilis*. Handsome New-Zeeland Trichilia. Forst. Prodr. 33. Willd. n. 7.—Leaves pinnate; leaflets obovate. Clusters axillary, compound.—Gathered by

Forster in New Zealand. His specific character, all we know of the plant, is not sufficient to distinguish it from our fourth species, *T. glabra*, though the two species are probably widely different.

9. *T. alliacea*. Garlick Trichilia. Forst. Prodr. 33. Willd. n. 8.—Leaves pinnate; leaflets lanceolate, acute. Clusters axillary, repeatedly compound.—Native of the island of Namoka.

10. *T. glandulosa*. Glandular-veined Trichilia.—Leaves pinnate; leaflets five or seven, elliptic-lanceolate, bluntly pointed, with axillary hairs on their veins beneath. Petals four. Nectary undivided. Stigma depressed.—Native of New South Wales, near Port Jackson. A specimen from thence was communicated to us by Sir Joseph Banks, under the name of *T. octandra* of Solander, which not being published, we presume to change, as the octandrous species of this genus are numerous, though this only was then known to the great botanists who first discovered it. The leaves agree nearly with *T. heterophylla*, hereafter described, in size and shape, but are all pinnate, and remarkable for axillary glands, bearing tufts of hairs, along the mid-rib of each leaflet beneath, as in the Laurustinus, of which we perceive no indications in any other species, except perhaps the first. *Clusters* axillary, solitary, stalked, an inch or two in length, simple, of few flowers. *Calyx* four-cleft, minutely fringed. *Petals* four. *Nectary* undivided. *Anthers* eight, sessile. *Stigma* capitate, broad. *Capsule* triangular, depressed, with three deflexed lobes. *Seeds* in a red, pulpy, elastic tunic.

11. *T. heterophylla*. Various-leaved Trichilia. Willd. n. 9. (Portesia mucronata; Cavan. Diff. 370. t. 216.)—Leaves pinnate or ternate; leaflets elliptic-obovate, pointed. Clusters simple, axillary and terminal. Petals four. Nectary undivided. Anthers eight. Stigma club-shaped.—Gathered by Commerçon in Madagascar. *Leaves* smooth; of three or five stalked, mostly elliptical, taper-pointed leaflets, near two inches long. *Clusters* an inch long, solitary or in pairs. *Flowers* small, four-cleft. *Fruit* unknown.

12. *T. trifoliata*. Three-leaved West Indian Trichilia. Linn. Sp. Pl. 551. Willd. n. 10. Jacq. Amer. 129. t. 82. Vahl Symb. v. 1. 31. (*T. quæ* Halesia Loeffingii; Loeff. It. 188.)—Leaves ternate; leaflets obovate, polished, obtuse; tapering at the base; the odd one much the largest.—Native of South America, and some of the West Indian islands, flowering in April and May. A tree fifteen feet high, exhaling from every part a disagreeable, though not powerful, odour. *Leaves* alternate, stalked; their two opposite leaflets an inch long, the odd one two inches; all very obtuse, tapering greatly at the base, without any partial stalks. *Clusters* axillary, very short, of about six small, whitish, five-cleft flowers. *Capsule* green, with brownish dots, globose, of three valves. *Seeds* with a scarlet skin. The negro women are said to procure abortion by a decoction of the roots. *Jacquin*.

13. *T. nervosa*. Three-leaved East Indian Trichilia. Vahl Symb. v. 1. 31. Willd. n. 11. (Melia Koetjape; Burm. Ind. 101, excluding Plukenet's synonym.)—Leaves ternate; leaflets ovate, acute; their ribs hairy beneath.—Native of Java. *Branches* downy at the extremity. *Leaves* stalked; leaflets on short stalks, entire, two inches long, and we presume all three about equal in size; common stalk downy, the length of the leaflets, shorter than the axillary upright flower-stalks. *Flowers* in short dense panicles, with a lanceolate bractea at the base of each. *Calyx* and *corolla* villous.

14. *T. spinosa*. Thorny Trichilia. Willd. n. 12. ("Turraea virens; Hellenius in Stockh. Transf. for 1788. 294. t. 10. f. 1." We suspect an error in the page.)—Leaves simple,

simple, ovate, emarginate. Branches spinous."—Native of the East Indies. Fruit a berry of three cells, with a seed in each; hence this plant seems intermediate between *Trichilia* and *Limonia*. Willdenow. We know nothing of it, but there appears little reason to place it here.

The genus *Trichilia* is sufficiently natural, notwithstanding the aberrations of structure in the *nectary*, or *stamens*, and of number in other parts of the *flower*. The species are by no means well determined, or correctly named. One alone has appeared in the European stores, nor are well-ascertained specimens frequent in collections. The presence or absence of axillary glands on the *leaves*, and the structure of the part bearing the *anthers*, whatever it may be called, seem to promise the best marks of specific distinction. The seeds in *T. glandulosa*, the only one whose fruit has fallen under our examination, are each inclosed in a rigid, elastic, permanent, bivalve *tunic*, whose outside is clothed with red pulp. Whether this be precisely the case in the rest, the descriptions of authors are not exact, nor consistent, enough to help us to determine.

TRICHINIUM, from $\tau\rho\iota\chi\iota\nu\mu$, a hair, alluding to the shaggy aspect of its flowers.—Brown Prodr. Nov. Holl. v. 1. 414.—Class and order, *Pentandria Monogynia*. Nat. Ord. *Amaranthaceæ*, Juss. Brown.

Ess. Ch. Calyx in five deep linear segments. Stamens connected at their base, without teeth. Anthers of two cells. Stigma capitate. Capsule without valves, single-seeded, inclosed in the converging base of the calyx, whose segments are spreading and feathery.

The species of this genus are herbaceous, generally perennial, with alternate *leaves*. Flowers terminal, capitate or spiked, each accompanied by three membranous shining *bractæas*. The hairs of the *calyx*, at first close, subsequently become extended, and give the segments a feathery aspect. *Trichinium* is truly, as its learned author observes, very closely related to *Ptilotus*; see that article. We should indeed feel no scruple in considering them one genus. Perhaps they ought strictly to be referred to the class *Monadelphica*, or at least they, and their Linnæan allies *Gomphrena*, *Achyranthes*, *Celofia*, &c. should be indicated at the head of that class, for the convenience of young botanists. Why the latter were not all placed there by the author of the sexual system, to the great relief of his fifth class, can only be attributed to his peculiar idea of the structure of their flowers. He calls a *nectarium*, what Mr. Brown esteems the united base of their filaments; but we believe an enlarged consideration of the whole tribe will justify the latter opinion.

1. *T. sufforme*.—Leaves linear, very narrow, smooth as well as the branches. Stems numerous. Root spindle-shaped. Heads of flowers nearly ovate. Bractæas acute, single-ribbed.—Gathered by Mr. Brown, in the tropical part of New Holland.

2. *T. gracile*.—Leaves linear, very narrow, smooth. Stem nearly simple. Head of flowers almost globular. Bractæas obtuse, ribblefs. Filaments unequal.—Found in the same country.

3. *T. diftans*.—Leaves linear, very narrow, smooth as well as the branches. Spike elongated, rather lax.—From the same country.

4. *T. spatulatum*.—Radical leaves obovato-spatulate, flat, smooth. Spike cylindrical.—Gathered by Mr. Brown in Van Diemen's island.

5. *T. macrocephalum*.—Stem-leaves lanceolate, wavy, smooth as well as the angular branches. Spike oblong, with a woolly stalk.—Native of the fourth coast of New Holland.

6. *T. intanum*.—Leaves lanceolate, hoary and downy as well as the round branches. Spikes nearly ovate, lateral as well as terminal.—Gathered by M. Baudin, on the west coast of New Holland.

We have seen no specimens of this genus, any more than of *Ptilotus* above-mentioned.

TRICHIRI, in *Geography*, a small island in the Grecian Archipelago; 5 miles E. of Spécia.

TRICHISMOS, from $\tau\rho\iota\chi\iota\varsigma$, the hair, in *Surgery*, a capillary fissure, or fracture of the skull, so called from its being so fine as to resemble a hair put upon the bone.

TRICHIURUS, in *Ichthyology*, a genus of the order of Apodes; the characters of which are, that the head is extended, with lateral opercula or gill-covers; that the teeth are ensiform, and semi-sagittated at the apex or tips; that it has seven branchiostegous or gill-membrane rays; that the body is compressed and ensiform, and the tail subulated, without any fin: whence it is called *lepturus*, and in English *needle-tail*. There are two

Species.

LEPTURUS or *Argentus*; Silvery Trichiurus. With the lower jaw longer than the upper; and equally distinguished by the singularity of its shape, and brilliancy of its colour; the body very compressed, tapering towards the extremity, and terminating in a fine point: the whole body, except the fins, of a bright silver-colour; the head narrow and the mouth wide; the lateral line of a gold-colour, commencing at the gills and continued to the tip of the tail; the dorsal fin moderately wide, transparent, and of a yellowish tinge, commencing almost immediately behind the head, and terminating near the end of the tail in a mere membrane, the other parts being strongly radiated; the pectoral fins small and of an oval shape; without any direct vent-fin, but having a series of very small naked spines or rays, about 110 in number, continued from the vent, which is situated about the middle of the body, to nearly the tip of the tail. Its general length is from two to three feet: it is said to be very voracious, swims with rapidity, and in the pursuit of its prey sometimes leaps into small vessels, which happen to be sailing by it. It is a native of the rivers and larger lakes of South America, and is considered as an eatable fish: it is also found in some parts of India and in China.

INDICUS, or *Electricus*, or *Fuscus*; Brown Trichiurus. With jaws of equal length; nearly equal in size to the preceding, but different in the conformation of the jaws, which are of equal length, and in the form of its teeth, which are very minute; the tail less slender and sharp, and the colour of the whole fish pale brown, variegated with spots of a deeper cast: a native of the Indian seas, and possessing a degree of electrical power.

TRICHOCARPUS, in *Botany*, from $\tau\rho\iota\chi\iota\varsigma$, $\kappa\rho\iota\tau\iota\varsigma$, a hair, or bristle, and $\kappa\rho\iota\tau\iota\varsigma$, fruit; alluding to the remarkable prominent rigid bristles, projecting from every part of the capsule.—Schreb. Gen. 366. Willd. Sp. Pl. v. 2. 1224. Mart. Mill. Dict. v. 4. (Ablania; Aubl. Guian. 585. Juss. 440. Lamarck Illustr. t. 479.)—Class and order, *Polyandria Digynia*. Nat. Ord. uncertain, Juss. Perhaps akin to his *Tiliaceæ*.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, in four or five deep, ovate, acute, spreading, permanent segments. *Cor.* none. *Stam.* Filaments numerous (sixty or seventy), capillary, longer than the calyx, inserted into the receptacle; anthers small, roundish. *Pist.* Germen simple, superior, ovate, villous; styles two, thread-shaped, erect, much longer than the stamens, divided at the summit; stigmas obtuse. *Peric.* Capsule elliptical, with four angles, one cell, and four valves,

valves, clothed all over with numerous rigid, projecting deciduous bristles. *Seeds* numerous, small, inserted into an ovate-oblong, central, unconnected receptacle, and enveloped in a viscid membrane.

Eff. Ch. Calyx in four or five deep segments. Corolla none. Styles two, divided. Capsule bristly, of one cell and four valves, with many seeds.

1. *T. laurifolia*. (*Ablania guianensis*; Aubl. t. 234.) Laurel-leaved Ablani, or *Trichocarpus*.—Found by Aublet, on the banks of rivers in Guiana, particularly about one which empties itself into the Sinemari river, thirty leagues above its mouth. This tree bears flowers and fruit in November, and is known to the Caribbee Indians by the name of *Goulougou-Ablani*. Its trunk is forty or fifty feet high, about two feet and a half thick, with a smooth reddish bark; the wood white, with some redness at the heart. *Branches* numerous and widely extended in all directions. *Leaves* alternate, stalked, elliptical, bluntly pointed, entire, rigid, smooth, undulated, with one rib and many transverse veins; their greatest length seven inches; breadth two and a half. *Flowers* small, in short, simple, axillary or terminal, spreading clusters. *Stamens* white, with yellow anthers. *Capsule*, when its bristles are fallen, about the size of a filberd. Its valves are likewise soon deciduous, leaving the seeds enveloped in a red viscid membrane. Nothing is recorded of the use or qualities of any part.

TRICHOCEPHALUS, in *Zoology*, a genus of the Infestina order of Vermes; the characters of which are, that the body is elastic and contorted, the hinder part thick and elevated, the anterior capillary and of double length, sometimes terminating knotty. Of this genus there are six species, distributed into two classes: *viz.*

* *With simple Head.*

HOMINIS. Above subcrenated, beneath smooth, fore-part very subtilely striated; two inches long.

EQUI. Two inches and a half long.

APRI. With tail on both sides furnished with crenated scales; equal to the human.

MURIS. With the head three-knotted: found in the intestine of the mouse, between the duodenum and rectum.

VULPIS. With an acute head; neck transversely striated, and unilateral vesicles. Found in the cæcum of the fox.

** *With uncinated or hooked Head.*

LACERTÆ. With tail on both sides scaly. Found in the intestines of the lizard.

TRICHODA, a genus of the Infusoria order of Vermes; the characters of which are, that the worm is inconspicuous with the naked eye, pellucid, and hairy on the other part. Gmelin's edition of Linnæus comprehends forty-seven species.

* *Without a Tail.*

PATELLA. Univalve; before and behind furnished with extended unequal bristles. Found in the marshes of Denmark.

INQUILINUS. Vaginated with a green small cylindrical bag, and retortile pedicel. Found in very pure sea-water.

ANAS. Elongated, with the apex of the neck elongated beneath. Found in pure waters.

LARUS. Dilated forward, with a gibbous back. Found in marshes in which the leaves of the poplar putrefy.

URSULA. Smooth, elongated, equal, on the fore-part hairy. Found in putrid infusions of hay and other vegetables.

SANNIO. Incurvated; above ciliated, below truncated. Found rarely in water furnishing duck-weed.

LANTER. Ovate-oblong, somewhat prominent at both ends. Found by the Greenlanders in water, in which the lichen coriarius has been infused.

PUBES. Ovate-oblong, gibbous, on the fore-part depressed. Found in duck-weed water.

CYPRIS. Obovate, above sinuated towards the hinder part, on the fore-part hairy. Found in water covered with duck-weed.

CYCLIDIUM. Ovate, with gaping apex and hairy base. Found in water in which vegetables have been infused.

URINARIUM. Ovate, with a very short hairy beak. Found in an infusion of hay.

LEPUS. Ovate, with hairy apex and bristly base. Found in animal and vegetable infusions.

CALOITUM. Broadish, oblong, on the fore-part furnished with shining small cornicles. Found in vegetable infusions.

SILURUS. Oblong, hairy before and behind, with a ciliated back. Found in water abounding with con-ferva.

MYTILUS. Subclavated, at both ends wider, green and ciliated. Found in marsh-water.

URNULA. Pitcher-shaped; before hairy. Found rarely in water covered with duck-weed.

LYNCEUS. Subquadrate, with hooked beak and hairy mouth.

SEMI-LUNA. Semi-orbicular, on the fore-part below hairy. Found in duck-weed water.

ORBIS. Orbicular, emarginated and hairy on the fore-part.

CIMEX. Above convex, below smooth and hairy. Found in vegetable infusions.

CHARON. Cymbiform, on the front hairy. Found in sea-water.

TINEA. Clavated, on the fore-part hairy; behind thick. Found in hay infusion.

TRIGONA. Convex, before ciliated, and behind eroded.

ANGULUS. Angulated, hairy at the apex. Found in hay-water.

PULLASTER. Ovate, before sinuated; cristated in front and hairy at the base. Found in duck-weed water.

PULEX. Ovate, before incised; in the front and base hairy. Found as the last.

PELLIONELLA. Cylindric, before hairy, behind bristly: in vegetable infusions.

CAMELUS. Hairy on the fore-part, thickish in the middle; and on both sides emarginated. Found as the last.

ACARUS. Piriform, on the fore-part below hairy, behind pedated: in water covered with duck-weeds.

BOMBA. Mutable, on the fore-part furnished with scattered hairs: as the last.

GRANATA. Spherical, with opaque centre, and hairy periphery: as before.

COMETA. Spherical, before hairy, with an appendant globule. Found in very pure water.

GRANDINELLA. Spherical, pellucid, above hairy: as the last.

SOL. Globular, radiated: in water kept three weeks.

SYNCASTER. Subquadrate, with obtuse beak, and disk with shining pedicels. Found in sea-water that has been kept.

RATTUS. Oblong carinated, the fore-part having very short hairs, the hind-part a long simple bristle: in stagnant waters.

CILIATA. Ventricose, behind pectinated with hairs. Found in muscle-water.

SULCATA. With ovate ventricose apex, acuminate, ventral furrow and on both sides hairy : as before.

** *With Tail.*

TRANSFUGA. Broadish, before hairy, behind bristly, finuated on one side, mucronated on the other. Found in sea-water for some time kept.

DELPHINUS. Oblong, before hairy, behind truncated with a reflex tail. Found in hay-water.

LUDIO. Cirrated, above hairy, with an extended tail. Found rarely in the grove-waters of Denmark.

MUSCULUS. Oval, on the fore-part hairy, the hinder part caudated. Found in hay-water.

PISCIS. Oblong, on the fore-part hairy, behind very finely extenuated into a tail : in duck-weed water.

CUNICULUS. Oblong, before hairy, behind somewhat sharpened : in pure water.

CLAVUS. Before rounded and hairy, behind with an acuminate tail. Found in marshes.

PUPA. Aculeated, hairy in front, with a bent tail. Found in duck-weed water.

CLAVA. Clavated, hairy in front, with a reflexile tail. Found rarely in the marshy waters of Denmark.

TRICHODERMA, in *Botany*, from *τριξ*, *τριχος*, a hair, and *δερμα*, a coat.—Perf. Syn. Fung. 230. (*Farinaria*; Sowerb. Fung. t. 360.)—Class and order, *Cryptogamia Fungi*. Nat. Ord. *Fungi*.

Eff. Ch. Naked. Powder copious, mealy, encompassed with a downy or shaggy coat.

1. *T. fuliginoides*. Perf. n. 1.—“Large, nearly globular, villous, whitish. Powder bright red, intermixed with clustered threads.”—Found in autumn, on the rotten trunks of Spruce Firs. An inch or two wide, soft, but not melting. The threads to which the seeds are attached spread radiating through the powdery mass, in little tufts, from a subjacent membrane. *Perfoon*.

2. *T. roseum*. Hoffm. Germ. v. 2. t. 10. f. 1. Perf. n. 2. (*Farinaria rosea*; Sowerb. Fung. t. 360. f. 3.)—Rose-coloured, encompassed with a fine, spreading, depressed, filamentous border. Frequent in spring on rotten branches, especially between the wood and bark of the Sal- low and Aspen. Half an inch broad, roundish or oblong, with a cobweb-like circumference.

3. *T. aurantiæum*. (*Farinaria aurantiaca*; Sowerb. *ibid.* f. 2.)—Tawny, orbicular. Powdery particles somewhat ovate, partly scattered, with a slight filamentous border. On leaves, often forming, as it were, a little nest, with a few cottony filaments towards the edges. *Sowerby*.

4. *T. seminarium*. (*Farinaria seminaria*; Sowerb. *ibid.* f. 1.)—Powder black, in little compact globules, on a white, mealy, slightly fibrous, orbicular base.—Observed by the Rev. J. Holme, of Peter-house, Cambridge, on the leaves of a Willow. This consists of little white scattered orbicular spots of a white mealy substance, from a quarter to half an inch broad, lodging several minute deciduous masses of black powder, or seeds.

5. *T. viride*. Perf. n. 3. “*Disp. Meth. Fung. 12.*” (*Pyrenium lignorum* *z*, *vulgare*; *Tode Fung. Mecklenb. v. 1. 33. t. 3. f. 29.*)—Roundish or unequal, very soft, with bright-green powder, and whitish fugacious filaments.—Found after autumnal rains, among fragments of fallen branches of trees, or of the stems of large herbaceous plants. Its substance is extremely soft, two or three lines in diameter. The white cobweb coat opens at the top, and exposes the minute condensed grains, or powder, of a most beautiful verdigris-green. *Perfoon, Tode*.

6. *T. aureum*. Perf. n. 4. *Obf. Mycol. fasc. 1. 99.*—“Widely expanded. Hairy coat whitish, very thin. Pow-

der dull yellow.”—This occurs rarely, in stoves or hot-houses, on rotten wood, into which it is sunk. Almost three inches broad, being one of the largest of its genus, but scarcely two lines in thickness. The shaggy covering is thin and evanescent. *Perfoon*.

7. *T. nigrescens*. Perf. n. 5. “*Disp. Meth. Fung. 12.*” —“Rather spreading, flattish. Powder sooty. Shaggy coat grey, very thin.”—Produced in the winter and early spring, on felled trunks of trees, especially of the maple kind. Half an inch broad, and one line thick, staining the fingers, and soon becoming black. *Perfoon*.

8. *T. dubium*. Perf. n. 6. (*See Perf. Obf. Mycol. fasc. 1. 99.*)—Linear, slightly downy; first whitish, then yellowish; of an uniform friable substance.—Frequent on decayed trees in autumn. About half an inch long, and one line broad. There is scarcely any distinct fibrous margin, though the whole fungus appears slightly downy. The inside is dense and cohering, not powdery, nor volatile; so that *Perfoon* expresses great doubts concerning the genus of this little production.

9. *T. pyrenium*. Perf. n. 7. (*Pyrenium lignorum* *z*, *aureum*; *Tode Fung. Mecklenb. v. 1. 33.*)—Oval, compressed, with a bright-yellow, downy, separating coat. Nucleus whitish, turning orange.—On the naked wood of decaying branches of beech, in May, but very rare. A line long, scattered. The internal substance rather soft and friable.

10. *T. leve*. Perf. n. 8. *Obf. Mycol. fasc. 1. 12.*—Whitish, spreading, smooth, turning buff-coloured. Powder yellow. This is found on the ground, as well as spreading over mosses, to the breadth of an inch and half or two inches, but is not among the common species. It is more permanent than some others.

11. *T. tuberculatum*. Perf. n. 9. *Obf. Mycol. fasc. 1. 12. t. 2. f. 8.*—Pure white, nearly orbicular; at first downy; afterwards tubercular. Powder grey.—Frequent after great rains, on the ground in shady woods. When young it is very white, of a cobweb texture, but soon becomes greyish. When full-grown the surface is beset with oblong tubercles. In a few days the whole changes to a grey powder.

TRICHODESMA, from *τριξ*, *τριχος*, a hair, and *δισμα*, a tie, alluding to the connexion of the anthers by their pubescence.—*Brown Prodr. Nov. Holl. v. 1. 496.* (*Borraginoides*; *Boerh. Lugd.-Bat. v. 1. 188. fig. E—K.* *Borago*; *Gærtn. t. 67.* *Cynoglossoides*; *Isnard in Mem. de l'Acad. des Sc. for 1718*; *German edition 194. t. 9. 10.* “*Pollichia*; *Medicus Phil. Bot. part 1. 32.*”)—Class and order, *Pentandria Monogynia*. Nat. Ord. *Asterifoliae*, *Linn. Borraginæ*, *Juss.*

Gen. Ch. *Cal.* Perianth inferior, of one leaf, in five deep, erect, permanent segments. *Cor.* of one petal, wheel-shaped; the length of the calyx; tube short, somewhat funnel-shaped; limb spreading, nearly flat, in five deep, equal, keeled, taper-pointed segments; throat naked. *Stam.* Filaments five, very short, inserted into the throat of the corolla; anthers oblong, prominent, converging, shorter than the limb, tipped with twisted bristly points, and bound together by their two rows of dorsal hairs. *Pist.* Germens four, superior; style central, thread-shaped, longer than the stamens; stigma simple, bluntish. *Seeds.* Nuts four, ovate, gibbous, half sunk in the cells of the four-winged central column near its summit.

Eff. Ch. Corolla wheel-shaped, with a naked throat. Anthers connected by dorsal hairs.

Mr. Brown has separated this genus, consisting of three known species, from the Linnæan *Borago*, for the very sufficient reason of the corolla having no valves or prominences

in its throat; to say nothing of the connexion of the *anthers*, or insertion of the *seeds*. The plants are herbaceous, clothed with pungent bristles; their *flowers* axillary, or racemose with *bractæas*. See BORAGO.

1. *T. indicum*. Indian Trichodesma. (Borago indica; Linn. Sp. Pl. 197. Willd. Sp. Pl. v. 1. 776. Ait. Hort. Kew. v. 1. 296. Borragninoides angustifolia, flore pallifcente cæruleo; Boerh. as above 188, with a plate. Cynoglossoides folio caulem amplexante; Inard as above, t. 9.)—Flowers axillary. Segments of the calyx auricled at the base. Seeds without a border. Leaves clasping the stem.—Native of the East Indies. A tender annual, cultivated by Miller, and flowering throughout the summer and autumn. The stem is much branched, rather diffuse. Leaves sessile, oblong, bluntish, entire, rough with hairs and callous points; clasping the stem with their slightly heart-shaped base. Flowers axillary, solitary, stalked, dropping, white, pale blue, or reddish, with five rusty spots round the mouth. Calyx hairy, each segment acute, much elongated at the base. Seeds pale, nearly smooth.

2. *T. africanum*. African Trichodesma. Borago africana; Linn. Sp. Pl. 197. Willd. Sp. Pl. v. 1. 777. Ait. Hort. Kew. v. 1. 296. Cynoglossoides africana verrucosa et hispida; Inard as above, t. 10.)—Clusters alternate, terminal. Calyx without auricles. Seeds bordered. Leaves ovate, stalked.—Native of the Cape of Good Hope. A tender annual, cultivated by Miller, flowering in July and August. The whole plant is very harsh and hispid. Leaves opposite. Flowers smaller than the last, but much more numerous, pale blue, yellowish about the mouth, with five purplish spots. Anthers with long convoluted points. Seeds bordered, fringed.

3. *T. zeylanicum*. Ceylon Trichodesma. Br. n. 1. (Borago zeylanica; Linn. Mant. 202. Willd. Sp. Pl. v. 1. 777. Ait. Hort. Kew. v. 1. 297. Jacq. Coll. v. 3. 169. Ic. Rar. t. 314. Burm. Ind. 41. t. 14. f. 2. Anchusa buglossoides, lithospermi femine; Pluk. Mant. 13. Phyt. t. 335. f. 4.)—Clusters terminal. Calyx without auricles. Seeds smooth, without a border. Leaves nearly sessile, tapering at the base.—Native of Ceylon, and other parts of the East Indies, as well as of New Holland, within the tropic. Dr. Roxburgh sent seeds to Sir Joseph Banks, in 1799. This, like the rest, is an annual plant, flowering in the stove about July and August. The herbage is, as Mr. Brown remarks, very variable in its quantity of bristles and soft hairs; the latter, in wild specimens, are sometimes very abundant, giving the long flower-stalks, and calyx, more especially, a hoary aspect. The leaves are oblong or obovate, mostly opposite. Clusters leafy. Corolla white and semi-transparent. Seeds ovate, grey, smooth and highly polished, like our Common Gromwell.

TRICHODIUM, received that name from Michaux, who constructed it out of $\theta\rho\iota\chi\acute{o}\varsigma$, $\tau\rho\iota\chi\acute{o}\varsigma$, a hair, and $\iota\delta\iota\omicron\varsigma$, form, or appearance, in allusion to the capillary stalks of the panicle.—Michaux Boreal.-Amer. v. 1. 41. Pursh 61.—Class and order, Triandria Dignia. Nat. Ord. Gramina.

Gen. Ch. Cal. Glume single-flowered, of two linear-lanceolate, acute, awnless, nearly equal valves. Cor. Glume of one valve, shorter than the calyx, ovato-lanceolate, membranous, awnless, smooth, permanent. Nectary a deeply cloven scale. Stam. Filaments three, capillary, longer than the calyx; anthers oblong, cloven at each end. Pist. Germen roundish-obovate; styles two, distant, short; stigmas loosely feathery, with long roughish hairs. Peric. none. Seed one, roundish, pointed at each end, unconnected with the corolla.

Ess. Ch. Calyx of two nearly equal valves, single-flowered. Corolla of one valve, shorter than the calyx, awnless. Stigmas feathery, nearly sessile.

1. *T. laxiflorum*. Spreading Trichodium, or Bristle-grass. Michaux as above, 42. t. 8. Pursh n. 1. (Cornucopie hyemalis; Walt. Carolin. 73. Agrostis scabra; Willd. Sp. Pl. v. 1. 370, according to Pursh.)—Stems erect. Leaves upright, linear-fetaceous, with roughish sheaths. Calyx-valves lanceolate.—Common in all grassy situations, from Hudson's bay to Florida, flowering from May to August. Michaux, Pursh. Root perennial. Leaves narrow and short, nearly erect. Panicle short, with very fine capillary stalks, loosely spreading, each branch bearing but a few small flowers about the extremity.

2. *T. decumbens*. Decumbent Bristle-grass. Michaux as above. Pursh n. 2. Ait. Epit. 375. (Cornucopie perennans; Walt. Carolin. 74. Agrostis anomala; Willd. Sp. Pl. v. 1. 370. A. Cornucopie; Frazer Monogr. with a plate.)—Stems decumbent. Leaves spreading, linear-lanceolate, with smooth sheaths. Calyx-valves taper-pointed.—On moist hills, and in short grass-meadows, from Canada to Carolina, flowering from June to August. Root perennial. This and the foregoing are highly valuable grasses. Pursh. Larger than the first species, with longer and broader smooth leaves, which spread in every direction. Stipula, as Willdenow observes, larger, lanceolate, torn. Panicle large and loose. Flowers about the size of our Agrostis alba, being twice the size of the foregoing, and much more numerous.

This, known by the name of Frazer's New American Grass, was brought from Carolina by that indefatigable collector, in the year 1788. His friend Mr. Walter, in the Flora Caroliniana, extols this grass as one of the Creator's most precious gifts, which he himself was destined to make first known to mankind. Kalm had indeed, long ago, sent a specimen to Linnæus, but without any particular account of its use or distinctions, so that his specimen remained undistinguished from other species, which it much resembles. The solitary valve of the corolla led Mr. Walter to refer this plant to the genus Cornucopie, to which it has no other affinity. He was moreover flattered by this name, as concurring with his own idea of the value of his discovery. Nor do we doubt the accuracy of his statements, published in Mr. Frazer's Monograph above cited. Nevertheless, this grass has disappointed the hopes of European cultivators, and has now totally disappeared. "The places that knew it, know it no more." It is not even mentioned in Mr. Sinclair's elaborate and valuable experimental work, the Hortus Gramineus Woburnensis, nor by Mr. Dryander in the Hortus Kewensis, though Mr. Aiton has supplied the latter defect in his Epitome. So difficult is it to cultivate grasses, in general, away from their native situations, for any agricultural profit, that the disappointment we are obliged to record, is no impeachment of the accuracy of those who still reckon our Trichodium among the best grasses in America.

3. *T. elatum*. Tall Bristle-grass. Pursh n. 3. (Agrostis distar; Michaux Boreal.-Amer. v. 1. 52. Cornucopie altissima; Walt. Carolin. 74.)—Stems erect. Leaves linear, rough, with smooth sheaths. Calyx-valves membranous, ovato-lanceolate, pointed.—In sandy deep swamps of New Jersey, Carolina, &c. Perennial, flowering in July and August. Near three feet high. Panicle close, coloured. Pursh. Stem hard. Flowers large. Michaux.

TRICHOGAMILA, a name of Dr. Patrick Browne's, which he has left, according to his usual custom, unexplained. It appears derived from $\tau\rho\iota\chi\acute{o}\varsigma$, a hair, and $\gamma\alpha\mu\omicron\varsigma$, marriage,

marriage, alluding to the pubescence enveloping both organs of impregnation.—Browne Jam. 218.—We have seen no specimen of this plant. It is said to grow close to the beach at Bull-bay, in Jamaica. The *stem* is shrubby, stiff, simple, three or four feet in height, and as many lines in diameter. *Leaves* round, smooth, alternate. *Flowers* small and whitish. *Outer calyx* (rather *bracteas*) two small deciduous leaves; *inner* cup-shaped, of one leaf, divided half way down into five ovate segments. *Corolla* of five oblong, abrupt, somewhat spreading petals, or of one petal divided to the base. *Filaments* ten, downy, erect, shorter than the corolla. *Anthers* roundish. *Germen* minute, in the bottom of the calyx. *Style* downy, the length of the stamens, with a bluntish *stigma*. *Drupa* the size and appearance of a gall-nut, but light and hollow, globose, woody, thin, with a thin coat, of one cell, inflated, rather uneven in its surface. *Nuts* two, oblong-ovate, two-lobed; one of them usually abortive; the other fixed to the bottom of the drupa, but not half occupying its cavity.

Jussieu, Gen. Pl. 260, suspects this to be the same genus with CHALCAS or MURRAYA (see those articles); and Linnæus has written *Chalcas* against Browne's description. We presume it is the same individual species, which, though of East Indian origin, had accidentally been conveyed to the shores of Jamaica. If this be correct, Browne mistook the *leaflets* for simple *leaves*, and perhaps did not meet with the *fruit* in its natural more juicy state.

TRICHOMA, in *Surgery*, the disease more commonly called *plica Polonica*.

TRICHOMANES, in *Botany*, an ancient Greek name for some small delicate kind of fern, supposed, from the description of Dioscorides, book 4. chap. 137, to be *Aplenium Trichomanes* of Linnæus, which very well answers to that description. The name, from τριχός, *τριχος*, a hair, (whatever may be the origin of the rest of the word,) about which etymologists disagree,) alludes to the slender shining stalks, common to most of the fern tribe, which procured them the appellation of Capillary herbs, and the reputation of improving the growth of the human hair. Linnæus selected this name for a delicate, pellucid, capillary-stalked genus, to which it is very suitable; more especially if we take into consideration, as he probably did, the peculiar character of a prominent hair or bristle, originating from the receptacle of the seed-vessels.—Linn. Gen. 560. Schreb. 758. Willd. Sp. Pl. v. 5. 498. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 5. 529. Sm. Mem. de l'Acad. de Turin, v. 5. 417. Traçts 255. Swartz Fil. 141. Ind. Occ. 1724. Brown Prodr. Nov. Holl. v. 1. 159. Sprengel Crypt. Engl. ed. 164. t. 5. f. 35. Juss. 16. Lamarck Illustr. t. 871.—Class and order, *Cryptogamia Filices*. Nat. Ord. *Filices*.

Gen. Ch. *Fructifications* inserted into the margin of the frond, terminal, distinct, tubular. *Involucrum* of one leaf, urn-shaped, of the texture of the frond, opening outward. *Capsules* of two valves, bound by an elastic ring, numerous, sessile on the lower part of a cylindrical common receptacle, or *column*, whose capillary naked point projects beyond the *involucrum*.

Eff. Ch. *Fructifications* placed at the edge of the frond. *Involucrum* urn-shaped, of one leaf, opening outwardly. Common receptacle prominent, bristle-shaped.

Obf. HYMENOPHYLLUM (see that article) was first separated by the writer of this, from *Trichomanes*, with which it had, on account of their similar membranous pellucid habits, been always confounded. The bivalve *involucrum*, enclosing the common receptacle, clearly distinguishes it

from the genus before us, whose *involucrum* has a spreading undivided border.

The second edition of *Species Plantarum* contains eleven, and the fourteenth edition of *Systema Vegetabilium* thirteen, species of *Trichomanes*, as Linnæus understood the genus. But though from these are deducted what are now referred to HYMENOPHYLLUM and DAVALLIA, Willdenow enumerates thirty-four species of genuine *Trichomanes*. These are distributed into four sections, according to the subdivision of their fronds. We shall select examples.

SECT. 1. *Frond simple*. Twelve species in Willdenow.

T. reniforme. Kidney-shaped Bristle-fern. Forst. Prodr. 84. Willd. n. 1. Swartz Fil. 369. "Schkuhr Crypt. 130. t. 134." R. A. Hedw. Fil. fasc. 3.—Fronds kidney-shaped, undivided, on bordered stalks.—Gathered by Forster, as well as by Mr. A. Menzies, in New Zealand. An elegant very singular fern, with long, creeping, thread-shaped, perennial *roots*, attached by rigid downy fibres, and throwing up scattered erect *fronds*, various in size, each on a simple smooth *stalk*, from one to six inches high, bordered, or slightly winged, especially in the upper part. The *leaf* itself is vertical, kidney-shaped, from one and a half to three inches wide, of a dull olive-green, membranous, semi-pellucid, smooth, full of numerous, radiating, repeatedly forked veins; the margin entire, slightly wavy; in the larger or older specimens beset with a row of cup-shaped immerged *involucrum*s, each terminating a vein, and each protruding a thick rough *column*, twice its own length, bearing a number of pale shining annulated *capsules*.

T. membranaceum. Membranous Bristle-fern. Linn. Sp. Pl. 1560. Willd. n. 5. Swartz Ind. Occ. 1724. (Darea americana lichenoides; Petiv. Musc. n. 763. Adiantum muscosum, lichenis petræi facie; Plum. Fil. 83. t. 101. f. a. Amer. 34. t. 50. f. a; inaccurately copied in Pluk. Phyt. t. 285. f. 3; and again in Petiv. Fil. t. 13. f. 5.)—Fronds sessile, dilated upwards, obtuse, undivided, or torn; the margin beset with peltate scales.—Found on wet, often inundated, stones and rocks about the banks of rivers, in Hispaniola. This has the colour and membranous texture of the foregoing, but with a silky gloss. Its black, shaggy, creeping *roots* bear scattered *fronds*, destitute of stalks, sometimes roundish, but mostly wedge-shaped, from one to three inches high, variously split, dilated, and jagged, beset with innumerable crowded radiating veins, and much resembling the texture of a bat's wing. The margin, as well as the tip of each segment, bears brown peltate scales, whose use is unknown, but which, as Dr. Swartz remarks, might easily cause this fern to be taken for an *Adiantum*, were there not found on the same individual, though far more sparingly, the proper fructification of a *Trichomanes*, consisting of deeply immerged, slender, tubular *involucrum*s, dilated, orbicular, and roughish at the mouth, each with a prominent (not as Swartz lays a concealed) *column*.

T. muscoides. Mossy Bristle-fern. Swartz Ind. Occ. 1726. Willd. n. 6. (T. hymenoides; R. A. Hedw. Fil. t. 3. f. 3. Phyllitis scandens minima, musci facie, foliis membranaceis subrotundis; Sloane Jam. v. 1. 74. t. 27. f. 1.)—Fronds roundish-oblong, irregularly sinuated, wavy, obtuse, on short hairy stalks. *Involucrum* prominent, cylindrical; bivalve at the mouth.—Found creeping over the trunks of trees, in low wet places, in Jamaica. The *root* is black, thick, and woolly, spreading to the extent of several inches. *Fronds* light green, lying over each other, scarcely more than half an inch wide, with strong, branching, but not parallel or crowded veins; the segments rounded and wavy. *Involucrum*s at length stripped as it were, and projecting entirely beyond the leaf on winged stalks; their margin

TRICHOMANES.

margin of two rounded valves, edged with brown. The *column* is certainly prominent. Our description differs from Dr. Swartz's in some material points, though taken from his own specimens.

T. reptans. Trailing Bristle-fern. Swartz Ind. Occ. 1727. Willd. n. 9. R. A. Hedw. Fil. t. 3. f. 4, bad. — Fronds obovate-oblong, nearly sessile, irregularly pinnatifid, with oblong obtuse segments; their base wedge-shaped. *Involucrum* immersed, its orbicular mouth not projecting beyond the leaf.—Native of old mossy trunks of trees, in the mountainous part of Jamaica. If we are right in our ideas of this species, it is browner and thinner than the last, with a larger *frond*, but shorter *stalk*; the veins much less thick and prominent. The *involucrum* moreover does not project, till stripped by age, nor is its margin divided. The *column* is certainly prominent. We do not boast, in this case, an original specimen from the author, and therefore may be mistaken.

T. sinuosum. Sinuated Bristle-fern. Willd. n. 10. Lamarck f. 1. (*T. crispum*; Linn. Sp. Pl. ed. 1. 1097. ed. 2. 1560, excluding the synonyms of Plumier and Petiver.)—*Fron*d lanceolate, pinnatifid; tapering at the base; segments ovate, obtuse, somewhat angular, with zigzag veins, and mostly solitary fructifications. — Native of the West Indies; Willdenow says of Guadeloupe. A very elegant and distinct species, sometimes resembling the outline of an oak-leaf, but it is more usually of a linear-lanceolate figure, tapering at each end, four inches, more or less, in height, light olive, pellucid, finely reticulated, flat, rarely a little hairy, with elegant, zigzag, equally dispersed veins. *Involucrum* immersed at the blunt point of each segment, almost always solitary, its dilated orbicular border not projecting beyond the leaf. *Column* slender, prominent, half twice as long as the *involucrum*. This seems, by the Linnæan herbarium, to be what Linnæus intended for *T. crispum*; but it is evident from the specific character and name that he had full as much in his contemplation Plumier's t. 86, quoted for a synonym; and the latter being universally received as the true *crispum*, we shall so retain it. See the next section.

T. polypodioides. Polypody Bristle-fern. Linn. Sp. Pl. ed. 1. 1098. ed. 2. 1561. Swartz Fil. 145. Willd. n. 11. — “*Fron*d lanceolate, pinnatifid, wavy. Flowers solitary, terminal.”—Native of India.—“*Fron*d the length and breadth of the finger, pinnatifid almost to the mid-rib; lobes lanceolate, bluntly ferrated, acute at the summit, each of them furnished with a solitary flower at the point. The *frond* moreover is pellucid, with alternate veins.”—Such is Linnæus's description of this species, which no person has ever discovered, and which can only be determined from his works or herbarium. In the latter nothing presents itself under this name; but the specimen marked *crispum*, mentioned under our preceding species, so precisely answers to this description of *polypodioides*, that we cannot but believe it is the very plant, and that Linnæus has here fallen into a most complicated mistake. As we are, nevertheless, unable to prove this, we would still retain the excellent name of *sinuosum*, to which those who think as we do may refer *polypodioides* as a synonym, with or without a mark of doubt.

T. elegans. Elegant Bristle-fern. Rudge Guian. 24. t. 35. Willd. n. 12.—Barren fronds lanceolate, deeply pinnatifid; fertile ones linear, pinnate, on longer stalks.—Native of watery mossy places in Guiana. *Fron*ds tufted; the barren ones leafy, pellucid, of numerous, deep, parallel, linear, bluntish, somewhat jagged segments, that are near an inch long; their common *stalk* round, about two

inches in length, nearly smooth; *fertile* ones fewer, their *stalks* erect, five or six inches long, the *frond* itself four or five, and only half an inch wide, scarcely at all leafy, but composed of two dense rows of numerous, crowded, stalked, cylindrical, two-edged *involucral cups*, each with a small orbicular border, and protruding a long, curved, rough, slightly club-shaped *column*, thrice the length of the *involucrum* itself.

Seçt. 2. *Fron*d pinnate. Three species; Willd.

T. crispum. Crisped Bristle-fern. Linn. Sp. Pl. 1560? Swartz Ind. Occ. 1731. Willd. n. 14. R. A. Hedw. Fil. t. 4. f. 2. (*Trichomanes* n. 1; Linn. Hort. Cliff. 476. *Polypodium crispum caliciferum*; Plum. Fil. 67. t. 86; copied in Petiv. Fil. t. 11. f. 8.)—*Fron*d pinnate; leaflets oblong, obtuse, wavy, crisped, hairy, many-flowered at the extremity; the upper ones confluent.—Native of various parts of the West Indies. The tufted hairy *root* bears many lanceolate stalked *fronds*, about a foot high, of a light pellucid olive-green, very thin and membranous; their numerous leaflets about an inch long, elegantly crisped and plaited, copiously veined, clothed with scattered tawny hairs. The blunt extremity of each leaflet, except some of the inferior ones, bears from four to six large, immersed, rather crowded, tubular *involucrums*, with orbicular entire slightly dilated mouths. From each proceeds a long slender, almost capillary, roughish *column*, whose point when entire is blunt, or rather capitate.

T. floribundum. Many-flowered Bristle-fern. Willd. n. 15. (*T. pinnatum*; Swartz Fil. 142. R. A. Hedw. Fil. t. 4. f. 1. *T. rhizophylla*; Cavan. Leccion. 279. Swartz Fil. 142.)—*Fron*d pinnate; leaflets lanceolate, ferrated; the upper ones decurrent, confluent. Fructification marginal, fringe-like, prominent.—Native of several parts of the West Indies. Twice the size of the last. The *leaflets* are usually near two inches long, above half an inch broad, alternate, bluntish, nearly smooth, beset with innumerable close transverse veins, connected by fine reticulations; their margin undulated and finely ferrated: those of the barren fronds crowded; of the fertile ones remote, most of their ferratures tipped with a little, brown, cup-shaped, entirely prominent and naked *involucrum*, with a capitate *column* about its own length. Cavanilles speaks of this as the handsomest species he had seen. His description leaves no doubt as to the identity of his plant, though we have not seen an instance of any sprouting roots from the tip of the frond, which probably led Dr. Swartz, without seeing specimens, to adopt it as distinct.

Seçt. 3. *Fron*d doubly pinnatifid. Six species; Willd.

T. crinitum. Hairy Bristle-fern. Swartz Ind. Occ. 1730. Willd. n. 19. R. A. Hedw. Fil. t. 1.—*Fron*d pinnate; leaflets obtuse, pinnatifid, decurrent, confluent; hairy at the margin and veins; segments often cloven. *Stalk* hairy.—Found on the trunks of trees, on the lofty mountains of Jamaica. *Fron*d about three inches in length, pale, pellucid; its tawny-haired *stalk* scarcely so long. *Involucrums* here and there imbedded at the ends of the segments of each *leaflet*, with a dilated, fringed, orbicular margin. *Column* long, roughish, capitate with a taper point. The segments of the *leaflets* are lanceolate, bluntish, not so generally divided in our specimens as in Hedwig's figure.

T. psidiferum. Covered Bristle-fern. Linn. Sp. Pl. 1561. Swartz Ind. Occ. 1739? Willd. n. 21. (*Filicula psidifera*; Plum. Fil. 74. t. 50. f. E; copied in Petiv. Fil. t. 13. f. 13.)—*Fron*d pinnate; leaflets oblong, obtuse, decurrent, pinnatifid, with linear, obtuse, decurrent, entire, mostly three-cleft segments. *Stalks* all winged. *Involucrum* closed by a lid bearing the *column*.—Found by Plumier

mier on mossy trees in Hispaniola. He is our only certain authority for this species, the description of Swartz not answering exactly to his account, and the figure in R. A. Hedwig, t. 3. f. 2, indicating something very different. The true *T. pyxidiferum* is so named because the *involutum* is formed like a box with a convex lid, through which latter the long prominent *column* is continued. We have seen indications of no such character in any other species. The *root* is creeping and hairy. *Fronde* stalked, three or four inches high, smooth, very thin, their *common* as well as *partial stalks* winged throughout, and of the same linear form as the segments of the *leaflets*, which are notched at the end. *Involutums* one or two about the lower part of each principal *leaflet* cup-shaped, quite closed by the above-mentioned lid.

T. europæum. European Bristle-fern. (*T. pyxidiferum*; Hudf. 461. Bolt. Fil. 56. t. 30. Hymenophyllum tunbridgensis β ; Fl. Brit. 1142. H. alatum; Engl. Bot. t. 1417. Filix humilis repens, foliis pellucidis et splendens, caule alato; Dill. in Raii Syn. 127. t. 3. f. 3, 4.)—Fronde bipinnate; leaflets oblong, decurrent, pinnatifid, with linear, obtuse, decurrent, entire segments. Stalks all winged. *Involutum* open, with a slightly spreading border. Few plants of any country have caused more enquiry, or more diversity of opinion, than this fern, originally discovered by Dr. Richardson "at Belbank, scarce half a mile from Bingley, Yorkshire, at the head of a remarkable spring." From thence Mr. R. Teesdale and Mr. Dickson have brought us young plants, like Dillenius's f. 4, but could find none like his f. 3. The botanists of Ireland have been more fortunate. Mr. J. T. Mackay met with perfect specimens in fructification, on rocks about the cascade, at the bottom of Turk mountain, Killarney. Some of these, more perfect than what is figured in Engl. Bot., lead us to concur with Mr. Brown's opinion, expressed in his *Prodromus*, in removing this plant from *Hymenophyllum*, to the present genus. It was indeed considered by Linnæus as not distinct from *T. pyxidiferum*, nor is this opinion so wide of the truth as has been supposed. By a comparison with Plumier's figure of the latter, this will be found to differ chiefly in being more compound, with a smaller, more slender, two-edged *involutum*, in which we can discover nothing like a lid. Its margin is narrow, but rather spreading. The *capsules* are few and large, bright yellow, with a broad ring. *Column* long and prominent. Some appearances in this and other species lead us to believe the *column*, laden with *capsules*, is generally protruded out of its *involutum* after the *capsules* are ripe, and it may therefore, in a very early state, be found entirely inclosed therein. This being the only European *Trichomanes*, we hope our specific name may be allowed, that of *alatum* being preoccupied; see Willd. n. 17.

T. venosum. Veiny Bristle-fern. Brown Prodr. n. 1.—"Fronde pinnate; leaflets linear, veiny, wavy, somewhat crenate; the lower ones lobed or pinnatifid at the base, and bearing a solitary *involutum* at their inner margin."—Gathered by Mr. Brown, in the island of Van Diemen, and near Port Jackson, New South Wales. This should seem akin to the two last, but we have seen no specimens.

SECT. 4. *Fronde* triply pinnatifid, or pinnate. Thirteen species; Willd.

T. trichoides. Capillary Bristle-fern. Swartz Ind. Occ. 1741. Willd. n. 23. (*T. tenellum*; R. A. Hedw. Fil. t. 3. f. 1.)—Fronde triply pinnate; leaflets linear, almost capillary, divided, emarginate. *Involutums* stalked, lateral, solitary, near the base of the principal branches.—In moist, shady, grassy places, in the cooler parts of Jamaica and Hispaniola. This is a peculiarly delicate and slender

fern, from two to four inches high, whose ramifications are so exceedingly narrow as to appear capillary, though the ultimate divisions are truly leafy, consisting of a wiry midrib, bordered with a continued, even, entire, scarcely discernible, leafy margin at each side, slightly dilated upward, and blunt at the end. The *fructification* is lateral and solitary, much as in the three preceding; each *involutum* stalked, tubular, two-edged, with a broad, orbicular, wavy margin. The *column* is very long and capillary.

T. rigidum. Rigid Bristle-fern. Swartz Ind. Occ. 1738. Willd. n. 29. R. A. Hedwig Fil. t. 2.—Fronde triply pinnate; leaflets pinnatifid, with linear, entire, taper-pointed segments. Common stalks two-edged, rigid. *Involutums* stalked, lateral, solitary, near the base of the secondary branches. Found about the roots of trees, on the lofty mountains of Jamaica. The creeping *root* sends up numerous rigid upright *fronds*, twelve or eighteen inches in height, of which at least one half consists of a brown, shining, round, firm *stalk*. The *leafy* part is finely and elegantly divided, dark green, peculiarly elastic, and when dry rigid and inflexed. *Involutum* urn-shaped, with a membranous spreading border. *Column* thick, not much protruding.

T. radicans. Winged Climbing Bristle-fern. Swartz Ind. Occ. 1736. Willd. n. 30. (*T. scandens*; R. A. Hedwig Fil. t. 6, excluding the synonyms.)—Fronde doubly pinnate; leaflets pinnatifid, with linear, cloven, obtuse segments. Common and partial stalks smooth, all winged. Stem climbing, creeping. Found on the mountains of Jamaica, creeping up the trunks of trees to a great extent, the downy rusty-coloured main *stem*, or *root* as it might be called, being firmly attached to the bark of the tree, throwing out little radicles as it goes. *Fronde* scattered, from nine to twelve inches long, on winged *stalks* measuring from one to three inches, ovato-lanceolate, twice or thrice pinnate, dark green, smooth, the stalks of all their subdivisions bordered with an entire uninterrupted wing; branches, leaflets and segments alternate. *Involutum* cylindrical or somewhat ovate, slightly winged with a portion of the segment which it terminates; the mouth spreading. *Column* long and slender. A very different species from the following, for which it has been mistaken by several botanists, to some of whom, though not quoted by Hedwig, we can trace his error.

T. scandens. Great Climbing Bristle-fern. Linn. Sp. Pl. 1562. Willd. n. 31. Swartz Ind. Occ. 1737. (*Adiantum scandens ramosissimum, laciniis retusis dissectum*; Plum. Fil. 76. t. 93; copied in Petiv. Fil. t. 12. f. 5.)—Fronde triply pinnate; leaflets oblong, pinnatifid, with linear obtuse segments. Common stalks round; partial winged, hairy. Stem climbing, creeping. Native of mountainous forests in Hispaniola, where it was gathered by Plumier, and since by Dr. Swartz. A much larger plant than the foregoing, creeping over the trunks of old trees. Each *frond*, two feet high, has a round, not bordered, main *stalk*, the partial ones only being winged. All the *leaflets* and their stalks are clothed with long loose hairs, of a shining or golden brown, such as are often likewise observable on the main stalk. The colour of the whole fern is more olive than the last, and its reticulations much coarser. *Involutum* much the same, nor do we find the *column*, when perfect, shorter in one than the other. Sloane's v. 1. t. 58. may be intended for *T. scandens*, but it is not sufficiently exact to afford any information.

T. tamarisciforme. Tamarisk Bristle-fern. Jacq. Coll. v. 3. 285. t. 21. f. 2. Willd. n. 34.—Fronde doubly pinnate; leaflets lanceolate, pinnatifid, with linear, very narrow, smooth

knooth segments. Common stalk round, bristly; partial winged, smooth. Involucrum stalked.—Native of the isle of Bourbon. Our specimen was communicated by M. Thouin to the younger Linnæus, who took it for *T. scandens*; but there is no appearance of any common trailing stem. The frond is almost two feet high. Stalk pale and smooth where naked, but in the leafy part of the frond blackish and hispid. Divisions of the leaflets peculiarly fine, regular and delicate, bluntish, sometimes emarginate, olive-green, without any hairs. Involucrum short and roundish, on a stalk more or less winged; its mouth spreading. Column long.

TRICHOMANES, in Gardening, comprehends plants of the herbaceous fern kinds, — the maiden-hair ferns; among which, the species which are cultivated for garden use and variety, are the canary maiden-hair fern (*T. canariense*); and the Tunbridge maiden-hair (*T. tunbridgense*).

These are both perennial plants, which have something curious and interesting in their frondose growth and habit, and are therefore proper to be cultivated for the ornament and variety which they afford.

Method of Culture.—Both these plants may be increased by slipping their branches, or dividing their roots, and planting them in pots of light earth in the first fort, and the latter kind either in the same way, or in a dry border of light mould, the former to be removed in the winter season to the protection of the greenhouse, but the latter to remain where planted, or some put into pots, to be placed out in particular situations, as occasion may require.

They both form a singular variety when put in assemblage with other different plants of the exotic greenhouse forts, and other kinds in the borders and various compartments.

TRICHONEMA, in Botany, from $\tau\rho\iota\chi\eta$, $\tau\rho\iota\chi\omicron\varsigma$, a hair, and $\nu\mu\alpha$, a filament, or stamen, alluding to the hairiness of that particular part of the flower.—Ker in Sims and Kon. Ann. of Bot. v. 1. 222. Curt. Mag. 575. Ait. Hort. Kew. v. 1. 82. (Romulea; Maratti Plant. 13. t. 1.)—Class and order, *Triandria Monogynia*. Nat. Ord. *Ensatæ*, Linn. *Irides*, Juss.

Gen. Ch. Cal. Sheath inferior, more than half the length of the corolla, of two lanceolate, entire, permanent valves. Cor. of one petal, superior; tube very short, funnel-shaped; limb regular, divided to its very base into six nearly equal, somewhat spreading, concave segments. Stam. Filaments three, inserted into the mouth of the tube, erect, much shorter than the corolla, downy; anthers rather large, converging, oblong, cloven at the base. Pist. Germen roundish; style thread-shaped, erect, longer than the stamens; stigmas three, deeply divided, equal, spreading, very slender, rather abrupt. Peric. Capsule roundish, membranous, tumid, of three cells and three valves. Seeds several, globose.

Eff. Ch. Sheath of two valves. Corolla with a very short tube, and equal regular limb. Filaments downy. Stigmas three, deeply divided, very slender. Capsule roundish. Seeds globose.

Obs. The shortness of the tube, divided stigmas, and pubescent stamens, distinguish this genus from *IXIA*. (See that article.) The last character is but slightly perceptible, and the others may perhaps hardly be thought sufficient to separate plants so precisely alike in habit. We shall nevertheless enumerate the species as given by Mr. Ker, late Gawler.

1. *T. Bulbocodium*. Channel-leaved Trichonema. Ker n. 1. Ait. n. 1. (*Ixia Bulbocodium*; Linn. Sp. Pl. 51. Willd. Sp. Pl. v. 1. 196. Jacq. Coll. v. 3. 265. Ic. Rar. t. 271. Curt. Mag. t. 265. Redout. Liliac. t. 88.

Sm. Fl. Græc. Sibth. t. 36. Compend. Fl. Brit. ed. 2. 8. Engl. Bot. t. 2549. Dickf. H. Sicc. fasc. 18. n. 1? *Sifyrinchium Theophrasti*; Column. Ecphr. 328. t. 327. *Crocus vernus*; Ger. Em. 153. f. 1, 2.)—Leaves linear, channelled, recurved, longer than the flower-stalk.—Native of grassy hillocks, and sandy ground near the sea, in the south of Europe, from Jersey and Guernsey to the Archipelago, in which last country it is very abundant, flowering in March and April. We have no where seen this pretty plant more beautiful, with its numerous varieties, than on the hillocks around the celebrated fountain of Egeria, near Rome. There all the different appearances of the flower, with respect to size and colour, which the above figures represent, and indeed many more, may be collected at once; nor can they fail to convince an observing botanist that they are no more distinct species, than our red or blue garden anemonies. The bulb is ovate, the size of a silberd, with many entire smooth coats. Leaves radical, recurved and widely spreading, narrow, smooth, rushy. Stalks one or two, combined at the base, single-flowered, more or less curved, round, smooth, much shorter than the leaves, though considerably elongated after flowering. Sheath somewhat coloured. Corolla from one to two inches long, purplish, pale rose-coloured with a yellow base, or almost white in the border, always variously streaked; the backs of the three outer segments greenish; all the segments elliptical, but various in breadth. Capsule membranous, corrugated, purplish. We cannot separate Mr. Ker's *rosium*, for which he cites *Curt. Mag. t. 265*, however different that figure may, at first sight, appear.

2. *T. cruciatum*. Square-leaved Trichonema. Ker n. 3. Curt. Mag. t. 575. Ait. n. 2. (*Ixia cruciata*; Willd. Sp. Pl. v. 1. 197. Jacq. Ic. Rar. t. 290. *Bulbocodium pedunculis nudis unifloris, foliis subulatis linearibus longifimis*; Mill. Ic. 160. t. 240; not 260, as in Hort. Kew. an almost unique error of the kind in the accurate Mr. Dryander, caused by the awkward roman numerals.)—Leaves linear, four-sided, with as many deep channels.—Native of the Cape of Good Hope. The leaves are more erect than in the former, various in breadth, but always known by their four-sided figure, displayed in a transverse section. The stalk is solitary, short and simple. Corolla variable in size, pale crimson or purplish, streaked, externally green; its segments acute and recurved.

3. *T. chloroleucum*. Green and white Trichonema. (*T. ochroleucum*; Ker n. 4. *Ixia chloroleuca*; Jacq. Coll. v. 4. 180. Jacq. Ic. Rar. t. 272, not 270. Willd. Sp. Pl. v. 1. 196.)—Leaves linear, revolute. Leaves of the sheath equal, coloured.—Native of the Cape of Good Hope. The leaves are usually two, unequal, one of them decumbent; their margins revolute, whence they become almost setaceous. Stalk solitary, single-flowered, erect, much shorter than the leaves. Sheath light purple, membranous. Corolla near two inches long, erect, white, striated, the three outer segments light green at the back. *Jacquin*.

4. *T. speciosum*. Crimson Trichonema. Ker n. 5. (*Ixia Bulbocodium*, var. *flore speciosissimo*; Andr. Repof. t. 170.)—Leaves linear, channelled, the length of the stem, which bears a solitary leaf near the top.—Native of the Cape of Good Hope, from whence Mr. G. Hibbert received its bulbs in 1800. These flowered in his garden at Clapham the following March. This appears most akin to the first species in its leaves, except their being more erect, and scarcely exceeding the length of the stem. The latter, though simple, bears one leaf near the top, according to Mr. Andrews, who is our only authority. We are aware that the European *T. Bulbocodium*, when it has two flowers, bears

bears also a leaf at the junction of their stalks. The *flower* of the present plant is uncommonly handsome, near two inches long, of a rich crimson; violet at the base; its three outer segments yellowish at the back, with crimson veins. The *sheath* is narrow, green and leafy, less membranous, or coloured, than in most of the rest.

5. *T. pudicum*. This is merely mentioned by Mr. Ker, as the *Ixia pudica* of Dr. Solander in Sir Joseph Banks's herbarium, without any indication of its character or distinctions.

The able writers from whom we adopt this genus, indicate several European as well as African species, that remain hitherto undefined. Of the latter we have not sufficient materials to judge; but the probability of there being some such cannot be doubted. What we have seen of the European specimens would, however, render us much on our guard against those of exotic origin.

TRICHONIUM, in *Ancient Geography*, a town of Greece, in Etolia.

TRICHOPHORUM, in *Botany*, from $\tau\rho\iota\chi\omicron\varsigma$, a *bristle*, and $\phi\epsilon\rho\omega$, to *bear*, because of the bristles encompassing the seed, in allusion to ERIOPHORUM, (see that article,) out of which the present genus is extracted.—“Perfoon Ench. v. 1. 69.” Pursh 57.—Class and order, *Triandria Monogynia*. Nat. Ord. *Calamaria*, Linn. *Cyperoideæ*, Juss.

Gen. Ch. *Cal.* Spike, or Catkin, imbricated every way, with ovate, flattish, pointed, keeled, loose scales, distinguishing the flowers. *Cor.* none. *Stam.* Filaments three, capillary; anthers erect, oblong. *Pist.* Germen superior, roundish, very small; style thread-shaped, the length of the scale, deciduous; stigmas three, elongated, reflexed. *Peric.* none. *Seed* solitary, beaked, ovate, triangular, with from six to nine capillary, wavy, brown bristles at the base, six times its own length. *Receptacle* cylindrical, cellular, and toothed.

Eff. Ch. Glumes chaffy, imbricated every way. Corolla none. Style deciduous. Seed triangular, beaked, surrounded at the base with from six to nine hairs, scarcely longer than the spike.

Obs. The difference between this genus and *Eriophorum* consists in the comparatively small number of hairs surrounding the base of the seed, and their much shorter proportion, to say nothing of their brown hue. All these circumstances certainly give the *Trichophorum* a different, and far less brilliant, aspect. It is in fact more akin to various species of *Scirpus*, whose seeds are accompanied by short, flat, rough bristles.

1. *T. cyperinum*. Many-headed Hair-rush. Pursh n. 1. (*Eriophorum cyperinum*; Linn. Sp. Pl. 77. Willd. Sp. Pl. v. 1. 313. Ait. H. Kew. v. 1. 134. *Scirpus Eriophorum*; Michaux Boreal.-Amer. v. 1. 33. *Cyperus miliaceus* ex provinciâ Marianâ, paniculâ villosâ aurâ; Pluk. Mant. 62. t. 419. f. 3.)—Stem leafy. Panicle doubly compound.—In ditches and near ponds, from Canada to Carolina, flowering in July and August, perennial, very tall. Pursh. The tufted partial *flower-stalks*, angular and rough, resemble little compound umbels, with many fealy *bractæas* at the base. *Heads* numerous, each the size of a large pea, their brown scales partly concealed by the fine prominent tawny hairs. *Seeds* white.

2. *T. alpinum*. Alpine Hair-rush. Pursh n. 2. (*Eriophorum hudsonianum*; Michaux Boreal.-Amer. v. 1. 34.)—Stem naked. Spike solitary.—In bogs on the mountains of Pennsylvania, Vermont, &c. flowering in August. Perennial. *Stem* triangular, as in the first species, but quite naked. *Leaves* radical, few, setaceous, channelled. *Mi-*

chaus, Pursh. We have Newfoundland specimens from Mr. Frazer, which answer to these characters. If so, the *spike* consists of scarcely more than three or four *flowers*, and the bristles of the *seed* are about the length of the shining tawny scales.

TRICHOPUS, from $\tau\rho\iota\chi\omicron\varsigma$, a *hair*, and $\pi\omicron\upsilon\varsigma$, a *foot*, expressive of the long taper stalk of the capsule.—Gærtn. v. 1. 44. t. 14.—Class and order unknown.

Eff. Ch. Capsule inferior, membranous, with three wings, and three cells, not bursting. Seeds two in each cell, triangular, deeply notched.

1. *T. zeylanicus*. *Bempul* of the Cingalese, described by Gærtner from the collection at Leyden. *Capsule* ovate, very thin, without valves, each angle extended into a wavy membranous border; each side marked with a longitudinal furrow; partitions from the centre of each valve, very thin; the base running down into a triangular stalk, gradually tapering to a fine capillary extremity. *Seeds* rusty-coloured, tumid, variously and deeply notched or lobed. *Skin* simple. *Albumen* conformable to the seed, with a longitudinal furrow, hard, cartilaginous, pale. *Embryo* very minute; in the lowest part of the albumen, monocotyledonous.

Gærtner observes some affinity between this plant and the *Commelina* tribe, but the inferior capsule appeared to him to denote a very distinct genus, of which he could discover no traces in any author.

We do not perceive why the great length of the stalk was admitted by Gærtner into the generic character, as the capsule being inferior, renders it a mere flower-stalk. No following botanist has thrown any light on this genus.

TRICHOPUS, in *Ichthyology*, a new genus of fishes, described by Ceppe from the MSS. and drawings of Commerçon; the characters of which are, that the body is compressed, and that the ventral fins have an extremely long filament. Ceppe has unnecessarily divided these fishes into two distinct genera, calling one “*Osphronemus*,” and the other “*Trichopodus*.” These fishes are natives of the Indian seas and rivers, and are distinguished, one species excepted, by the remarkable length of one ray of the ventral fins, which extends the whole length of the body, or even beyond it.

Species.

GORAMY; Rufescent *Trichopus*. With a silvery cast on the sides, and the second ray of the ventral fins extremely long; *Osphronemus Goramy* of Ceppe. Native of the fresh waters of China, where it is greatly esteemed as an article of food, and known by the name of “*Goramy*.” It is a prolific species, and easily introduced into new situations; having been imported into Java, and many other of the eastern islands.

ARABICUS; Greenish *Trichopus*. With violet and blue stripes, and second ray of the ventral fins extremely long; the *Osphroneme Gal* of Ceppe, the *Labrus Gallus* of Linn. Syst. Nat. Gmel., and the *Scarus Gallus* of Forsk. Arab. See *LABRUS Gallus*.

SATYRUS. With sinking forehead, projecting chin, and extremely long, single-rayed ventral fins; *Trichopode Montoniæ* of Ceppe. This fish is known in some countries by the name of “*Goramy*,” or “*Gouramy*.”

PALLASII; Brown *Trichopus*. With pale undulations; a black spot on each side of the body and tail; and long single-rayed ventral fins. Described by Dr. Pallas as a species of *Labrus*, and by Kolreuter, in the Petersburg Transactions, as a *Sparus*. See *LABRUS Trichoporus*.

MONODACTYLUS; Silvery *Trichopus*. With brownish back; and short, single-rayed, rigid ventral fins; *Monodactyle*

Stylis falciforme of Cepede, and described by him under the genus *Monodactylus*. Shaw's Zoology, vol. iv. pt. 2.

TRICHOSANTHES, in *Botany*, elegantly so called by Linnæus, from *τριχος*, a hair, and *ανθος*, a flower, in allusion to the fine capillary segments which border the corolla. The same idea may be expressed in English by Hair-blossom.—Linn. Gen. 505. Schreb. 661. Willd. Sp. Pl. v. 4. 598. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 5. 340. Juff. 396. Lamarck *Ilustr.* t. 794.—Class and order, *Monoecia Syngenesia*, Linn. *Monoecia Polyadelphia* rather, as suggested in Sm. *Introd. to Bot.* ed. 3. 363. Nat. Ord. *Cucurbitaceæ*, Linn. Juff.

Gen. Ch. Male, *Cal.* Perianth of one leaf, club-shaped, very long, smooth, with five small reflexed teeth at the mouth. *Cor.* of one petal, united with the calyx, flat, spreading, deeply divided into five ovate-lanceolate segments, fringed with very long, branched, capillary, spreading subdivisions. *Stam.* Filaments three, very short, crowning the rim of the calyx; anthers five, combined into a cylindrical upright body, marked all over with a line curved up and down in all directions, bearing the pollen.

Female, on the same plant, *Cal.* Perianth as in the male, superior, deciduous. *Cor.* as in the male. *Pist.* Germen inferior, oblong, slender; style thread-shaped, the length of the calyx; stigmas three, oblong, awl-shaped, splitting. *Peric.* Berry oblong, coated, of three widely separated cells. *Seeds* numerous, compressed, obtuse, tunicated.

Eff. Ch. Male, Calyx with five teeth. Corolla in five deep segments, with a branched fringe. Filaments three.

Female, Calyx with five teeth. Corolla in five deep segments, with a branched fringe. Style three-cleft. Berry oblong.

1. *T. anguina*. Snake Hair-blossom, or Snake Gourd. Linn. Sp. Pl. 1432. Willd. n. 1. Ait. n. 1. Curt. Mag. t. 722. (*Anguina sinensis*, flore albo elegantissimo, &c.; Michx. Gen. 12. t. 9. Mill. Ic. t. 32. *Cucurbita sinensis*, fructu longo anguino, &c.; Till. Pif. 49. t. 22.)—Fruit cylindrical, elongated, incurved. Leaves heart-shaped, lobed, wavy, with little pointed teeth.—Native of China and Cochinchina, according to Micheli and Loureiro. A tender annual in our stoves, whose seeds are often imported from the East Indies. The herbage is trailing, luxuriant, and much branched, like the rest of its tribe, with *tendrils*, and broadish melon-like *leaves*, whose under surface is finely downy. *Flowers* in loose long-stalked *clusters*, conspicuous for their snowy whiteness, and capillary or cobweb-like border, by which, in the warm stillness of a stove, they seem suspended in the air, though the least breath might destroy them. The *fruit*, three or four feet long, and an inch or two in diameter, of a dark shining green, often marked with white, more or less coiled or undulated, lies on the ground, partly shaded by the *leaves*, and has the appearance, at first sight, of a large snake. Hence Micheli took his generic name, which is most commodiously, as a specific one, made into an adjective.

2. *T. scabra*. Rough Hair-blossom. Loureir. Cochinch. 589. Willd. n. 2. (*T. angulata*; Lamarck Dict. v. 1. 190? Willd.)—Fruit roundish, many-lobed. Leaves roundish-heart-shaped, rough, very rugged. Stalks single-flowered.—Native of woods in Cochinchina, where it is called *Dua nhâ thoi*. Stem shrubby, many-furrowed, climbing by means of cloven *tendrils*. *Leaves* alternate, stalked. *Flowers* solitary, on simple axillary stalks, white, with a short fringe. *Fruit* small, red, roundish, with twelve lobes, and five cells. *Seeds* numerous, flat, oblong. This de-

scription of Loureiro does not, as to the *fruit*, answer well to the character of the genus; but that part is known to be the least uniform or constant of any, in this tribe, even in the same species.

3. *T. fetidissima*. Fetid Hair-blossom. Jacq. Coll. v. 2. 341. Ic. Rar. t. 624.—Fruit ovate, pointed, furrowed. Leaves oblong-heart-shaped, viscid, nearly entire. Corolla fringed with simple teeth.—Native of the coast of Guinea. Jacquin says it proved a greenhouse plant with him, flowering in summer in the open air. The *root* is perennial, tap-shaped. Whole *plant* viscid and fetid like putrid flesh, or the *Stapelia hirsuta*, which odour adheres to the hands of any person who touches it. *Stems* one or more, annual, herbaceous, branched, leafy, rising by *tendrils* to the height of eight feet. *Leaves* drooping, hairy, stalked, from one and a half to three inches long; paler beneath. *Flowers* small, yellow; their border beset with bristly teeth. *Fruit* tawny, measuring with its beak about an inch and a half. Nothing can less answer to the idea of the original species than the present, nor ought they to rank in the same genus.

4. *T. nervifolia*. Rib-leaved Hair-blossom. Linn. Sp. Pl. 1432. Willd. n. 4. (Tota-piri; Rheede Hort. Malab. v. 8. 33. t. 17. Raii Hist. v. 3. 337, not 377.)—"Fruit ovate, acute. Leaves oblong-heart-shaped, three-ribbed, toothed."—Found about Cranganore, on the coast of Malabar, flowering in the rainy season. *Stems* slender. *Leaves* paler beneath. *Flowers* white, with a long entangled fringe. *Fruit* like a cucumber. A sneezing medicine is made of the leaves, with garlic, supposed useful in the epilepsy. The juice of these *leaves*, mixed with some kind of oil, is used to anoint the temples of maniacs; to whom also a fumigation, made by a woollen thread dipped into the juice of the leaves and bruised fruit, and then burnt, is thought in India to be beneficial.

5. *T. caudata*. Beaked Hair-blossom. Willd. n. 5. (*T. cuspidata*; Lamarck Dict. v. 1. 190. Scheru-padavalam; Rheede Hort. Malab. v. 8. 31. t. 16. Raii Hist. v. 3. 337.)—Fruit turbinate-ovate, with an elongated point. Leaves oblong, heart-shaped, three-ribbed, toothed.—Native of the East Indies. Nearly related to the following, but smaller in every part, and the *fruit* is turbinate, crowned with the tube of the *calyx*.

6. *T. cucumerina*. Cucumber Hair-blossom. Linn. Sp. Pl. 1432. Willd. n. 6. Ait. n. 2. (Padavalam; Rheede Hort. Malab. v. 8. 30. t. 15. Raii Hist. v. 3. 337.)—Fruit ovate, acute. Leaves roundish-heart-shaped, deeply lobed, angular, wavy.—Native of sandy ground among trees, on the Malabar coast, flowering in June and July. Every part is fetid. *Root* widely spreading, fibrous, annual. *Stems* herbaceous, angular, hairy, not very harsh. *Leaves* soft and downy, divided down to the stalk. *Flowers* white, small, with a long entangled fringe. *Fruit* yellowish; the *seeds* lodged in red pulp. Prepared with fugar, this *fruit* is thought to help digestion, and cure pains of the stomach and bowels, killing worms, promoting expectoration, &c. The juice of the *root* is purgative and emetic, useful in intermittent fevers.

7. *T. amara*. Bitter Hair-blossom. Linn. Sp. Pl. 1432. Willd. n. 7. (*Colocynthis flore albo fimbriato, fructu oblongo*; Plum. Amer. 86. t. 100. Raii Hist. v. 3. 332.)—Fruit oblong-obovate, obtuse. Leaves heart-shaped, sinuated, rough; dotted beneath.—Gathered by Plumier, in the woods of Hispaniola, flowering in December, and bearing ripe fruit in April. The *leaves* are remarkably small, hardly an inch and a half in breadth or length, roughish,

with minute points. *Flowers* white, as large as in *T. anguina*, but with a simple, much shorter fringe. *Fruit* four or five inches long, and an inch and a half in diameter, contracted at the base; its rind thin, smooth, greenish, variegated; the pulp white and very bitter, with brown seeds.

8. *T. tricuspadata*. Three-pointed Hair-blossom. Loureir. Cochin. 589. Willd. n. 8.—“Fruit ovate, acute. Leaves heart-shaped, three-pointed, many-ribbed, smooth.—Native of Cochinchina. *Stem* shrubby, climbing, with three-*left tendrils*. *Leaves* finely toothed, with thick, nearly orbicular, crenate *stipulas*. *Flowers* fringed, white, in axillary spikes, with large toothed *bracteas*. *Fruit* small, yellow, of two cells, with two seeds. *Loureiro*.

9. *T. pilosa*. Villous Hair-blossom. Loureir. Cochin. 588. Willd. n. 9.—Fruit ovate, acute. Leaves heart-shaped, toothed, hairy; the lower ones palmate; upper three-lobed. Found wild in Cochinchina. *Stem* rather shrubby, climbing to a great extent, by means of divided tendrils, hairy as well as the *leaves*. *Spikes* lateral, long, with lanceolate ferrated *bracteas*. *Flowers* white, with a long fringe. *Fruit* scarlet, of one cell. *Seeds* rhomboid, compressed, lobed, brown.

10. *T. tuberosa*. Tuberous Hair-blossom. Willd. n. 10. Ait. n. 3. (*T. corniculata*; Lamarck Dict. v. 1. 191. Anguria fructu parvo, florum segmentis ramosis; Plum. Ic. 14. t. 24.)—Fruit elliptic-oblong. Leaves in three deep lobes; the lateral ones cloven; all entire.—Native of the West Indies. M. Thouin sent it in 1810 to Kew, where it blossoms in the stove about June and July. The *root* is a huge, globular, perennial, tuberculated, fleshy mass, near a foot in diameter. *Stems* annual, climbing by simple tendrils. Segments of the *leaves* lanceolate, divaricated, two or three inches long. *Flowers* somewhat umbellate. *Corolla* with a longish rather sparing fringe at the end of each segment, if we may rely on Burman's copy of Plumier's figure. Willdenow has taken rather an unwarrantable liberty in changing Lamarck's printed names, of this and our fifth species; though in the present instance certainly for the better, the resemblance of horns, in the flower, being probably a deception.

11. *T. laciniosa*. Jagged Hair-blossom. Willd. n. 11.—“Fruit ovate, acute. Leaves heart-shaped, palmate, with five or seven lobes, toothed, smooth.”—Native of the East Indies. Sent by Klein to Willdenow, who describes it with a smooth, slender, angular, climbing *stem*. *Leaves* two or three inches long, remotely toothed. *Male flowers* about six together, in axillary corymbose clusters; with ovate toothed *petals*: *female* ones solitary, on axillary stalks; their *petals* fringed.

TRICHOSTEMA, so called by Gronovius, from $\tau\rho\iota\chi\omicron\varsigma$, $\tau\rho\iota\chi\omicron\varsigma$, *hair*, and $\sigma\tau\omicron\mu\alpha$, *the flamen of a flower*, alluding to the peculiarly long capillary filaments of the original species.—Linn. Gen. 300. Schreb. 397. Willd. Sp. Pl. v. 3. 170. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 3. 425. Pursh 414. Juss. 116. Lamarck Illustr. t. 515.—Class and order, *Didynamia Gymnospermia*. Nat. Ord. *Verticillata*, Linn. *Labiata*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, two-lipped; the upper lip twice the largest, in three equal acute segments; lower in two deep acute segments. *Cor.* of one petal, ringent; tube very short; upper lip compressed, falcate; lower in three deep segments, the middle one oblong, very small. *Stam.* Filaments four, capillary, remarkably long, incurved, two rather shorter than the rest; anthers simple. *Pist.* Germen four-cleft; style capillary,

the length and shape of the filaments; stigma cloven. *Peric.* none, except the enlarged, inflated, closed calyx, fo reflexed that its upper lip becomes the lower. *Seeds* four, roundish.

Eff. Ch. Upper lip of the corolla falcate. Stamens very long. Calyx two-lipped.

Obs. It is necessary to note, that the above characters, as far as respects the stamens, agree with the specific definition of one of the two Linnæan species only. Linnæus has left a manuscript remark, that “Adanson refers this genus to TEUCRIUM;” see that article. He certainly does so, in his *Familles des Plantes*, v. 2. 188, like Dillenius; but in contradiction to his own just character of the latter, consisting in the want of an upper lip.

1. *T. dichotomum*. Marjoram-leaved Annual Trichostema. Linn. Sp. Pl. 834. Willd. n. 1. Ait. n. 1. Pursh n. 1. (Trichostema; Linn. Hort. Cliff. 493. *T. staminibus longissimis exsertis*; Gron. Virg. ed. 2. 90.)—Stamens very long, prominent. Leaves rhomboid-lanceolate. Flowering branches twice forked.—In fields and on sunny hills, from Pennsylvania to Carolina. Annual, flowering in July and August. *Flowers* large, fine blue. The whole plant has an agreeable refinous scent. *Pursh*. *Root* fibrous. *Stem* a span high, erect, round, downy, with opposite crossing *branches*. *Leaves* opposite, lanceolate, obtuse, entire, rough, the lower ones accompanied by axillary tufts of small leaves, or rudiments of branches. *Flowering branches* from the bosoms of the upper leaves, taller than the stem, crossing each other, and bearing a leaf similar to those just described. Each *branch* ends in a paniced form, with forked divisions, the proper *flower-stalks* single-flowered. *Stamens* setaceous, very long. *Calyx* reflexed after flowering. *Linn. Hort. Cliff.*

Pursh adopts from Walter, *Fl. Carol.* 164, a variety with linear *leaves*, called by that writer *T. lineare*.

2. *T. brachiatum*. Scffile-leaved Trichostema. Linn. Sp. Pl. 834. Willd. n. 2. Ait. n. 2. Pursh n. 2. (*Teucrium virginicum, origani folio*; Dill. Elth. 380. t. 285.)—Stamens short, within the flower. Leaves ovato-lanceolate. Flowering branches opposite, paniced.—Native of Virginia, according to Dillenius. Mr. Pursh never saw this species but in the Bankian herbarium, nor have we examined an authentic specimen. The habit of the *plant* seems much like the last, but the *leaves* are more sessile. Dillenius's representation of the parts of the *flower*, though, doubtless, accurate, but ill agrees with the Linnæan generic description, nor are those parts far unlike those of a *Teucrium*. The *stamens* are strongly incurved, or involute, and therefore do not project out of the *flower*. We suspect this may not be a distinct species from the foregoing. Both require elucidation from American botanists.

3. *T. spirale*. Spiral Trichostema. Loureir. Cochin. 371. (*Cây ráu mè* of the Cochinchinese.)—“Stamens very long and spiral. Leaves ovate, acute.”—Native of Cochinchina. *Stem* herbaceous, erect, square, four feet high, with opposite crossing *branches*. *Leaves* opposite, entire, downy. *Flowers* pale violet, in long terminal spikes. *Corolla* ringent, its upper lip falcate. *Stamens* very long, rolled up spirally, and retained within the corolla. *Loureiro*. This last character answers exactly to Dillenius's plate of *T. brachiatum*, to which Loureiro thought his plant nearly akin. Not having, probably, access to that plate, he did not discover how well it agreed, even where he thought the difference greatest.

TRICHOSTOMUM, from $\tau\rho\iota\chi\omicron\varsigma$, $\tau\rho\iota\chi\omicron\varsigma$, *a hair*, and $\sigma\tau\omicron\mu\alpha$, *the mouth*, because the fringe of this moss is remarkable

TRICHOSTOMUM.

remarkable for the length and slenderness of its hairs. Fringe-mosses.—Hedw. Fund. v. 2. 90. t. 8. f. 43, 44, but indifferent. Sp. Musc. 107. Schreb. Gen. 760. Sm. Fl. Brit. 1235. Engl. Bot. t. 1152. Swartz Musc. Suec. 29. Turn. Musc. Hib. 33. (Didymodon; Hedw. Crypt. v. 3. 8. Sp. Musc. 104. Schreb. 760. Swartz Musc. Suec. 27. Swartzia; Hedw. Crypt. v. 2. 72. Cynodontium; Hedw. Sp. Musc. 57. Bryi species variae; Linn. Hudf.)—Class and order, *Cryptogamia Musci*. Nat. Ord. *Musci*.

Eff. Ch. Capsule oblong. Fringe of thirty-two capillary straightish teeth, approximated or united in pairs.

Trichostomum of Hedwig has, or ought to have, all the teeth of its fringe minutely connected together, at the very base, in pairs. The genera which the writer of this article first presumed to reduce to the present, as above indicated, have distinct teeth, though those teeth nevertheless approach each other in a similar manner. These genera differ among themselves in having separated or united flowers. None can be more naturally akin than they all are, and they have been disunited by obscure and difficult, as well as unnatural marks. Of this so good a judge as Mr. Turner could not but be aware, and we are happy in having his concurrence. What is said under the article *Dicranum* of the general habit of that genus, is in a great measure applicable to this; except a remarkable difference in the aspect and texture of their fringes. This part in *Trichostomum*, instead of being broad, stout, transversely furrowed, red, with pale points, is long, slender, and of even thickness and colour. The small and unbranched species of the two genera most resemble each other. The great branched hoary *Trichostoma*, comprehended under *Bryum hypnoides* of Linnæus, Hudson, &c. are least allied to *Dicranum*. We are not aware of any *apophysis*, or glandular base, to the capsule, in the genus before us.

The species are commodiously disposed in two sections, distinguished by the separation or combination of their teeth. Eighteen are natives of Britain, which is about the number that Hedwig reckons up all together. We shall describe the most remarkable.

SECT. 1. *Teeth of the fringe all distinct at the base.* Five British species.

T. trifarium. Three-ranked Fringe-moss. Fl. Brit. n. 1. Engl. Bot. t. 1707. (Cynodontium trifarium; Hedw. Sp. Musc. 57. Swartzia trifaria; Hedw. Crypt. v. 2. 76. t. 28. Bryum trifarium; Dickf. Crypt. fasc. 3. 8.)—Leaves lanceolate or awl-shaped, in three rows, keeled, entire. Capsule ovate. Stem branched.—Native of barren hilly ground. Dr. Abbot discovered it at Clapham Springs, near Bedford. None but a discerning botanist would distinguish this little moss from many others, far more common. The tufts are perennial, scarcely half an inch high, of a dull rusty green. *Leaves* with a strong, often reddish, mid-rib, but no bristly point; the lower ones broadest. *Flowers* terminal, each consisting of a few jointed *stamens*, and still fewer brown *pistils*, of which latter one only comes to perfection. *Fruit-stalk* hardly an inch high, rather wavy, bulbous at the base, its lower half red. *Capsule* erect, small, of a shining brown. *Lid* conical, slightly curved, scarcely so long as the capsule. *Fringe* paler in our specimens than in Hedwig's plate, but drawn rather too long in *Engl. Bot.*

T. capillaceum. Capillary Fringe-moss. Fl. Brit. n. 2. Engl. Bot. t. 1152. (Swartzia capillacea; Hedw. Crypt. v. 2. 72. t. 26. Bryum capillaceum; Dickf. Crypt. fasc. 1. 4. t. 1. f. 6. Fl. Dan. t. 1000. f. 1. B. æstivum; Hudf. 485, excluding the synonym of Dillenius. B. n. 1806;

Hall. Hist. v. 3. 44. t. 45. f. 1.)—Leaves capillary, in two rows; sheathing and dilated at the base. Capsule elliptic-cylindrical. Lid conical. Stems very densely tufted.—Not uncommon in bogs on the mountains of Scotland, Wales, and the north of England, as well as Switzerland and Sweden, bearing capsules in April or May. Though figured by Haller, this moss was little understood by British botanists, when the writer of the present article gathered it on the Pentland hills, near Edinburgh, in May 1782, and communicated it to Mr. Dickson, to whom it was new. The *stems* are several inches high, very slender, rusty, crowded into dense and wide perennial tufts, soaked in water, and conspicuous for the delicate bright green of the fine capillary *leaves* which clothe their summer shoots. The numerous *fruit-stalks*, an inch and half or two inches long, red and shining, at length zigzag, are of an equally slender and delicate habit. *Capsule* erect, small, nearly cylindrical, thin, smooth, pale shining brown, darker or tawny at the edge, as is the small conical *lid*. *Veil* very slender. *Fringe* brownish, deciduous.

T. papillosum. Papillary Fringe-moss. Fl. Brit. n. 5. Engl. Bot. t. 2533. (Bryum papillosum; Dickf. Crypt. fasc. 4. 12. t. 11. f. 5.)—Leaves awl-shaped, keeled. Capsule elliptical, nearly erect, gibbous on the lower side at the base. Lid conical. Stem branched.—Found by Mr. Dickson alone, on turfy bogs, in the Highlands of Scotland. The *stems* are branched and level-topped about half an inch high. *Leaves* dark-green, slender, imbricated every way, entire. *Fruit-stalks* an inch or inch and half high, terminal, erect, red, with a cylindrical sheath at the base. *Capsule* red-brown, smooth, with a prominence, like a short spur, at the base, which renders this species very remarkable and distinct, but does not seem to be of the nature of an *apophysis*. The *lid* is conical, short. *Teeth* of the fringe certainly thirty-two.

SECT. 2. *Teeth of the fringe connected in pairs at the base.* Thirteen British species.

T. lanuginosum. Toothed Hoary Fringe-moss. Hedw. Sp. Musc. 109. Crypt. v. 3. 3. t. 2. Fl. Brit. n. 8. Engl. Bot. t. 1348. (T. ferratum; Ehrh. Crypt. n. 94. Bryum hypnoides α ; Linn. Sp. Pl. 1584. Fl. Dan. t. 476. B. hypnoides polycephalon, lanuginosum, montanum; Dill. Musc. 372. t. 47. f. 32.)—Leaves lanceolate, with a pellucid toothed point. Capsule ovate. Stem procumbent, branched in a pinnate manner.—This, a genuine specimen of the habit of a *Trichostomum*, is a very common moss in dry mountainous woods, and on exposed rocks, stones, walls or heaths, bearing capsules, though rarely, in autumn. The copiously branched, arching, elastic, leafy *stems* compose large light soft tufts, on which many a tired hunter or botanist has reposed. The *leaves* are of a dull yellowish-green, rendered hoary, when dry, by their flat white inflexed points, which are curiously bordered with short, broad, abrupt teeth, in a manner unlike every other species, and not ill resembling the cogs of a wheel. *Fruit-stalks* from the small branches, lateral, solitary, half an inch long, tawny, twisted when dry. *Capsule* erect, brown, smooth, thick and short, with an awl-shaped lid, and a pale reddish *fringe*. The *veil* is conical, brown-pointed, splitting up in many different parts, not all at one side.

T. ericoides. Heath-like Hoary Fringe-moss. Schrad. Spicil. 62. Fl. Brit. n. 9. Engl. Bot. t. 1991. Turn. Musc. Hib. 38. (T. elongatum; Ehrh. Crypt. 233. Bryum ericoides; Dickf. Crypt. fasc. 4. 14. B. hypnoides γ ; Linn. Sp. Pl. 1585. B. hypnoides, ericæ facie, capsulis barbatis, alpinum; Dill. Musc. 371. t. 47. f. 31.)—Leaves ovato-lanceolate, recurved, keeled and deeply chan-

nelled, with a pellucid finely ferrated point. Capsule ovate. Stem erect, with very short branches.—One of the most handsome, as well as most rare, of its genus. Dr. Richardson originally sent it to Dillenius from the highest part of Snowdon. Two of our best British cryptogamists, Messrs. Borrer and Hooker, found it in fructification, in 1808, on the sandy shores of the Tay near Dunkeld. The stems are perennial, two or three inches high, erect, in loose tufts, leafy, subdivided, and furnished moreover with abundance of short spreading branches, which give the plant that resemblance to *Erica vulgaris*, expressed in the name. Leaves deep green, or tawny, spreading and recurved, revolute, entire, keeled with a deep channel resembling a mid-rib, and tipped with a fine ferrated hair-like point, most visible when dry. Fruit-stalks terminating the last year's shoots, about an inch and a half long, red, finally dark purple, twisted. Capsule erect, smooth, brown. Lid red, awl-shaped, straight, nearly of the same length. Fringe purple, almost as long, straight and slender. Veil fringed with jagged teeth, not splitting.

T. canescens, Common Hoary Fringe-moss. Hedw. Sp. Musc. 111. Crypt. v. 3. 5. t. 3. Fl. Brit. n. 10. Engl. Bot. t. 2534. (Bryum hypnoides α ; Hudf. 480. B. hypnoides hirsutie canescens, vulgare; Dill. Musc. 368. t. 47. f. 27?)—Leaves ovato-lanceolate, with a central channel, but no nerve, and a pellucid rough point. Capsule ovate. Stem erect, with upright branches.—Very common every where, on open, dry, sandy heaths, or moors, both in mountainous and maritime situations, bearing capsules about February or March, but not frequently. The branches are more level-topped and ascending than in the last-described, and the leaves of a yellower green, becoming very hoary when dry, in consequence of their white points, rough in every direction. The want of a mid-rib in this species, though there is a furrow appearing like one, has been pointed out as a means of distinguishing it from the rest, especially from *T. ericoides*. But the same character is found, as we have already described, in that species; while some of Dillenius's specimens of the present, very carefully examined, prove to have an actual rib. These are possibly accidental fragments of another species. The present certainly has no mid-rib, and has its capsule, fringe, and lid accord exactly with *ericoides*. The latter may be, as Hedwig thought, but a variety of this more common and less elegant kind. Whether there be any permanent difference in the roughness of the points of their leaves, which affords a clear distinction in *T. lanuginosum*, can only be determined by a more minute examination than our materials will admit.

T. fasciculare. Beardless Hoary Fringe-moss. Schrad. Spicil. 61. Fl. Brit. n. 11. Engl. Bot. t. 2005. (B. hypnoides β ; Linn. Sp. Pl. 1585. B. hypnoides, hirsutie virefens, fasciculare alpinum; Dill. Musc. 370. t. 47. f. 28.)—Leaves lanceolate, pointed, revolute, keeled. Capsule ovate-oblong. Stem branched, diffuse.—An inhabitant of dry rocky mountains in the North, bearing plenty of capsules in the spring, whose empty blackened remains continue long. This species approaches several mountain kinds of *Dicranum* in habit, but is a genuine *Trichostomum*. The hoariness of the old plants arises partly from a whitish hue assumed by the leaves in decay, and partly from their slightly pellucid edges; but not from any pellucid or hair-like point, the want of which renders *T. fasciculare* very distinct from the three foregoing. Its fringe too is much shorter, and the leaves have a mid-rib.

T. glaucescens. Glaucous Fringe-moss. Hedw. Crypt. v. 3. t. 37. B. Fl. Brit. n. 14. Engl. Bot. t. 2381. (Bryum glaucescens; Dickf. Crypt. fasc. 4. 1c.)—Leaves

linear-lanceolate, acute, rather glaucous. Capsule ovate, slightly furrowed. Stem erect, somewhat branched.—Native of Sweden and Scotland, in which last country Mr. Dickson discovered this pretty and uncommon species, growing in shady rather mountainous situations. We have not heard of it from any other person. The stems compose perennial leafy tufts, scarcely half an inch high. Leaves erect, pointless, rather incurved when dry, of a light-green, slightly glaucous, entire, keeled, with a mid-rib; the upper ones most elongated and tapering. Capsules peculiarly light-coloured and shining, with a purple fringe, and a conical oblique lid, reddish at the base, half the length of the capsule. The internal cavity of the latter does not reach to the bottom, which, as the thin outer coat of the capsule dries, causes a contraction there, like an *apophysis*, but of a very different nature. The same appearance is observable in some species of *Bryum* with club-shaped fruit.

T. lineare. Linear-leaved Fringe-moss. Fl. Brit. n. 17. Engl. Bot. t. 1598. (Bryum lineare; Dickf. Crypt. fasc. 3. 6. t. 8. f. 2.)—Leaves linear-lanceolate, imbricated, acute. Capsule elliptical. Lid conical, oblique. Stem erect.—Native of Scotland, Wales, and Northumberland, in wet places, on a calcareous or sandy soil, bearing capsules in the spring. Stems tufted, branched, perennial, an inch or more in height, clothed with dark-green leaves, which vary from an almost linear to an ovate form, and turn either yellowish or blackish, from constant immersion in water, or from its dripping upon them. Fruit-stalks red, an inch long. Capsule ovate, smooth, with a taper lid of its own length. The aspect of this moss, especially when growing in a wet shady place, is much like *Dicranum pellucidum*, and it has caused some mistakes by that means. Still more perhaps does it resemble a *TORTULA*, (see that article,) but the short straight delicate fringe truly indicates a *Trichostomum*. The teeth, standing in pairs, are connected by one common base, according to Mr. Sowerby.

T. fontinalioides. River Fringe-moss. Hedw. Crypt. v. 3. 36. t. 14. Fl. Brit. n. 19. (Fontinalis minor; Hudf. 468. Dickf. Dr. Pl. 17. Engl. Bot. t. 557. F. triangularis minor carinata, e cymis capsulifera; Dill. Musc. 257. t. 33. f. 2. Hypnum n. 1796; Hall. Hist. v. 3. 41, excluding the synonyms of Dillenius and Linnaeus.)

β . *Fontinalis alpina*; Dickf. Crypt. fasc. 2. 2. t. 4. f. 1. (Hypnum nigricans; Villars Dauph. v. 3. 905, B.)—Leaves lanceolate. Capsules ovate, nearly sessile at the ends of the lateral shoots. Stem floating, very much branched.—Native of rivers, in various parts of England, as the Thames at Lambeth, the Isis at Oxford, and the Ouse at Oakley, Bedfordshire. The mountain variety β inhabits the stony beds of the more rapid streams of Scotland, Wales, and the north of England. Both are firmly attached to walls or stones under water, their numerous tufted, branched leafy stems, four or five inches long, floating with the stream. The leaves are of a very dark dull olive-green, narrower and almost black in the variety β , loosely imbricated, lanceolate, entire, acute, keeled, with a strong rib; all undulated and twisted when dry. Capsules terminating the lateral branches, solitary, erect, ovate, brown, smooth. Lid half as long, conical, rather curved. Fringe long, tawny or red, its teeth variously connected and pierced at the base, slightly convoluted when dry, soon falling off. The habit of this moss is so little like the rest of its genus, that we cannot but wish the character of its fringe were more decidedly sufficient to establish a new one. The specific name moreover, though expressive, is barbarously constructed.

The reader will observe that *T. cirratum*, Fl. Brit. n. 6, is omitted in the Compendium, ed. 2, proving merely a large variety of *Dicranum polyphyllum*, Fl. Brit. 1225. Engl. Bot. t. 1217.

Some species referred to *Trichostomum* by Hedwig, on account of the approximation of their teeth, we consider as *Grimmia*, because they have only sixteen teeth, not thirty-two. An instance occurs in *G. homomalla*, Fl. Brit. 1194. Engl. Bot. t. 1900, so like *heteromalla*, which immediately precedes it in these works, that they can hardly be distinguished but by the above minute character. We acknowledge indeed that the dwarf species of *Trichostomum*, in general, have almost entirely the habit of *Grimmia*. But the difference between the numbers sixteen and thirty-two, in their teeth, appears, by the analogy of other genera, a most certain and natural generic distinction. See GRIMMIA.

TRICHOURI, in *Natural History*, a term used by some authors to express such flies as have one or more hairs growing out at their tails: these are called also *feticauda*.

TRICHRUS, the name of a stone described by the ancients, and said to yield three colours: in their common way of preparing bodies of this kind for medicinal use (which was by rubbing them down on a porphyry, or other hard stone with water), this first coloured the water black, then red, and lastly white. It seems to have been a kind of hæmatites, or blood-stone.

TRICKANDORE, in *Geography*, a town of Hindoostan, in the province of Tinevelly; 30 miles E.S.E. of Palamcotta.

TRICKUT, one of the Nicobar islands. N. lat. 8° 3'. E. long. 94° 10'.

TRICLARIA, in *Mythology*, an epithet given to Diana, in Achaia; and Pausanias tells us (In Corint.) that Menalippus and Cometho gratified their lust in the temple of Diana Triclaria. This profanation, as it is said, was followed with a general barrenness, inasmuch that the earth produced no fruit, and with an epidemical distemper, which swept away numbers of people. The Achaians, having consulted the oracle of Apollo, were answered by the priestesses, that the impiety of Menalippus and Cometho was the cause of all their calamities, and that the only way to appease the goddess was to sacrifice to her every year a boy and a young virgin.

TRICLINIUM, in *Antiquity*, the name given by the Romans to the room in which they eat; and also to the beds upon which they reclined at meat, so called, because it was contrived to accommodate three persons.

TRICOCCÆ, in *Botany*, one of the natural orders among the *Fragmenta* of Linnæus, where it ranks as the thirty-eighth, between the COLUMNIFERÆ and SILIQUOSÆ, (see those articles,) though without having scarcely any affinity of characters or qualities with either. The name is derived from τρεῖς, *three*, and κόκκος, *a grain, or seed*, and alludes to the form of the seed-vessel, apparently composed of three combined lobes, each of which comprehends a single-seeded cell. (See DICOCCLUS.) We are not however to understand that every such seed-vessel belongs to this order. *Thea* is one exception among several; while, on the other hand, some genera which do belong to it may have only two lobes to their fruit; witness *Mercurialis*; while *Plukenetia* has four, and *Hura* a much greater number. The valves are generally powerfully elastic, serving by that means to scatter the seeds widely, as soon as they are fully ripe.

The plants composing this natural order have alternate, mostly simple, leaves, often furnished with glands. Their secreted fluids are milky, and extremely acrid, their milk being a natural emulsion, of a most virulent resin, or gum-

resin, mixed with a watery liquid. The calyx and corolla have, as Linnæus observes, always something unusual in their conformation, especially about the nectary. The style is generally peculiar, being three-cleft, sometimes very deeply, and each branch again divided. Many of the genera have separated, either monoecious or dioecious, flowers. The stems are either shrubby, sometimes very fleshy; or herbaceous, with annual or perennial roots.

Euphorbia is selected by Linnæus to exemplify the order of *Tricocca*. No genus can be more natural or distinct, however different the habit, or herbage, of some of the numerous species from each other. According to the generally received idea of this genus, its flowers are simple or united, each having a calyx of one concave or inflated leaf, whose four or five marginal teeth bear as many abrupt, coloured, nectariferous glands. These latter, in some instances, as *E. corollata*, assume perfectly the appearance of petals. Yet Linnæus was always much puzzled and surprised at the petals thus originating from the teeth of the calyx, of which he could scarcely find another example. Other peculiarities in this remarkable genus could not escape so accurate an observer, as the long stalk which elevates the germen out of the flower, and turns it to one side; and the progressive nature of the stamens, as well as their anthers, which come forth in succession. The herbage too is remarkably various, arboreous and succulent, or herbaceous; spinous or unarmed; the leaves opposite, or alternate, or deficient. Two species having an irregular calyx, gibbous underneath, were separated into a distinct genus by Dillenius, under the faulty name of *Tithymaloides*, but they are too naturally akin to the rest to justify such a measure.

Although the above is the generally received idea of *Euphorbia*, Jussieu, Gen. Pl. 386, has hinted that the flower is perhaps a compound one, consisting of a central female floret, with many monandrous male ones, distinguished by chaffy scales, all in one common involucre. Mr. Brown, in his very instructive Remarks on the Botany of Terra Australis, published at the end of captain Flinders's Voyage, has confirmed this opinion, by an additional observation. He conceives what all authors have taken for a joint in each filament, to be in fact the separation of the filament from its footstalk; or in other words the base, or receptacle, of the flower, or floret, which is entirely destitute of a proper perianth and corolla; the female floret likewise having its footstalk, on whose dilated, sometimes obscurely lobed, summit, the sessile germen is placed. In support of this doctrine, it is suggested that the real filament is, as in other plants, produced subsequent to the formation of its anther, and of the stalk below the joint; their surfaces moreover, in some species, being different in nature. But the most conclusive certainty is given to Mr. Brown's theory, by the discovery of a new genus, hitherto unpublished, having an involucre nearly similar to *Euphorbia*, inclosing several fasciculi of monandrous male flowers, around a solitary female; while in this there is an obvious perianth, regularly divided into lobes, at the joint of each supposed filament, as well as at that by which the germen is connected with its stalk.

The above idea of *Euphorbia*, as a monoecious genus, brings it nearer to the rest of this natural order, which have almost universally separated, either monoecious or dioecious, flowers. At least such is the case with the genera properly belonging to it, and which constitute Jussieu's order of *Euphorbia*, or *Euphorbiacea*.

TRICOLLORI, in *Ancient Geography*, a people of Gallia Narbonensis, whose capital was Alarante; who occupied the territory of Sileron.

TRICOLONI, or TRICOLONS, a town of Arcadia, N.E.

N.E. of Megalopolis. Here was a temple of Neptune, near it a sacred wood, and at a small distance a temple of Diana, furnished Calista.

TRICOMIA, a town of Asia, in Phrygia Major.

TRICOR, a name by which some of the chemical writers have called gold.

TRICORD, an ancient musical instrument with three strings. The first lyre of Mercury is supposed by many to have had but three strings. Most of the writers on music among the ancients, have supposed that the three sounds of this primitive lyre, were E, F, G.

Julius Pollux called the *pandora*, or *pandura*, the instrument with three strings.

The emperor Heliogabalus, says Lampridius, sung, danced, recited, or declaimed to the sound of the flute, founded the trumpet, played on the *pandura* and the organ.

Here is work for ingenious conjectures: what was meant by reciting to the flute? What music could an instrument without a neck produce with only three strings? And what kind of instrument was the organ upon which Heliogabalus played, before organs were supposed to have been invented?

TRICORII, in *Ancient Geography*, a people of Gallia Narbonensis, mentioned by Lucan in his *Pharsalia*, and also by Livy and Polybius, in their account of the march of Hannibal. Livy says that Hannibal, having passed the Rhone, took his route on the left, through the country of the Tricastini, and touching on the territory of the Vocontii, entered into that of the Tricorii. Ascending along the Rhone, he arrived on the fourth day of his march at the junction of a river with the Rhone, on the confines of the Allobroges, who inhabited the territory between these rivers. This river is called Scoras by Polybius, and Arar (the Saone) by Livy. Some critics, however, are of opinion that this name is erroneous, and that it was Isere.

TRICORNIS, in *Anatomy*, an epithet applied to the lateral ventricle of the brain. See BRAIN.

TRICORYNE, in *Botany*, from τρεῖς, *three*, and κορυνη, *a club*, expressive of the three club-shaped seed-vessels.—Brown Prodr. Nov. Holl. v. 1. 278.—Class and order, *Hexandria Monogynia*. Nat. Ord. *Coronarie*, Linn. *Aphodeli*, Juss.

Eff. Ch. Corolla in six deep, spreading, equal segments, deciduous. Filaments with tufts of hairs. Anthers vertical, cloven at the base. Germen deeply three-lobed, connected at the base with the thread-shaped style. Stigma simple. Capsules three, club-shaped, not bursting. Seeds solitary.

This genus ranges naturally between *Anthericum* and Mr. Brown's *Casia*. The species are herbaceous, with fibrous, mostly perennial, roots. Leaves grassy, narrow. Branches, if any, accompanied by an interior stipula (or bractea). Flowers umbellate, erect, yellow, their partial stalks having a joint at the summit. Corolla twisted as it fades, and soon falling. Seed-vessels resembling coated nuts, one of them sometimes abortive, but rarely more than one.

1. *T. simplex*.—Stem undivided. Leaves flat, roughish at the edges. Umbel solitary, of from ten to sixteen flowers. Partial stalks thrice as long as the involucre.—Observed by Mr. Brown at Port Jackson, New South Wales.

2. *T. elatior*.—Stem round, smooth, leafy; branches smooth, panicled, angular and striated. Leaves flat. Umbels of from five to seven flowers. Native of the same country.

3. *T. scabra*.—Stem round, hispid, leafy. Branches panicled, angular and striated, rough. Leaves flat, mi-

nutely toothed. Umbels of from five to seven flowers.—Native of the tropical part of New Holland.

4. *T. tenella*.—Stem slender, round, forked, smooth, leafless, scaly. Umbels of two or three flowers.—Found by Mr. Brown on the south coast of New Holland.

5. *T. anceps*.—Stem much branched, leafless, scaly, angular, smooth. Branches two-edged. Umbels of few flowers.—Gathered by Sir Joseph Banks, in the tropical part of New Holland, and seen only in his herbarium by Mr. Brown.

TRICOT, in *Geography*, a town of France, in the department of the Oise; 13 miles N.W. of Compeigne.

TRICRANA, in *Ancient Geography*, an island situated on the coast and to the S.E. of the peninsula of the Argolide, having to the S. the island Aristera, to the N.W. that of Hydreia, and to the N. the promontory of Acra. Pausanias mentions this island.

TRICRATUS, in *Botany*, so named by the late M. l'Heritier, from τρεῖς, *three*, and κρατος, *power*, or *dissinction*; perhaps in allusion to the three-fold affinity or resemblance of the plant, indicated by Jussieu, who remarks that it has the habit of *Valeriana*, the flowers of *Primula*, and nearly the character of *Mirabilis*. We still do not perceive any reason for Jussieu's original name, *Abronia*, (from ἀβρον, *pretty and delicate*,) being superseded by the above.—L'Herit. Monogr. with a plate. Willd. Sp. Pl. v. 1. 807. (*Abronia*; Juss. Gen. 448. Lamarck Illustr. 468. t. 105.)—Class and order, *Pentandria Monogynia*. Nat. Ord. *Aggregate*, Linn. *Nyctagine*, Juss.

Gen. Ch. Cal. Perianth none. Cor. of one petal, inferior; tube funnel-shaped, inflated at the base, then suddenly contracted; limb shorter than the tube, flat, equal, in five deep, inversely heart-shaped segments. Nectary cup-shaped, of one leaf, encompassing the germen, and united with the inflated base of the tube. Stam. Filaments five, thread-shaped, unequal, shorter than the tube, to which they are united in their lower part, and inserted into the nectary; anthers oblong, within the tube. Pist. Germen superior, roundish, embraced underneath by the nectary; style one, thread-shaped; stigma undivided. Peric. none. Seed. Nut elliptic-oblong, pointed at each end, five-angled, invested with the hardened base of the corolla, of one cell.

Eff. Ch. Corolla funnel-shaped, with an inflated permanent base; its limb in five deep, cloven segments. Nectary cup-shaped, embracing the germen, bearing the stamens. Calyx none. Nut with five angles and one kernel.

1. *T. admirabilis*. L'Herit. as above. Willd. n. 1. (*Abronia umbellata*; Lamarck Illustr. 469. t. 105.)—Native of the sea-coast of California, where its seeds were collected by M. Colignon, a gardener who was sent out with La Peyrouse. These produced flowering plants in the Paris garden in 1788. The *herbage* is delicate, with several branches spreading on the ground; whether perennial or annual is not mentioned. Leaves simple, opposite, ovate, entire, on long stalks. Flowers in axillary, long-stalked heads, with an ovate bractea under each flower. Tube green. Limb of an elegant rose-colour. This little plant is perhaps the only fruit of La Peyrouse's unfortunate expedition.

TRICRENA, or TRICRINA, in *Ancient Geography*, the name of three fountains, a place of Peloponnesus, in Arcadia, E. of Pheneos.

TRICUSPID, in *Anatomy*, three-pointed, one of the valves of the heart, placed at the right auriculo-ventricular aperture. See HEART.

TRIDACNÆ, in *Natural History*, a genus of bivalve shells.

TRIDACTYLIA, in *Ornithology*, a genus of birds, separated by Dr. Shaw from *Picus*, on account of the number of toes; this having but three, whereas the genuine Pice are all furnished with four. Its generic characters are; beak many-sided, straight, wedge-shaped at the tip; nostrils covered with setaceous recumbent feathers; and feet with only three toes, placed two before and one behind. The species are the following.

HIRSUTA. Downy, varied with black and white. See *Picus Tridactylus*.

UNDULATA. Waved, varied with black and white, beneath white. The southern three-toed woodpecker of Latham. First described by Brisson, and by him said to inhabit Cayenne.

TRIDAX, in *Botany*, from τρεις, *three*, and δακτυ, *to bite*, or *wound*, because of the three deep divisions of its marginal florets. Such is the explanation of De Theis, and it seems consonant with the meaning of Linnæus; yet the latter in his *Philosophia Botanica* enumerates this word, which he considers as synonymous with ἑριδωξ, *lettuce*, among the old Greek names incapable of explanation. Possibly he had forgotten his original idea, between the writing of his *Hortus Cliffortianus* and the *Philosophia*; especially as he had not since seen the plant. Pliny speaks of *Ostrea tridacna*, a kind of oysters, so called because one of them was large enough for three bites, or mouthfuls.—Linn. Gen. 435. Schreb. 568. Willd. Sp. Pl. v. 2214. Mart. Mill. Dict. v. 4. Juss. 190. Gærtn. v. 2. 451, no figure.—Class and order, *Syngenesia Polygamia-superflua*. Nat. Ord. *Compositæ oppositifoliæ*, Linn. *Corymbiferæ*, Juss.

Gen. Ch. *Common Calyx* cylindrical, imbricated, with ovate-oblong, sharpish, upright scales. *Cor.* compound, radiant. Florets of the disk all perfect, tubular, funnel-shaped, erect, five-toothed; those of the radius female, ligulate, in three deep segments of equal length, the middle one narrowest. *Stam.* in the perfect florets, Filaments five, capillary, very short; anthers united into a cylindrical tube. *Pist.* in the perfect florets, Germen oblong; style bristle-shaped, the length of the stamens; stigma obtuse; in the female ones, Germen oblong; style thread-shaped, the length of the corolla; stigma obtuse. *Peric.* none, except the permanent calyx. *Seeds*, in both kinds of florets, solitary, oblong. Down simple, rather longer than the calyx. *Recept.* flat, clothed with lanceolate chaffy scales, shorter than the seeds.

Eff. Ch. Receptacle chaffy. Down of many simple hairs. Calyx imbricated, cylindrical. Florets of the radius in three deep segments.

1. *T. procumbens*. Procumbent Tridax. Linn. Sp. Pl. 1268. Willd. n. 1. Mill. Dict. ed. 8. (Tridax; Linn. Hort. Cliff. 418. After americanus procumbens, foliis laciniatis et hirsutis; Houttoun's MSS.)—Gathered at Vera Cruz by Dr. Houttoun, who sent seeds to Miller. The latter cultivated this plant, in his bark-stove at Chelsea, but it flowered sparingly, and seldom perfected seed. He sent a dried specimen to Cliffort, which Linnæus described, but there is none preserved in the Linnæan collection, nor has any figure of the *Tridax* ever appeared. It seems to be herbaceous and perennial, propagating itself by the trailing stems, which throw out roots, and are hairy, clothed with opposite, nearly sessile, rough, hairy, ovate leaves, an inch and half long, acute at each end, sharply serrated, their lowest and largest serratures, which are about the middle of the leaf, making a sort of angle at each side. *Flower-stalks* long, naked, simple, at first terminal, but afterwards becoming lateral. *Flowers* solitary, erect, palish copper-

coloured, or whitish; Linnæus erroneously supposed the radius to be yellow.

TRIDE, in the *Manege*, signifies short and swift: thus a *tride pace*, is a going of short and quick motions, though united and easy. A *tride career* is a very fast gallop, with the times or motion short and nimble; and so of other motions. Some apply the word only to the motion of the haunches.

TRIDENT, TRIDENS, an attribute of Neptune; being a kind of sceptre, which the painters and poets put into the hands of that god. It is in form of a spear, or fork with three prongs, whence the word.

The poets tell us, that Neptune makes the earth open whenever he strikes it with his trident.

Mythologists give several reasons for assigning to Neptune the trident. Some say that it was designed to denote by its three points, the quality of the three sorts of waters that are upon the earth; those of the sea, which are salt; those of the fountains, that are sweet; and those of the ponds, that partake of both these qualities. Others say, that it alludes to Neptune's threefold power over the sea, which he troubles, assuages, and preserves. But without hunting after myteries, it is sufficient to allow, that the trident was a kind of sceptre used by ancient kings.

TRIDENT, among *Mathematicians*, is used for a kind of parabola, by which Descartes constructed equations of six dimensions.

TRIDESMIS, in *Botany*, so called by Loureiro, from τρεις, *three*, and δεσμος, *a little tuft or bundle*, descriptive of the styles.—Loureir. Cochinch. 576.—Class and order, *Monocia Polyandria*. Nat. Ord. *Tricocca*, Linn. *Euphorbia*, Juss.

Gen. Ch. Male, *Cal.* Perianth of five lanceolate, hairy, spreading leaves. *Cor.* Petals five, lanceolate, downy, nearly equal to the calyx, inserted into the receptacle. *Stam.* Filaments about twenty, shorter than the corolla; anthers oblong, erect.

Female, at the base of the same spike, *Cal.* Perianth inferior, of the structure of the male. *Cor.* none. *Pist.* Germen superior, roundish; styles from fifteen to twenty, thread-shaped, longer than the stamens, collected into three bundles; stigmas thickish. *Peric.* Capsule roundish, bristly, of three cells and three valves. *Seeds* solitary, angular at the inner side, gibbous externally.

Eff. Ch. Male, Calyx of five leaves. Petals five. Stamens about twenty.

Female, Calyx of five leaves. Corolla none. Styles numerous, in three bundles. Capsule of three cells, with solitary seeds.

1. *T. hispida*. Bristly Tridesmis. *Ki quât yông* of the Chinese. Loureir. n. 1.—“Leaves hispid on both sides, Spike short.”—Found in bushy places about Canton, in China. An unbranched upright shrub, about ten inches high, with a perfectly simple, very long, vertical, twined, thick-barked root. *Leaves* scattered, ovate, rather acute, slightly serrated. *Flowers* in a short, simple, terminal spike. A decoction of the root is thought by the Chinese to strengthen the tendons and bones.

2. *T. tomentosa*. Downy Tridesmis. *Ca sí mà* of the Chinese. Loureir. n. 2.—“Leaves downy beneath. Spike elongated.”—Found wild about Canton. *Stem* shrubby, erect, four feet high, with numerous ascending branches. *Leaves* alternate, lanceolate, somewhat serrated. *Flowers* in long, simple, terminal spikes. *Stamens* but ten. *Styles* six, long, in three pairs. *Capsule* hairy.

We cannot precisely reduce these plants to any known genus,

genus, and yet it is very probable they may be already described among the numerous species of *Croton*, which Jussieu justly calls *genus recognoscendum*, as requiring perhaps to be divided, or better defined.

TRIE, in *Geography*, a town of France, in the department of the Upper Pyrenees; 13 miles E.N.E. of Tarbe.

TRIE le Château, a town of France, in the department of the Oise; 3 miles W.N.W. of Chaumont.

TRIEBEL, a town of Lower Lusatia, in the circle of Guben; 12 miles W. of Sorau. N. lat. $57^{\circ} 36'$. E. long. $14^{\circ} 51'$.—Also, a town of Saxony, in the Vogtland; 3 miles S.S.W. of Oelsnitz.

TRIEBSCHBACH, a river of Saxony, which runs into the Elbe, near Meissen.

TRIEDROSTYLA, derived from $\tau\rho\iota\varsigma$, *thrice*, $\epsilon\delta\epsilon\alpha$, *a side*, and $\sigma\upsilon\lambda\omicron\varsigma$, *a column*, in *Natural History*, the name of a genus of spars.

The bodies of this genus are spars, in form of trigonal columns, adhering by one end to some solid body, and terminated at the other by a trigonal pyramid. Of this genus there are four known species. Hill.

TRIEL, in *Geography*, a town of France, in the department of the Seine and Oise; 6 miles N. of St. Germain.

TRIELEN, a small island in the English Channel, near the coast of France. N. lat. $48^{\circ} 22'$. W. long. $4^{\circ} 50'$.

TRIERMERUS, the *three-day fly*, in *Natural History*, a fly somewhat like the butterfly; it has four large yellowish wings, and a long body, with a head furnished with long antennæ, large eyes, and a spiral trunk. It is found among the nettles and mallows.

TRIERMIMERIS, $\tau\rho\iota\epsilon\rho\mu\mu\epsilon\rho\iota\varsigma$, *semiteritaria*, a kind of cæsuræ in Latin verse, in which, after the first foot of the verse, there remains an odd syllable, which helps to make up the next foot.

As in, *Ille latus niveum molli fultus hyacintho*.

TRIENACH, in *Geography*, a bay of the county of Donegal, Ireland, on the west coast. N. lat. $54^{\circ} 53'$. W. long. $8^{\circ} 17'$.

TRIENNIAL, an epithet applied chiefly to offices or employments which last for three years.

Thus we say, a triennial government: most regular monasteries have triennial superiors; that is, they elect new ones at the end of each three years.

In 1695, an act was made for triennial parliaments, *i. e.* for parliaments which should be dissolved, and the members be elected anew, every three years. Till that time, the king had it in his power to prorogue and continue his parliaments as long as he pleased. This opened a door to corruption, which the triennial bill was intended to prevent.

The triennial act has, from some other views, been since repealed; for the great struggles usual at elections, the great ferment it usually put the nation into, the great expences upon that occasion, with other considerations, determined the legislature, in 1717, to change triennial parliaments for septennial ones. See *Dissolution of PARLIAMENT*.

TRIENS, in *Antiquity*, a copper money, of the value of one-third of an *as*, which on one side bore a Janus's head, and on the other a water-rat.

This was the piece of money used to be put in the mouths of the deceased, to pay Charon his fare for their passage into another world.

TRIENS, or *Triental*, was also used for a drinking cup; and that which was ordinarily used. It contained four cyathi.

TRIENTALIS, in *Botany*, from *triens*, the third part of

any thing, usually of a foot measure. A name borrowed by Linnæus from John Bauhin, who calls this pretty little plant *Herbarientalis*, alluding to its humble stature.—Linn. Gen. 183. Schreb. 244. Willd. Sp. Pl. v. 2. 282. Mart. Mill. Dict. v. 4. Sm. Fl. Brit. 406. Ait. Hort. Kew. v. 2. 333. Pursh 254. Juss. 96. Lamarck Illustr. t. 275. Gærtner. t. 50.—Class and order, *Heptandria Monogynia*. Nat. Ord. *Rotaceæ*, Linn. *Lyfimackie*, Juss.

Gen. Ch. reformed. *Cal.* Perianth inferior, of about seven linear-lanceolate, pointed, spreading, permanent leaves. *Cor.* of one petal, star-shaped, flat, in seven deep, ovato-lanceolate segments, alternate with the calyx, very slightly connected. *Stam.* Filaments seven, capillary, inserted into the base of each segment, spreading, the length of the calyx; anthers simple, recurved. *Pist.* Germen superior, globose; style thread-shaped, equal in length to the stamens; stigma capitate. *Peric.* Capsule ovate, of one cell, and as many ovate, rigid, cartilaginous, thick-edged valves as there are calyx-leaves, and opposite to them, highly polished internally. *Seeds* several, nearly orbicular, convex externally, angular within, blackish, dotted, each enveloped in a snow-white, finely reticulated, combined, membranous tunic. *Recept.* central, globose, very large, with a cavity for each seed.

Ess. Ch. Calyx of seven leaves. Corolla in seven deep equal segments, flat. Capsule of one cell, and many valves. Seeds in a reticulated tunic.

Obs. Linnæus remarks that seven is the most usual number in the parts of fructification, though sometimes liable to vary. He adds, that the fruit is a dry berry, not bursting with valves like a capsule. So Gærtner likewise represents this fruit; and as botanists have rarely seen it, they have, like ourselves, adopted the opinions and descriptions of these great writers. Yet nothing is more certain, if we may believe our eyes, than that the fruit of *Trientalis* from Scotland, is, as above described, a capsule with rigid spreading valves, probably soon breaking off from the base, and leaving a brittle, dry, globular mass of seeds, sticking around their receptacle, and enveloped in a most elegant white network, originally perhaps pulpy, which has been taken for the membranous coat of a dry berry. At first we were inclined to suspect the valves of the capsule might be a permanent hardened corolla, but their being opposite to the calyx soon decided that point. It is high time for us to correct this, too long neglected, error.

1. *T. europea*. European Chickweed Winter-green. Linn. Sp. Pl. 488. Fl. Lapp. ed. 2. 109. Willd. n. 1. Fl. Brit. n. 1. Engl. Bot. t. 15. Fl. Dan. t. 84. (*Herba trientalis*; Bauh. Hist. v. 3. 536. *Pyrola alpinæ flore major*; Bauh. Prodr. 100; copied in Morison, sect. 12. t. 10. f. 6.)—Leaves elliptical.—Native of turfy heaths, or of woods on the sides of hills, in Scotland and the northern countries of Europe, as well as some parts of the north of England, flowering in May and June. The perennial root is slightly tuberous, with many long whitish fibres. *Stem* solitary, simple, erect, four or five inches high, almost naked, except at the top, where it is crowned with a tuft of nearly sessile, bright green, smooth, entire leaves, delicately veined, an inch and half or two inches long; tapering at the base; more or less blunt at the extremity. Among them are several axillary, capillary stalks, about the same length, each bearing a very pretty and delicate white flower, with yellowish, or pale pink, anthers and stigma. Linnæus was particularly fond of this plant, and has celebrated its "fascinating beauty" in his elegant and eloquent *Flora Laponica*.

2. *T. americana*. American Chickweed Winter-green. Pursh

Pursh n. 2. (T. europæa; Michaux Boreal.-Amer. v. 1. 220.)—Leaves lanceolate, tapering at each end.—In cedar swamps, and other places, among bog-moss, on high mountains, from Canada to Virginia, perennial, flowering in July and August, and differing considerably from the European species. *Pursh*. We have this from Newfoundland, as well as from the garden of the late right honourable Charles Greville, at Paddington. The leaves are narrower, more lanceolate, and tapering at each end, but we can discover no difference in the flowers, nor any other part besides. Both kinds blossom at the same time in our gardens.

TRIERARCHI, τριηραρχοι, among the Athenians, commissioners chosen annually out of the richest citizens, who are obliged to provide all sorts of necessaries for the fleet, and to build ships at their own charge. See Potter, Archæol. Græc. lib. i. c. 15. tom. i. p. 86.

TRIERES, or TRIERIS, in *Ancient Geography*, a town of Syria, burnt by Antiochus.

TRIERON, a promontory of Africa Propria, at the extremity of the Lesser Syrtis. Ptolemy.

TRIERS, in *Law*. See TRIORS.

TRIERTY, in *Geography*, a small lake of the county of Donegal, Ireland, near the borders of the county of Fermanagh.

TRIESING, a river of Austria, which runs into the Danube, 3 miles N.W. of Fischamund.

TRIESTE, a sea-port town of the duchy of Carniola, situated in the Adriatic, at the north-east part of what is called the Gulf of Trieste. The houses here stand on the ascent of a mountain, extending themselves quite to the sea, and on the top of the mountain is a castle. The harbour consists of the inner and outer. The empress-queen, Maria Theresa, caused it to be considerably improved and fortified, and also declared it a free port, imparting to it all the requisite immunities and privileges, whence all sorts of wares, both by water and land, in and out of the time of fairs, may be imported here, free from any duties and taxes; but from this immunity, iron, steel, copper, quicksilver, salt, gunpowder, mirrors, and crystal, are excepted. By these means many ships and vessels are induced to arrive there, which at this place unlade their goods, and take others on board, which are conveyed from hence by land-carriage out of the hereditary lands belonging to the house of Austria, and also out of Germany. A wall, fortified with a bastion, serves as well for the defence of the harbour against any hostile attempt, as for screening it against the wind, and also for the security of the shipping. On the north-west side of the town, where formerly were salt-pits, a beautiful suburb has been erected, and thereby the bad air, which formerly arose from these salt-pits, meliorated: but still at the time of flood, which often rises here four or five feet in height, a stench is perceived, the sea at this place having a boggy ground. The water also of a fresh spring has been conducted by pipes from the distance of two Italian miles to the town. These and other improvements and good regulations, have in view the increase of the trade of the place. Trieste is likewise the see of a bishop, who is suffragan to the archbishop of Goritz, and bears the title of the count of Trieste. In its cathedral too are twelve canons. The sovereign captain, who governs the town and its territories, resides in the castle. Lotharius, king of Italy, made a donation of this town and circumjacent country, together with the right of mintage, to John, at that time bishop of the place; but bishop John II. disposed of the jurisdiction over it to the community of Trieste for 500 marks. Afterwards it was incorporated with the duchy of Carniola, but again dismembered. In 1795, this place was taken by the French. The number of fixed in-

VOL. XXXVI.

habitants is estimated at 30,000, without including sea-faring people and strangers; 74 miles S.S.W. of Vienna. N. lat. 45° 53'. E. long. 13° 55'.

TRIESTE. See TRISTE.

TRIESTY, mountains in the north-western part of the county of Mayo, Ireland, near the Mullet, and immediately north of Tullaghan bay.

TRIETERIA, in *Antiquity*, feasts which the Bœotians and Thracians held every three years in honour of Bacchus, and in remembrance of his expedition into India, which lasted three years.

TRIETERIS, τριητηρις, in the *Ancient Chronology*, a cycle of three years.

Thales, it is said, observing that the lunar revolution never exceeded thirty days, appointed twelve months of thirty days each; so that the year consisted of three hundred and sixty days: and in order to reduce these months to an agreement with the revolution of the sun, he intercalated thirty days at the end of every two years, whence that space of time was called a *period of three*, because the intercalation was not made till after the expiration of full two years, though really it was only a period of two years; as we are informed by Censorinus, De Die Natali, cap. 18.

TRIEWALD, MARTIN, in *Biography*, an eminent mathematician and engineer, was born at Stockholm in 1691, and being intended for trade, he travelled to England for information and improvement on subjects that concerned his commercial pursuits. Disappointed in prospects of this kind, he changed his object; and was fortunately engaged by the proprietor of some coal-mines near Newcastle to superintend the machinery of his works. This situation corresponded to his genius and inclination; and he was thus led to pay particular attention to mechanics, both in theory and practice. In 1726 he returned, after an absence of ten years, to his native country, where he constructed a steam-engine, and read lectures in philosophy, illustrated by a course of experiments, similar to those of Desaguliers, which he had attended in London. He thus attracted the notice of the king and of the States, who conferred upon him a pension, with the title of director of machinery. He also proposed some improvements in the manufacture of iron and steel. Thus diligently and actively employed for the benefit of his country, he received a commission as captain of engineers and inspector of fortifications; and he invented various machines connected with those offices, models of which are preserved in the Academy of Sciences at Stockholm and also in the Academy of Lund. Diving was also an object of his attention, and on this subject he wrote a treatise, entitled "Konst at lefwa under Watnet, or the Art of living under Water," Stockholm, 1741, 4to. (See DIVING-BELL.) For this invention he received honorary rewards both from his own sovereign and the king of France. In 1729 he was elected a member of the Society of Upsal; and the same honour was conferred upon him by the Royal Society of London and other learned bodies. Triewald died suddenly in 1747. He communicated various papers to the Academy of Sciences at Stockholm, which appear in its Memoirs for the years 1739, 1740, and 1747. Beckman's Hist. of Inventions. Desaguliers' Philof. Gen. Biog.

TRIEXAHEDRIA, formed of τρις, thrice, εξ, six, and εδρα, a side, in *Natural History*, the name of a genus of spars.

The bodies of this genus are perfect and pellucid crystalliform spars consisting of thrice six planes, being composed of an hexangular column, terminated at each end by an hexangular pyramid: of this genus there are three known species. Hill.

TRIFALTIGKERT, in *Geography*, a town of Prussia, in Natangen; 16 miles S.S.E. of Königsberg.

TRIFAX, among the *Romans*, a javelin three cubits long, which was thrown by the catapulta.

TRIFELS, in *Geography*, a citadel of France, in the department of Mont Tonnerre. Here Richard I., king of England, was kept, when he appeared before the diet of Worms; 1 mile S.E. of Anweiler.

TRIFOLIASTRUM, in *Botany*, Bastard Trefoil, a name given by Micheli, Nov. Gen. Pl. 26. t. 25, to such species of *Trifolium* as have their legume projecting beyond the calyx, which he, on that account, separates from thence. Neither the character, nor the name, has met with the sanction of following writers. See TRIFOLIUM.

TRIFOLIUM, τριφυλλον of the Greeks, Trefle of the French, from which last is more immediately derived our Trefoil; names all expressive of the same idea, of the three leaves, or leaflets, growing on one stalk, which is so characteristic of this popular and well-known genus. — Linn. Gen. 387. Schreb. 509. Willd. Sp. Pl. v. 3. 1352. Enum. 791. Mart. Mill. Dict. v. 4. Sm. Fl. Brit. 781. Prodr. Fl. Græc. Sibth. v. 2. 93. Ait. Hort. Kew. v. 4. 378. Pursh 477. Juss. 355. Tourn. t. 228. Lamarck Illustr. t. 613. Poiret in Lam. Dict. v. 8. 1. Gærtn. t. 153. (Melilotus; Tourn. t. 229. Willd. Enum. 789. Juss. 356. Lamarck Illustr. t. 613. Trifolium; Mich. Gen. 26. t. 25. Lupinaster; Buxb. in Comm. Petropol. v. 2. 345. t. 20. Lupulinum; Rivin. Tetrap. Irr. t. 10. Lagopus; ibid. t. 15—17. Triphyloides; Ponted. Anthol. 240.)—Class and order, *Diadelphia Decandria*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminosæ*, Juss.

Gen. Ch. Cal. Perianth inferior, of one leaf, tubular, five-toothed, permanent. Cor. papilionaceous, with long claws, mostly permanent, withering; standard reflexed; wings shorter than the standard; keel of one petal, shorter than the wings. Stam. Filaments two, distinct, one simple, one in nine segments; anthers simple, roundish. Pist. Germen oblong-ovate; style awl-shaped, ascending; stigma simple, smooth. Peric. Legume short, of one valve, and one cell, not bursting, scarcely exceeding the calyx in length, deciduous. Seeds one to four, roundish.

Ess. Ch. Calyx tubular, five-cleft. Keel simple, shorter than the wings and standard. Stigma smooth. Legume not bursting, deciduous, scarcely longer than the calyx. Seeds very few.

All botanists have perceived the difficulty of defining the technical characters of this genus, and yet none can be, in itself, more natural. Linnæus reckoned it the most difficult in the whole vegetable kingdom to discriminate by any essential mark. He comprehends under *Trifolium*, as may be seen above, various other genera of good systematic writers, differing among themselves as follows. *Melilotus* of Tournefort and Jussieu, has a legume longer than the calyx, with loosely spiked flowers; *Trifolium* of Micheli, a legume longer than the calyx, with capitate flowers: *Lupinaster* of Buxbaum, a legume with several seeds, and five leaflets in each leaf: *Lupulinum* of Rivinus, a permanent corolla, whose standard is inflexed and flattish, ribbed or plaited: *Lagopus* of the same author, a shaggy calyx, equal in length to the corolla: and finally *Triphyloides* of Pontedera, has a monopetalous corolla, the standard wings and keel being all united into one tube; which is likewise the case with a great many more species than this author, or Linnæus, has indicated.

Linnæus admitted the inflorescence as a part of his natural, and even his essential, character of this genus, defining it "a little umbel or head." He was always very unwilling

to adopt this measure, and we presume to think he has, in no case, resorted to it with advantage. In the present it is neither correct nor discriminative, scarcely any species being really umbellate, and though many are capitate, as many are spiked, while several are racemose. We have therefore followed the example of Jussieu, who in this instance wisely lays aside the inflorescence; attempting a more full and explicit character from the parts of fructification themselves. In natural affinity the present genus comes nearest to *TRIGONELLA*, which will presently follow in alphabetical order. Some of the *Meliloti* especially, closely accord therewith, both in characters, habit, and qualities, particularly in an appropriate scent, allied to that of new hay and bitter almonds, most powerful, and very permanent, in the dried herbage. Some compare it to the smell of a pig-flye. The Blue Melilot, and Common Fenugreek, possess this odour in the greatest perfection.

Trifolium is a very extensive genus. Linnæus has forty-six species in the fourteenth edition of his *Systema Vegetabilium*; Willdenow has seventy-two in his *Sp. Pl.*—Eighteen are natives of Britain. Fifty-six are enumerated by Mr. Aiton in his *Hortus Kewensis*. We have three to add from the *Prodr. Fl. Græc.*, two or three American ones of Mr. Pursh, and a few from other sources. It is necessary to take a view of the whole, partly for their more correct botanical distinction, though in general they are better defined than the species of most, equally extensive and natural, genera. A correct knowledge of these plants is supremely important to the agriculturist; because the qualities of some, very near in external appearance, differ widely in utility; and because there are many, hitherto little observed, which promise to be as valuable as any of the rest. Some of these are known and cultivated in other countries, and others may be well worthy of trial. Unless they are first accurately distinguished, nothing respecting them can either be perfectly understood, or clearly communicated.

The species are distributed into five very natural sections, and are all herbaceous. Some in each section are annual, others perennial. The stems are branched. Leaves alternate, more or less stalked, of three, mostly obovate, and equal, toothed or entire, rarely linear, leaflets, with a pair of membranous ribbed stipulas united to the base of the foot-stalk. Inflorescence terminal or lateral, generally stalked, either tufted, capitate, spiked or racemose. Flowers red, purplish, white or yellow; sometimes, though rarely, fragrant.

SECT. I. MELILOTI. Legumes projecting beyond the calyx; with several seeds. Flowers racemose.

1. *T. ceruleum*. Blue Melilot Trefoil. Linn. Sp. Pl. 1077. Willd. n. 1. Ait. n. 1. Bieberst. Taur. v. 2. 207. (T. odoratum; Ger. Em. 1195. Melilotus cerulea; Rivin. Tetrap. Irr. t. 9. Lotus sylvestris; Camer. Epit. 894; not 724, as in Willd. and Ait. after Linn.; the latter being *T. arvense*.) A good coloured figure is wanting.)—Clusters roundish-ovate, long-stalked. Legumes half-naked, beaked, with slight longitudinal ribs, and two seeds. Stem erect. Stipulas entire.—Native of Bohemia, Tauria, Germany, &c. in dry barren ground, flowering in summer. Cultivated in our gardens, for curiosity, ever since the time of Turner, Gerarde, &c. The root is annual, fibrous. Stem two or three feet high, smooth, angular, leafy, scarcely branched. Leaflets pale, elliptical, toothed, an inch long, smooth; the odd one stalked. Flowers pale, blue, in numerous, solitary, long-stalked, axillary heads, all the way up the stem. The whole plant, either fresh or dried, has a sweet liquorice-like scent, lasting

TRIFOLIUM.

a great number of years, and perfuming every thing near it.

2. *T. indicum*. Indian Melilot Trefoil. Linn. Sp. Pl. 1077. Willd. n. 2. Ait. n. 2. (*Melilotus lutea* Indiarum orientalis erecta, folliculis rotundis parvis, spicis florum ex foliorum alis multiplicatis; Pluk. Phyt. t. 45. f. 4.)—Clusters cylindrical. Legumes naked, strongly reticulated, single-seeded, obtuse. Stem erect. Stipulas nearly entire.—Native of the East Indies. Cultivated at Oxford before 1680. Annual, flowering in summer. Smaller and more slender than the foregoing, with long slender clusters of small, yellow, drooping flowers. The leaflets also are smaller and narrower. Legumes not much bigger than mustard-seed, turgid, pale, roundish-elliptical, strongly corrugated, with a sort of elevated net-work, and tipped with the capillary style, not properly beaked. Such is the Linnæan plant, which does not agree with Willdenow's definition. We cannot answer for the varieties enumerated in *Sp. Pl.* Some are said to have white flowers. The yellow fades greatly in what we have examined, before the corolla falls. Willdenow has in his *Enumeratio*, 789, distinguished the β , which is Plukenet's t. 45. f. 5, as a species, by the name of *Melilotus ruguloſa*.

3. *T. messanense*. Sicilian Melilot Trefoil. Linn. Mant. 275. Suppl. 339. Willd. n. 3. Ait. n. 3. Sm. Fl. Græc. Sibth. t. 741, unpublished. Desfont. Atlant. v. 2. 192. (*T. fructu racemoso*; Bocc. Mus. 163. t. 124. *Melilotus messanensis* procumbens, folliculis rugosis sublongis, spicis florum brevioribus; Raii Hist. 952. Tourn. Inst. 407. *M. minima* recta lutea, filiquis crassis curtis in capitulum congestis, femine fœnugræci; Morif. v. 2. 162. fœct. 2. t. 15. f. g. t. 16. f. 9, very good.)—Clusters shorter than the leaves. Legumes naked, ovate, pointed, with crowded, concentric, interbranching ribs, single-seeded. Stems decumbent.—Gathered by Ray, in a moist situation, on the tongue of land separating the port of Messina from the straits of Sicily. Signor Arroiti, who sent us specimens in 1811, informs us this species is not now found about Messina, but in the fields of Girgenti. Professor Desfontaines met with it in fields in Barbary; and Dr. Sibthorp in cultivated ground every where throughout Greece. It there bears the name of $\tau\rho\acute{\iota}\phi\upsilon\lambda\lambda\iota$, which belongs indeed to most of this genus, in modern Greek. Dr. Sibthorp judged it to be the $\lambda\alpha\lambda\omicron\varsigma$ $\eta\mu\epsilon\rho\varsigma$ of Dioscorides, a point equally difficult to disprove or establish. This species is little known in our gardens, though cultivated in Morifon's time, whose figure cannot be mistaken. The root is said to be annual, though furnished with many little fleshy granulations, to enable it to resist occasional drought, such as occur in *Vicia lathyroides*, and some other annual vetches. Stems several, a foot long, diffuse or procumbent, the central one only being erect, all stout, smooth, leafy, scarcely branched. Clusters axillary, oblong, hardly longer than the common footstalks, each on a short stalk, and composed of ten or twelve yellow flowers, twice or thrice as large as the last. The leaves are not very different. Legume one-third of an inch long, peculiarly distinguished by its ovate, oblique, pointed, somewhat compressed, figure, and especially the numerous concentric elevated lines, like coiled horse-hair, more or less interbranching in the middle, which occupy its sides. The luxuriance of the herbage, and the nature of its root, indicate this plant as worthy of agricultural experiment, though its procumbent mode of growth may be an objection to the mower. It is certainly very different from Mr. Sinclair's *T. macrorhizum*, Hort. Gram. Woburn. 290, of which we propose to speak under *T. officinale*.

4. *T. mauritanicum*. Barbary Melilot Trefoil. Willd. n. 4.

Ait. n. 4. Sm. Fl. Græc. Sibth. t. 742, unpublished. (*Melilotus fulcata*; Desfont. Atlant. v. 2. 193.)—Clusters longer than the leaves. Legumes naked, nearly orbicular, obtuse, pointless, with concentric elevated ribs, single-seeded. Stems diffuse.—Native of cultivated fields in Barbary and Sicily; very abundant about Messina, according to signor Arroiti. There can be no doubt as to the synonym of Desfontaines. We have not seen the work of Schousboe, cited by Willdenow. This is an annual species, with numerous branching diffuse stems, but more slender in every part than the last. Leaflets elliptic-lanceolate, obtuse. Flowers yellow, small, very numerous, in long, slender, linear, longish-stalked clusters, much exceeding the leaves. Legume hardly so big as in *T. indicum*, formed as it were of a convoluted line or hair, somewhat in the manner of the last, but the whole legume is not a quarter so large, nor has it any elongation or point. These two species have, nevertheless, been confounded by botanists, for want of a good figure of the present, which deficiency the Flora Græca will supply.

5. *T. macrorhizum*. Long-rooted Melilot Trefoil. Willd. n. 5. "Waldst. et Kitaib. Hung. v. 1. 24. t. 26." Ait. n. 5.—Legumes racemose, naked, rugose, single-seeded. Stems and branches ascending. Leaflets linear.—Native of moist salt-marshes in Hungary. "Root perennial. Seeds toothed above their scar." We have no knowledge of this plant. See *T. officinale*.

6. *T. polonicum*. Polish Melilot Trefoil. Linn. Sp. Pl. 1078. Willd. n. 6. Ait. n. 6.—Clusters lax, on very long stalks. Legumes naked, two-seeded, lanceolate, pointed, transversely corrugated. Stem erect. Leaflets pointed, nearly entire.—Native of Poland. Sent to Kew garden in 1788, by M. Thoun. A very distinct annual species, of a slender habit. Stem quite round. Leaflets obovato-lanceolate, acutely pointed, rather silky, and somewhat glaucous, almost perfectly entire; the odd one hardly an inch long. Flowers yellow, distant, small, on long and slender partial stalks; their common ones at least thrice the length of the leaves. Legume rather compressed, pendulous, a quarter of an inch long, beaked, and tipped with the style, not hairy.

7. *T. spicatum*. Spiked Melilot Trefoil. Sm. Prodr. Fl. Græc. Sibth. n. 1783. Fl. Græc. t. 743, unpublished.—Legumes naked, single-seeded, spiked, erect, corrugated, acute. Stipulas awl-shaped, entire. Stem erect.—Gathered by Dr. Sibthorp, in the isle of Cyprus. Root annual. Stem twelve or eighteen inches high, branched and bushy. Leaflets obovate, toothed, half an inch long. Spikes stalked, about as long as the leaves, consisting of yellow, deflexed flowers; when in fruit becoming twice as long, more lax, and somewhat racemose, the legumes being slightly stalked, erect, roundish-obovate, with a short broad point, tipped with the capillary white style; their sides marked with concentric elevated corrugations. Seed globose.

8. *T. dentatum*. Toothed Melilot Trefoil. "Waldst. et Kitaib. Hung. v. 1. 41. t. 42." Willd. n. 7. Ait. n. 7.—Legumes racemose, naked, two-seeded, somewhat rugose, rather acute. Stipulas toothed at the base. Stem erect.—Native of moist meadows in Upper Hungary. Perennial. Abundantly different from the *officinale*, the leaflets being sharply and doubly toothed; the stipulas also toothed, and deeply divided at their base. Willdenow.

9. *T. officinale*. Common Melilot Trefoil. Linn. Sp. Pl. 1078. Willd. n. 8. Fl. Brit. n. 1. Engl. Bot. t. 1340. Mart. Rust. t. 72. Fl. Dan. t. 934. Fuchf. Hort. Gram. Woburn. 293. (*Saxifraga lutea*; Fuchf. Hist. 749.)—Legumes racemose, naked, two-seeded, somewhat corrugated, ovate, acute, rather compressed. Stipulas awl-shaped. Stem erect.—Native of bushy places, hedges, banks, or cul-

TRIFOLIUM.

tivated fields, on clay or marle, throughout Europe, flowering in June and July. Not rare in England. Dr. Sibthorp met with it in moist low situations, throughout Greece and the Archipelago, and confirmed the old opinion, of its being the *μελιλωτός* of Dioscorides. From this old Grecian's venerable authority the plant has long been esteemed medicinal, but is now out of use; nor is it cultivated, with us at least, for any agricultural purpose. The seeds, even in a very small quantity, poison the flavour of flour. *Martin, Sinclair.* The root is annual. Stem branched, two or three feet, or more, in height, angular and furrowed. *Leaflets* dark green, smooth, obovate, serrated. *Flowers* full yellow, veiny, in long dense clusters. *Keel* and *wings* equal, and nearly as long as the *standard*. *Legume* hairy, transversely wrinkled, but not very strongly. *Stigma* capitate.

Mr. Sinclair's specimen named *T. macrorhizum*, in his elaborate and very valuable agricultural work, the *Hortus Gramineus Woburnensis*, 291, does not exhibit any marks of specific difference from the *officinale*, of which however it appears to be an important variety, differing in its biennial root, larger *leaflets* and *flowers*. The seeds are two in each *legume*, never, as is sometimes the case with the *officinale*, more than two. It produces a great crop of fodder, or hay, at the time of flowering, but little afterwards. If kept from flowering, the root will last four or five years. Such is Mr. Sinclair's account, who nevertheless now candidly assents to our opinion of its being a variety. We have no means of ascertaining whether this may be Willdenow's *macrorhizum*, our n. 5, but it does not answer to his character. We can vouch for its being widely different from *mesfanense*, n. 3. Can it be Willdenow's *officinale* γ?

10. *T. germanicum*. White German Melilot Trefoil. (*T. officinale* β; Willd. n. 8. Sm. Prodr. Fl. Græc. Sibth. v. 2. 94. Melilotus; Rivin. Tetrap. Irr. t. 6? M. germanica; Ger. Em. 1205. M. vulgaris; Willd. Enum. 790. M. officinarum germaniæ, flore albo; Tourn. Inst. 407. Lotus sylvestris, flore albo; Tabern. Kreuterb. 893.)—Legumes racemose, naked, single-seeded, corrugated, obovate, acute. Stipulas fetaceous. Stem erect.—Native of cultivated fields in Germany. Dr. Sibthorp observed it near Thessalonica. Root biennial. Stem taller than the last. *Flowers* white. *Wings* longer than the *keel*, though shorter than the *standard*. The figure of Rivinus answers better to this description than to our common *T. officinale*, and was probably taken from what is the most usual German plant. We have never compared specimens, but must observe, that the *stipulas* are sometimes perfectly fetaceous in our *officinale*:—Gerarde seems to have been well acquainted with the *germanicum*, as was also his editor Johnson.

11. *T. Kochianum*. Scentless Melilot Trefoil. (Melilotus Kochiana; Willd. Enum. 790.)—"Legumes racemose, naked, two-seeded, nearly even, ovate, acute, compressed. Stipulas toothed. Stem ascending."—Native of Germany. Biennial. Without scent. *Corolla* yellow; its *wings* the length of the *keel*, but shorter than the *standard*. *Willd.*

12. *T. Petitpierreanum*. White Single-seeded Melilot Trefoil. (Melilotus Petitpierreana; Willd. Enum. 790.)—"Legumes racemose, naked, single-seeded, corrugated, obovate. Stipulas fetaceous. Stem ascending."—Native of Germany. Biennial. *Corolla* white; its *wings* longer than the *keel*, and equal to the *standard*. *Willd.* The author whom we quote acknowledges his obligations to the accurate Dr. Hayne for distinguishing the three last species from *T. officinale*.

13. *T. italicum*. Italian Melilot Trefoil. Linn. Sp. Pl. 1078. Willd. n. 9. Ait. n. 9. (Melilotus italica;

Camer. Hort. 99. t. 29, excellent. Willd. Enum. 790. M. filiculis pendentibus, curtis, lutea, &c.; Morif. sect. 2. t. 16. f. 4.)—Legumes racemose, naked, two-seeded, elliptical, obtuse, strongly corrugated and crisped. Stem erect. *Leaflets* roundish-obovate, nearly entire.—Native of Italy, Barbary, and Greece. Dr. Sibthorp gathered it on the dry parts of the famous mount Hymettus, near Athens. This species has long been cultivated in curious gardens, both in England and on the continent. Gerarde describes it under his *Melilotus*, n. 2, but the figure does not agree. The root is annual. Stem stout, angular, leafy, about two feet high, overtopped, as the fruit advances, by the numerous, elongated, upright, cylindrical clusters, of pendulous, roundish-elliptical legumes, each as big as a small pea, conspicuous for their strong, prominent, zigzag, and plaited wrinkles, by which the present species is clearly distinguished. Its *leaflets* moreover are of a much broader and rounder figure than any of the foregoing, rather wavy than serrated. *Stipulas* ovate, taper-pointed, toothed. *Flowers* yellow. Dr. Sibthorp conjectured, with great probability, that this might be the kind of Melilot, mentioned by Dioscorides as growing in the south of Italy, about Nola, of a yellowish colour, and weaker scent.

14. *T. hamosum*. Hooked Melilot Trefoil. Bieberst. Taur. v. 2. 207. (Fænugræcum meliloti facie minus; Buxb. Cent. 2. 39. t. 44. f. 1?)—"Legumes racemose, naked, compressed, single-seeded, ribbed, hairy, with a hooked point. Stipulas awl-shaped, undivided. Stems ascending."—Gathered by the chevalier de Steven, in Georgia, and the northern part of Tartary. "The root is annual, simple. Stems several, from three to nine inches long, rarely more, slightly branched. Clusters axillary, stalked, short and somewhat capitate. Flowers yellow, the size and shape of *T. officinale*. Calyx hoary. Legume ovate, deflexed, hoary; smooth at the base; terminating in a long inflexed point. Seed kidney-shaped, of a dirty yellow. Leaflets wedge-shaped, sharply toothed. Stipulas small." We have seen no specimen.

15. *T. creticum*. Cretan Melilot Trefoil. Linn. Sp. Pl. 1078. Willd. n. 10. Ait. n. 10. (*T. peltatum creticum*; Bauh. Pin. 329. Prodr. 142, with a figure. Morif. sect. 2. t. 14. f. 3.)—Legumes racemose, naked, two-seeded, membranous, compressed, bordered; nearly orbicular. Stem ascending.—Native of Crete, Greece, and Barbary. Root annual. Stem branched, twelve or eighteen inches high. *Leaflets* broad, thick and fleshy, like those of *T. italicum*, bordered with shallow teeth, inodorous. *Flowers* pale yellow. *Legumes* very remarkable for their broad, elliptical, nearly orbicular, flattish figure, half an inch in diameter, in loose clusters, two or three inches long. They are represented much too turgid in the above engravings, especially in Morison's.

16. *T. ornithopodioides*. Bird's-foot Trefoil. Linn. Sp. Pl. 1078. Willd. n. 11. Fl. Brit. n. 2. Engl. Bot. t. 1047. Curt. Lond. fasc. 2. t. 53. Fl. Dan. t. 368. (Fænugræcum humile repens, ornithopodii siliquis brevibus erectis; Raii Syn. 331. t. 14. f. 1.)—Legumes about three on a stalk, naked, eight-seeded, twice the length of the calyx. Stems procumbent.—Native of England, France, and Denmark, on barren gravelly heaths, among short grass, flowering in June and July. The fibrous annual root is furnished with fleshy tubercles, such as are mentioned under n. 3. Stems mostly simple, depressed, two or three inches long, clothed with little leaves, resembling many of the third section, the stalks of the *leaflets* being all equal; and neither they, nor the slender pale-purple flowers, two or three on each short axillary stalk, having any affinity to the
Meli-

TRIFOLIUM.

Melilots, with which the present species is associated entirely on account of its many-seeded, transversely furrowed, prominent, bivalve legumes, which moreover are umbellate, not racemose. This species therefore connects the Melilots by its fruit, with the true Trefoils by its habit, stipulas, inflorescence, &c. We should gladly have retained the genus *Melilotus*, adopted of late, from preceding writers, by Willdenow in his *Enumeratio Plant. Hort. Berol.* had we found his generic characters faithful. These are the deciduous corolla, and the bursting legume, longer than the calyx. But the legume of most of the *Meliloti* does not burst, any more than that of a genuine *Trifolium*. Their general habit indeed, and their peculiar odour, agree far better with *TRIGONELLA*, (see that article,) than with *Trifolium*.

SECT. 2. LOTOIDEA. Legumes covered by the calyx; with several seeds.

17. *T. Lupinaster*. Bastard-lupine Trefoil. Linn. Sp. Pl. 1079. Willd. n. 12. Ait. n. 12. Mart. Rust. t. 16. Curt. Mag. t. 879. (*T. leguminibus polyspermis, foliis pluribus*; Gmel. Sib. v. 4. 19. t. 6. f. 1.)—Flowers in short unilateral tufts. Leaflets five, without a naked common stalk. Legume with many seeds.—Native of Siberia. Observed also near Constantinople by the abbé Sestini and Dr. Sibthorp. It sometimes appears in our gardens, from exotic seeds; but though hardy as to cold, does not endure long. The root is naturally perennial, tap-shaped. Stems erect, simple or branched, a foot, more or less, in height. Leaflets lanceolate, about an inch and half long, smooth, elegantly veined and finely toothed, usually five, rarely six or seven, each on a minute partial stalk, crowning the ribbed common one, which is bordered all the way up, on each side, with a long and broad membranous stipula. Flowers crimson, occasionally white, numerous, handsome, in terminal heads; their partial stalks directed one way, hairy, each with a little cup-like membranous bractea at the base.

18. *T. reflexum*. Reflexed American Trefoil. Linn. Sp. Pl. 1079. Willd. n. 13. Ait. n. 13. Pursh n. 1. (*T. capitulis fructiferis reflexis, &c.*; Gron. Virg. ed. 2. 110.)—Heads reflexed when in fruit. Legumes three-seeded. Stem procumbent. Leaves downy.—On dry hills and among rocks, in Pennsylvania, Kentucky, and on the mountains of Carolina, flowering in June and July, perennial. Flowers of a fine purplish-red. Pursh. Mr. John Hunnemann is recorded as having sent this Trefoil to Kew in 1794. We have never met with a specimen. The leaflets are described as obovate, slightly serrated, soft and downy, variegated with white. Flowers large and handsome, in terminal and axillary heads. Seeds two or three in each legume.

19. *T. angulatum*. Angular Trefoil. Waldst. et Kitaib. Hung. v. 1. 26. t. 27. Willd. n. 14. Ait. n. 14.—Heads reflexed when in fruit. Flowers with partial stalks. Legumes four-seeded. Stem decumbent, zigzag, angular and furrowed.—Native of Hungary, on a saline soil. Annual. Sent to Kew by Mr. Hunnemann, in 1803, where it flowers from June to August, in the open ground. Stems branched, smooth. Leaflets obovate, sharply toothed, emarginate, pointed. Heads, or rather dense umbels, stalked, composed of stalked, red, reflexed flowers. Calyx smooth, with nearly equal awl-shaped teeth. Willd.

20. *T. strictum*. Upright Small Trefoil. Linn. Sp. Pl. 1079. Willd. n. 15. Ait. n. 15. "Waldst. et Kitaib. Hung. v. 1. 36. t. 37." (*Trifolium pratense annuum erectum minimum, foliis longis angustis pulchrè venatis ac tenuissimè serratis, floribus albis, in capitulum sphericum*

congestis, filiquis minimis dispermis; Mich. Gen. 29. t. 25. f. 7.)

β. *T. lævigatum*; Desfont. Atlant. v. 2. 195. t. 208. Willd. n. 16.

Heads nearly globose. Legumes two-seeded. Stem erect. Leaflets lanceolate, finely serrated. Stipulas rhomboid, toothed at one side.—Native of Italy, Spain, France, Hungary and Barbary. Micheli gathered it in various grassy or heathy places about Florence, flowering in May. The root is annual. Leaflets somewhat like those of *T. Lupinaster*, n. 17, in shape, but the lower leaves have a long common footstalk. The stipulas are remarkable for their square figure. Heads of flowers small, dense, on long, solitary, axillary stalks. Corolla white. Legume half-ovate, with a recurved beak. We agree with Willdenow, though we have not compared specimens, that the plant of Desfontaines is very near that of Micheli. Indeed we cannot find marks to define it as even a variety. Linnæus adopted his *T. strictum* from the last-named author, in writing the second edition of *Sp. Pl.*, but before that work was printed, he obtained a specimen of what he thought the same, and this is elaborately described there, though the crops annexed to the specific character, as in the original manuscript before us, indicates his not having seen the plant. What he there described is *T. parviflorum* of Ehrhart, Willdenow's n. 56, our n. 66. We must presume that this description, according to so very ill with what professor Desfontaines found in Barbary, prevented his recognizing the Linnæan plant.

21. *T. capitolium*. Tufted White Trefoil. Willd. n. 17. Ruyner Mem. pour servir à l'Hist. Phys. et Nat. de la Suisse, v. 1. 162, with a plate, under the French name of *Trefle gazonant*. (*T. Thalii*; Villars Dauph. v. 3. 478. t. 41.)—Heads roundish. Flowers slightly stalked, erect. Legumes mostly four-seeded. Leaflets obovate, minutely toothed. Stems decumbent, tufted, shorter than the flower-stalks. Native of the mountains of Switzerland and Dauphiny, in barren, waste, or trodden places. This most resembles our Common White Trefoil, or Dutch Clover, hereafter described, but the short, depressed, entangled stems, though composing a dense turf, do not creep. The root is woody and perennial. Stalks of the flowers, and even of the leaves, longer than the stems; the former terminal, solitary, erect, from two to five inches in length, bearing a globular, but slightly racemose, head of white flowers, purplish at the base, less depressed than in *T. repens*, but we find no perceptible difference as to the comparative inequality of their calyx-teeth. Legume small, elliptical, compressed, strongly ridged at each margin, beaked with the permanent style and capitate stigma, enveloped in the dry, brown, ribbed corolla, and containing three or four small seeds. No valuable properties with respect to agriculture have been discovered in this plant, nor has it been hitherto raised in England.

22. *T. hybridum*. Mule White Trefoil, or Tall Dutch Clover. Linn. Sp. Pl. 1079. Fl. Suec. 258. Willd. n. 18. Ait. n. 16? (*T. flore albo*; Rivin. Tetrap. Irr. t. 11. f. 2. T. n. 368; Hall. Hist. v. 1. 160. *Trifolium pratense corymbiferum, erectum, annuum et præaltum, caule crassiore fistuloso, &c.*; Mich. Gen. 28. t. 25. f. 2, but not f. 6. *Melilotus qui Trifolium orientale altissimum, caule fistuloso, flore albo*; Cor. Inst. R. Herb. 27; Vaill. Paris. t. 22. f. 5.)—Heads globose. Flowers stalked. Legumes two-seeded. Leaflets elliptical. Stem erect, zigzag, hollow, many-flowered.—Native of Tuscany, in places where water has stagnated in winter. Micheli. Of Sweden, in open situations on a clay soil. Linnæus. In meadows of the Morca. Sibth. Root annual, according to Micheli, to whom

whom also we are indebted for the character of the *legume* having but two *seeds*, which we have never had an opportunity of examining. *Stem* upright, twelve or eighteen inches high, hollow, striated, smooth, leafy, with three or four upright branches, under each of which the main stem divaricates at an obtuse angle. *Leaves* on very long stalks, with a pair of large, ovate, somewhat deltoid, pale, membranous, veiny, long, and taper-pointed *stipulas*: *leaflets* all equally nearly sessile, an inch long, broadly elliptical, rather ovate than obovate, emarginate, finely serrated; the lower ones partly entire. *Flowers* white, on hairy partial stalks, composing numerous dense globular *heads*, hardly an inch in diameter, whose common stalks are but of a moderate length, stout and angular. Such is the genuine *T. hybridum* of Linnæus, whose synonyms above quoted cannot be disputed, though others have been confounded herewith. This is one of the species well worthy of agricultural experiment, though hitherto unnoticed in England. Its crop must be very considerable.

Linnæus calls the *stem* "ascending;" yet the specimen in his herbarium is perfectly erect, though zig-zag in the upper part. Ehrhart, in his *Phytophyllacium*, n. 26, gives, under the name of *T. hybridum*, Upsal specimens whose *stem* is decumbent, or partly ascending, hollow, but not zig-zag. The *leaflets* are narrower, as well as much more sharply and copiously serrated, than in the Linnæan specimen, and the *flower-stalks* are longer. This appears to be the *Trifolium lupinum corymbiferum annuum album majus, folio longiore obtuso, siliquâ incurvâ latâ compressâ ac dispersâ*; Mich. Gen. 28. t. 28. f. 5. The form of the *leaflets* perhaps is variable, as those of neither this, nor of the true *hybridum* above described, do really answer well to Micheli's figures. This decumbent or ascending plant, doubtless known to Linnæus, must have been comprehended in his idea of *T. hybridum*, of which it is probably a variety. Ehrhart has named it, according to a mode of his own, *Bubroma*, indicating its value as food for oxen. The tubular *stem* clearly distinguishes these two plants, whether species or varieties, from all to which they are near akin, especially from the following, and *T. repens*.

23. *T. Vaillantii*. Trailing White Clover, or Trefoil. Poirlet in Lamarck Dict. v. 8. 4. Prodr. Fl. Græc. n. 1789. (T. n. 758; Hall. Enum. Rar. 41. *Trifolium annuum corymbiferum album et procumbens, folio cordato, subtus atro-virente splendente, siliquâ tetraspermâ, infernè falcatim discriminatâ*; Mich. Gen. 27. t. 25. f. 6. *Melilotus parisiensis humifusus, foliis serratis glabris*; Vaill. Paris. t. 22. f. 1.)—*Heads* globose. *Flowers* stalked. *Legumes* four-seeded. *Leaflets* elliptic-obovate, finely serrated. *Stems* branched, decumbent, solid, many-flowered.—Found in meadows and pastures about Florence very abundantly. *Micheli*. About Paris. *Vaillant*. In the meadows of Switzerland. *Haller, Lachenal*. In the Morea. *Sibth*. Some dried specimens of this do not, at first sight, look much unlike the Linnæan one of *T. hybridum*, though smaller, and the general size of every part is much less. The *leaflets* vary greatly, and are sometimes wedge-shaped. The decisive character of the *stem* being not tubular, but filled with spongy pith, and always decumbent, though not creeping, will ever clearly distinguish this from every variety of the last, to which we may add Micheli's mark of the four *seeds*, doubtless correct; but some of them are liable to prove abortive, so that only one ripe *seed* can sometimes be found. The present species promises far less advantage to the cultivator than the *hybridum* or the *repens*, and therefore ought carefully to be distinguished from both.

24. *T. repens*. Common White Trefoil, or Dutch Clover. Linn. Sp. Pl. 1080. Fl. Suec. 259. Willd. n. 19. Fl. Brit. n. 3, excluding the syn. of Vaillant. Prodr. Fl. Græc. n. 1790. Engl. Bot. t. 1769. Pursh n. 2. Curt. Lond. fasc. 3. t. 46. Mart. Rust. t. 34. Fl. Dan. t. 990. Riv. Tetrap. Irr. t. 13. f. 2. (*T. pratense*; Ger. Em. 1185, the figure only. *Trifolium pratense corymbiferum majus repens*, n. 1—9; Mich. Gen. 26. t. 25. f. 1, 3 and 4.)—*Heads* nearly globose. *Flowers* stalked. *Legumes* four-seeded. *Leaflets* inversely heart-shaped, or roundish. *Stems* creeping, solid, many-flowered.—Very common in meadows and pastures throughout Europe, from Sweden to Greece, and all the islands of the Archipelago, flowering from May to September, and varying excessively with regard to luxuriance, as well as in the pale and whitish, or dark and purplish, marks of its *leaves*. Mr. Pursh says it is found in fields, pastures, and cleared lands on the mountains of North America, making its appearance wherever lands are cleared of timber, in the most remote parts of the country; from 60 to 100 miles distant from any place where it grew naturally. So it springs up in recently cleared ground in England, being one of the most universal plants of the temperate zone. It forms an excellent bottom for pastures, and is particularly valuable for fodder in the dry autumnal months. Mr. Sinclair thinks it less eligible in the spring, except mixed with grasses, being apt to cause in sheep the disease termed red-water, especially if the weather be cold and moist. The *roots* are fibrous and perennial. *Stems* many, quite prostrate, branched near their origin, creeping to a great extent, with radicles from most of the joints; they are round, smooth, full of pith. *Leaves* very variable in size, and somewhat in shape, sharply toothed, on long stalks. *Stipulas* tubular. *Flower-stalks* much longer than the *leaves*, axillary, solitary, mostly erect, angular, solid. *Heads* rather depressed. *Flowers* white; brown in decay. *Legume* oblong, smooth, with three or four *seeds*. In osier-holts, and such rich moist places, the *stem* is more upright and luxuriant; but being solid, cannot be confounded with *T. hybridum*, a species never yet discovered in England, any more than *T. Vaillantii*. Linnæus blames Micheli for making a great number of imaginary species out of this common *T. repens*, but he himself, in some degree, has erred, on the other hand, in confounding two or three very distinct species together. How far we are correct in citing Micheli as above, and whether some other things, distinguished by him, do not likewise come under the *repens*, could be determined only by a most careful scrutiny of his own specimens, and perhaps the cultivation of the plants themselves.

25. *T. ambiguum*. Doubtful Pale Trefoil or Clover. Bieberst. Taur. v. 2. 208; excluding the syn. of Haller, n. 368, not 138. (See *T. hybridum*, n. 22.)—"Heads with stalked flowers. *Legumes* with one or two seeds. *Calyx-teeth* nearly equal. *Standard* lanceolate. *Leaflets* ovate, bluntish, finely serrated. *Stem* creeping."—Frequent in the meadows of Tauria and Caucasus, as well as about the Don and the Wolga, flowering in summer. Larger and more robust than the *hybridum* and *repens*, equally creeping and forming tufts. Flowering *stems* a span, rarely a foot, in length. *Stipulas* lanceolate, withering. *Leaflets* the size of *T. alpestre*, but broader and blunter, yet not emarginate, striated in like manner with very prominent ribs, ending in extremely sharp and crowded marginal teeth. *Heads* dense, twice the size of the two species just mentioned, as are also the *flowers*, which are bent downwards as they fade. *Calyx* striated, with awl-shaped divaricated teeth,

TRIFOLIUM.

teeth. *Corolla* pale, reddish in decay, like those species. *Petals* distinct. *Standard* much longer and narrower than in those. *Legume* short, often single-seeded. *Marshall a Bieberstein*. The creeping *stem* surely distinguishes this species from *hybridum*; it is much to be wished the learned author had told us whether it be hollow or not. The form of the *leaflets* and *standard*, and the small number of *seeds*, appear sufficiently unlike *repens*.

26. *T. comosum*. Tufted Trefoil. Linn. Sp. Pl. 1080. Willd. n. 20. Ait. n. 18. (*T. carolinianum*; Michaux Boreal-Amer. v. 2. 58? Pursh n. 3? Poiret in Lamarck n. 2? Lagopus americanus, floribus majoribus comosis; Petiv. Mus. 26. n. 254.)—"Heads globose. Flowers stalked, imbricated. *Standard* deflexed, permanent. *Legumes* four-seeded."—Native of America. *Linnaeus*. The *carolinianum* of authors, here quoted with doubt, is described as diminutive and erect; its *leaflets* inversely heart-shaped, roundish, smooth, fringed and finely crenate; *stipulas* cloven; *heads* reflexed, of few flowers; *corolla* hardly projecting beyond the *calyx*; *seeds* about three. This is found in sandy fields near Charlestown, South Carolina, flowering from June to August, and is perennial. *Flowers* small, white. *Pursh*. How far the opinion of Poiret, adopted by Pursh, that the above two plants constitute one species, is correct, we are utterly unable to determine, having seen neither; but Petiver's definition of the *flowers* is altogether at variance with that of Michaux and Pursh.

27. *T. alpinum*. Dwarf Alpine Trefoil. Linn. Sp. Pl. 1080. Willd. n. 21. Ait. n. 19. Dickl. Dr. Pl. 38. (*T. n. 369*; Hall. Hist. v. 1. 161. *T. alpinum*, flore magno, radice dulci; Bauh. Prodr. 143, no figure. *T. alpinum* rheticum, astragaloides; Bauh. Hist. v. 2. 376. *T. angustifolium* alpinum; Ger. Em. 1207. Trifoglio angustifoglio alpino; Pon. Bald. 194.)—Heads hemispherical, somewhat racemose and whorled. Flower-stalks radical, naked. *Legumes* two-seeded, pendulous. *Leaflets* linear-lanceolate.—Abundant in the alpine pastures of Switzerland, Italy, the Pyrenées, and the south of France, flowering in August. The most unscientific visitant of those beautiful scenes could hardly overlook this plant, whose large bright crimson *flowers*, each above an inch long, seem to spring almost immediately from dense tufts of no less elegant *leaves*. If this species, procured for the English gardens above forty years ago by Dr. Pitcairn and Dr. Fothergill, be still preserved, a coloured figure of it would be highly acceptable to the public. The *root* is perennial, thick and woody, running very deep into the ground, and said to have the sweetness of liquorice. *Stems* very short, or scarcely any. *Herbage* smooth. *Stipulas* long, lanceolate, membranous, finely striated. *Common flower-stalks* simple, often not taller than the leaves. No other species can be confounded with this.

28. *T. involucreatum*. Striped-flowered Trefoil. Willd. n. 49. Donn. Cant. ed. 5. 183.—Heads roundish, dense, each with an orbicular, ribbed, many-toothed, spinous involucre. *Stem* erect, branched. *Leaflets* lanceolate. *Stipulas* many-toothed. *Legumes* two-seeded.—Native of the west coast of North America, from whence its seeds were brought by Mr. Menzies, and raised in the Cambridge garden in 1791. We obtained specimens there August 3d, 1796. Yet this species does not occur either in Hort. Kew., or in Pursh, nor did we discover it in Willdenow, till we had hit on the same name, he having greatly misplaced it, in the next section, after *T. angustifolium*. The *root* is annual. *Stem* twelve or eighteen inches high, branched, leafy, hollow, round, smooth like the rest of the plant. *Stipulas* membranous, with many unequal bristly teeth. *Leaflets*

elliptic-lanceolate, toothed, an inch or an inch and half long. *Heads* of flowers above an inch broad, on long, stout, striated, axillary stalks, and each subtended by a very remarkable membranous orbicular *involucre*, whose strong, close, radiating ribs, end in unequal spinous teeth. *Flowers* sessile. *Calyx* ribbed and spinous, membranous, pale with green teeth. *Corolla* variegated with purple and white. *Legume* ovate, abrupt, compressed, with two entirely distinct valves, and two *seeds*. The whole plant sometimes becomes very diminutive from starvation.

SECT. 3. LAGOPODA. *Calyx* more or less villous.

29. *T. subterraneum*. Subterranean Trefoil. Linn. Sp. Pl. 1080. Willd. n. 22. Fl. Brit. n. 4. Engl. Bot. t. 1048. Curt. Lond. fasc. 2. t. 54. Rivin. Tetrap. Irr. t. 13. f. 1. (*T. pumilum* lupinum, flosculis longis albis; Raii Syn. 327. t. 13. f. 2.)—Heads of about four flowers. *Calyx*-teeth linear, hairy. *Involucre* central, reflexed, rigid, star-like, embracing the fruit.—Native of Italy, the Levant, France, and England, on dry gravelly heaths, among short grass, flowering in May, and very common in Hyde park, Greenwich park, &c. *Root* annual, knobbed. *Stems* depressed, spreading, almost concealed by the numerous, broad, pale purple-veined *stipulas*. *Leaflets* inversely heart-shaped, dark green, hairy. *Flower-stalks* at first erect, each bearing three or four *flowers*, conspicuous for their long white *corolla*. After flowering, these stalks bury the *legumes*, which are thin and single-seeded, in the ground, and fix them there, by shooting out several spreading firm and thick fibres, constituting an *involucre* of the fruit, though apparently like roots. The herbage of this species is trifling, and though it conduces to the spring verdure of many an otherwise barren tract, has nothing to encourage cultivation.

30. *T. globosum*. Globular Cotton-headed Trefoil. Linn. Sp. Pl. 1081. Willd. n. 23. Ait. n. 21. Sm. Fl. Græc. Sibth. t. 744, unpubl. (*T. orientale*, capite lanuginoso; Tourn. Cor. 27.)—Heads globose, many-flowered. *Calyx* very hairy all over, with linear teeth. Upper flowers numerous abortive, densely villous. *Stems* decumbent.—Native of Arabia and Syria, as well as of Cyprus and Asia Minor. A rare annual species, which *Linnaeus* cultivated from Hasselquist's seeds, and which may have been in our gardens a century ago, though not at present to be met with. It preserves some analogy with the last, though very unlike in appearance, having many pink *flowers*, in upright *heads*, and the *stems* are far less depressed. The *leaflets* have each a white transverse stripe, but not constantly. The analogy alluded to consists in the *flowers*, which perfect seed, being overwhelmed and borne down by a number of abortive ones above them. These seem to grow out as the others fade, in the form of empty *calyces* with innumerable, woolly, entangled teeth. No figure of the present species has yet appeared, but Mr. Bauer has prepared a very admirable drawing for the *Flora Græca*.

31. *T. bispidum*. Bristly-headed Trefoil. Desfont. Atlant. v. 2. 200. t. 209. f. 1. Willd. n. 24. (*T. hirtum*; Allion. Auctuar. 20.)—Heads terminal, solitary, globose. *Calyx* very hairy, with taper teeth. *Involucre* of several roundish-ovate pointed leaves. *Stem* erect.—Gathered by Desfontaines in fields in Barbary, near Mascara; by Allioni in Monteferrato. *Root* annual, long and tapering. *Stem* erect, a span high, more or less branched in a corymbose manner, striated, leafy, thaggy with soft hairs, as are likewise the *leaves* and their *footstalks*. *Leaflets* obovate, finely toothed, obtuse, not emarginate. *Heads* many-flowered, sessile, subtended by three or four close, membranaceous, ribbed, hairy *bractæas*, all pointed, and a solitary

solitary leaf like those lower down. *Corolla* rose-coloured, longer than the calyx-teeth, which however gradually extend beyond it as the flower fades. We much doubt whether this be a distinct species from the following. The *bractæas* are very filular, except being pointed, and the position of the *stems*, as well as the form of the *leaflets*, are known to be uncertain marks.

32. *T. Cherleri*. Hairy Pink Trefoil. Linn. Sp. Pl. 1081. Willd. n. 25. Ait. n. 22. Sm. Fl. Græc. Sibth. t. 745, unpubl. (*T. glomerulis perforatæ*, Cherleri; Bauh. Hist. v. 2. 377. *Lagopus minor*, fupinus, molli et compresso capite, flore albo; Barrel. Ic. t. 859.)—Heads terminal, solitary, globose. Calyx very hairy, with taper teeth. Involucrum of three roundish-ovate pointless leaves. Stems procumbent.—Native of France, Spain, and Barbary, in barren dry places. Dr. Sibthorp gathered it on the shores of Greece and the Archipelago. The seeds are sometimes introduced into our gardens from abroad. This is a little annual species, usually with several procumbent *stems*, three or four inches long; in a starved state having a solitary more erect one. *Leaflets* inversely heart-shaped, with a dark-purple mark. *Flowers* numerous, in dense heads. *Corolla* twice as long as the *calyx*, pale blush-coloured, with a long crimson *standard*; but the calyx-teeth subsequently rise above it. The *involucral* leaves are like the last, except in being blunt, and are also accompanied by a leaf.—*T. pidum*, Willd. n. 26. Bieberst. Taur. v. 2. 210, appears not to differ from *T. Cherleri*, and is doubtless Dr. Sibthorp's plant gathered on the shores of Greece and the Bosphorus. Nothing can be more uncertain than the spots on the *leaves*, which gave occasion to the name; and the proportion of the *corolla* to the *calyx* depends on the period of examination. Barrelier faithfully represents it longer than the *calyx* in *Cherleri*, when the flower is in perfection.

33. *T. sphaerocephalum*. Round-headed White Trefoil. Desfont. Atlant. v. 2. 201. t. 209. f. 2. Willd. n. 27.—Heads terminal, solitary, globose. Calyx very hairy, with taper teeth, twice the length of the *corolla*. Involucrum of three rounded leaves. Stems procumbent.—Native of fields in Barbary, near Mascara. Desfontaines. Very like the last, except its little white *corolla*, shorter than the *calyx*. The citation of Barrelier, copied by Willdenow from Desfontaines, is the very same which, in the preceding page, he had transcribed from Linnæus, though less exactly given by the latter. The proportion of the *corolla* does not answer to this, but to *T. Cherleri*, which may very probably have occasionally, as Barrelier says it has, a white *flower*. We should hardly scruple to reduce these three last described, with *pidum*, to one species.

34. *T. saxatile*. Thyme-headed Trefoil. Allion. Pedem. v. 1. 305. t. 59. f. 3. Willd. n. 28. (*T. thymiflorum*; Villars Dauph. v. 3. 487. *T. parvum rectum*, flore glomerato cum unguiculis; Bauh. Hist. v. 2. 378. *Trefle des glaciers*; Reyn. Mem. pour servir à l'Hist. Phys. et Nat. de la Suisse; v. 1. 166.)—Heads terminal, mostly in pairs, hemispherical, leafy. Calyx densely hairy, with taper teeth, as long as the *corolla*. Upper stipulas bracteaceous, ovate, acute. *Leaflets* wedge-shaped, emarginate.—Native of the sandy beds of torrents, among the alps of Dauphiny and Piedmont, or the glaciers of Switzerland. Our specimens from M. Reynier's herbarium were gathered at the glaciers of mount Sylvio, which terminates the valley of St. Nicholas in the Vallais, by the celebrated herbalist M. Thomas. The *root* is described as biennial. *Stems* several, a finger's length, simple, leafy, rather silky than hairy, crowned with one or two small, densely silky *heads*,

of little white *flowers*; the central ones, according to Villars, imperfect or abortive. *Leaflets* small, silky, scarcely toothed, deeply emarginate. *Stipulas* purplish, ribbed, acute, for the most part lanceolate, but those of the two opposite leaves, close under the heads of flowers, are broad and ovate, serving as *bractæas*.

35. *T. capense*. Bracteated Cape Trefoil. Willd. n. 29. (*T. diffusum*; Thunb. Prodr. 136.)—"Heads globose, woolly, bracteated. Stem herbaceous, decumbent. *Leaflets* obovate, obtuse, hairy."—Native of the Cape of Good Hope. Thunberg.

36. *T. lanatum*. Naked-flowered Cape Trefoil. Thunb. Prodr. 136. Willd. n. 30.—"Heads globose, woolly, without bractæas. Stem herbaceous, decumbent. *Leaflets* obovate, obtuse, hairy."—From the same country.

37. *T. birsutum*. Hairy Cape Trefoil. Thunb. Prodr. 136. Willd. n. 31.—"Heads globose, hairy. Stems herbaceous, diffuse. *Leaflets* oblong, hairy."—Found also at the Cape, by Thunberg. It is impossible to form a correct idea of these three last species, from the above characters, which suit equally well a number already known, to which the author appears never to have adverted. We merely register these plants here for future inquiry.

38. *T. lappaceum*. Bur Trefoil. Linn. Sp. Pl. 1082. Willd. n. 32. Ait. n. 24. Sm. Fl. Græc. Sibth. t. 746, unpubl. (*T. capitulo glomerato rigido*; Bauh. Hist. v. 2. 378.)—Heads globose, somewhat elliptical. Calyx-teeth awl-shaped, fringed; at length divaricated. Stems much branched, spreading. *Leaflets* obovate, toothed.—Native of fields in the south of France, and the isle of Cyprus. Introduced at Kew, in 1787, by the late Mr. Bell. An annual plant, with a dense tuft of branching, leafy, quadrangular, variously spreading *stems*, a foot high. *Stipulas* lanceolate, ribbed, hairy. *Heads* many-flowered, terminal, stalked, or nearly sessile. *Calyx* strongly ribbed and mostly smooth, with long fringed teeth, finally much shrunk, rigid, and widely spreading. *Corolla* twice as long as the calyx-teeth, monopetalous, which we believe to be the case with most of this round-headed tribe; its tube, or united claws, white, wings pale; *standard* pink, the length of the tube. *Legume* minute, ovate, single-seeded.

39. *T. diffusum*. Diffuse Hungarian Trefoil. Ehrh. Beitr. v. 7. 165. Pl. Select. n. 39. Willd. n. 33. Ait. n. 25. Waldst. et Kitaib. Hung. v. 1. 49. t. 50. Bieberst. Taur. v. 2. 210.—Heads roundish-ovate, very hairy. Calyx-teeth unequal, brittle-shaped, almost as long as the *corolla*. Stem diffuse, hairy. *Leaflets* oval, fringed, nearly entire.—Native of sandy ground in Hungary and Siberia. *Root* biennial. *Heads* stalked, terminal, as big as *T. pratensis*, accompanied by two *leaves*. *Corolla* monopetalous, its segments almost of equal length, purplish. *Legume* not quite covered by the *calyx*, one or two-seeded. Ehrhart, Bieberstein. The *stem* is twelve or eighteen inches long, the *leaflets* full an inch.

40. *T. rotundifolium*. Round-leaved Lilac Trefoil. Sm. Prodr. Fl. Græc. Sibth. n. 1795. Fl. Græc. t. 747, unpubl.—Heads globose, terminal, solitary, with lanceolate bractæas. Calyx very hairy, longer than its teeth. Stems simple, diffuse. *Leaflets* nearly orbicular, toothed, hairy.—Gathered by Dr. Sibthorp in the Morea. A very pretty and distinct annual species, which seems never to have been noticed before. The *stems* are scarcely a span long, clothed, like the rest of the herbage, with copious hoary hairs. *Leaflets* remarkably round, not half an inch in diameter, strongly and unequally toothed. *Calyx* tubular, very slightly inflated, with short, lanceolate, upright teeth. *Corolla* twice the length of the calyx, elegantly variegated with

TRIFOLIUM.

with pale purple and white, its *petals* distinct. *Germen* hairy.

41. *T. Lagopus*. Oblong Hairy Trefoil. Willd. n. 34.—“Spikes oblong, villous, terminal, solitary. Calyx-teeth bristle-shaped, as long as the monopetalous corolla. Stems simple, diffuse. Leaflets obovate, toothed.”—Native of Spain. *Pourret*. *Root* annual, slender. *Stems* several, four inches long, villous. *Leaflets* small, villous, obtuse, not emarginate. *Stipulas* ovate, large, ribbed, finely toothed. *Spikes* eight lines long, subtended by a leaf. *Willdenow*.

42. *T. stipulaceum*. Stipulaceous Cape Trefoil. Thunb. Prodr. 136. Willd. n. 35.—“Heads villous, ovate, terminal. Stem herbaceous, decumbent at the base. Leaflets jagged, villous.”—Found at the Cape of Good Hope, by Thunberg, whose specific character is all we know of this species. The word “herbaceous” is truly superfluous in any specific character of a *Trifolium*!

43. *T. microcephalum*. Little-headed Trefoil. Pursh n. 4.—“Ascending, downy. Leaflets obovate, emarginate, finely toothed. Stipulas ovate, pointed. Heads minute, stalked, of a few sessile flowers. Involucrum ovate, awned. Calyx awned, as long as the corolla.”—Found by governor Lewis, on the banks of Clark’s river, flowering in July. Perennial. *Flowers* exceeding small, pale purple. *Pursh*. Some specimens from the north-west coast of America answer nearly to these characters, except being quite smooth; and we are persuaded they are only a diminutive state of *T. involucreatum*, n. 28.

44. *T. rubens*. Red Long-spiked Trefoil, or Clover. Linn. Sp. Pl. 1081. Willd. n. 36. Ait. n. 26. Jacq. Austr. t. 385. Mart. Ruft. t. 9. (*Lagopus* major, *spicâ longiore*; Ger. Em. 1192.)—Spikes long and cylindrical. Calyx-teeth hairy; the lowermost about the length of the monopetalous corolla. Stipulas sword-shaped, longer than the footstalk. Leaflets lanceolate, sharply serrated. Stem erect.—Native of Italy, the south of France, Germany, and Switzerland, especially in the warmer meadows of the latter, where, according to Haller, this handsome species is very common. It flowers in summer, and found a place in our English gardens in Gerard’s days. *Root* perennial. *Stem* one or two feet high, erect, firm, full of solid pith, smooth like the very elegant, finely serrated, and veined, *leaflets*, which are two inches long. Their common *stalk* is united almost entirely to the long, entire, even, sharp-pointed *stipulas*, which reach far beyond it. *Flowers* crimson, in dense, cylindrical, thick, blunt *spikes*, two or three inches long, beset with the prominent bristly *calyx-teeth*, of which the lowermost is much the most conspicuous. This Trefoil, though not hitherto brought into cultivation, seems, as professor Martyn observes, of a good quality, and sufficiently productive.

45. *T. pratense*. Common Purple Trefoil, or Clover. Linn. Sp. Pl. 1082. Willd. n. 37. Fl. Brit. n. 6. Engl. Bot. t. 1770. Mart. Ruft. t. 3, and t. 36. Fl. Dan. t. 939. Afzel. Tr. of Linn. Soc. v. 1. 240. Matth. Valgr. v. 2. 189. (*T. pratense purpureum*; Fuchf. Hist. 817. *Trifolium*; Rivin. Tetrap. Irr. t. 11. f. 1.)—Spikes ovate, dense. Stems ascending. Corolla monopetalous, unequal. Four of the calyx-teeth equal. Stipulas awned.—Common in grassy meadows and pastures throughout Europe, flowering from May to September. In its native situations, particularly on dry calcareous or gravelly hills, this valuable plant is truly perennial, though, like Saintfoin, less permanent in cultivated manured land. For its agricultural properties, and management, see CLOVER. Great difficulties have long attended the botanical discrimination of this and some other species, which we

shall presently describe; but they are for ever set at rest, by the most minute and laborious details of Mr. Afzelius, in the first volume of the Linnæan Society’s Transactions. Nor is this question merely curious or speculative; for the qualities of the plants, in an economical view, are as widely different as can well be. The *root* of *T. pratense* is tapering and branched, but not creeping. *Stems* about a foot high, more or less, slightly branched, leafy, solid, downy in the upper part. *Leaflets* elliptical, more or less acute, entire, smoothish, with a pale lunate spot. Upper *leaves*, near the flowers, mostly opposite. *Stipulas* rather broad, ovate, pale, purple-ribbed, with taper points. *Spikes* terminal, solitary, sessile, of numerous light-purple *flowers*, with a sweet, but faint scent, their *petals* united at the base, and combined with the *filaments*. *Calyx* hairy, ten-ribbed, its lowest tooth longer than the rest, but much shorter than the *corolla*. The figures in Fl. Dan. and Martyn represent the cultivated plant; that of Engl. Bot. the wild one. What Dillenius represents, in his edition of Ray’s Synopsis, t. 13. f. 1, seems merely a starved plant. There is said to be a procumbent, very hairy, kind, found on the loftiest mountains of Switzerland and Dauphiny, which is also but a variety.

46. *T. medium*. Zigzag Trefoil, or Bastard Clover. Linn. Faun. Succ. ed. 2. 558. Hudf. ed. 1. 284. Afzel. Tr. of Linn. Soc. v. 1. 237. Willd. n. 38. Fl. Brit. n. 7. Engl. Bot. t. 190. Mart. Ruft. t. 2. (*T. flexuosum*; Jacq. Austr. t. 386. *T. alpestre*; Fl. Dan. t. 662. Hudf. ed. 2. 326, but not of Linnæus.)—Spikes lax. Stems zigzag, branched. Corolla monopetalous, nearly equal. Two upper calyx-teeth shortest. Stipulas linear, taper-pointed. Native of most parts of Europe, particularly in elevated calcareous pastures, or on a gravelly soil over clay, flowering in July. Differs from the last in its zigzag, more branched, *stem*, whose pith is so very thin and pellucid, that the centre seems hollow. The longer and linear *stipulas*, and more lax *spikes*, as well as the fringed elliptical *leaflets*, somewhat glaucous beneath, further mark this species, which ought to be carefully distinguished, as being destitute of any value to the farmer. The *root* is perennial.

47. *T. alpestre*. Oval-spiked Narrow-leaved Trefoil, or Clover. Linn. Sp. Pl. 1082. Willd. n. 39. Ait. n. 29. Jacq. Austr. t. 433. Mart. Ruft. t. 1. Afzel. Tr. of Linn. Soc. v. 1. 234. (*T. folio longiore, flore purpureo*; Rivin. Tetrap. Irr. t. 12. f. 1.)—Spikes globose, mostly solitary. Calyx-teeth hairy; the lowermost as long as the monopetalous corolla. Stipulas bristle-pointed. Leaflets lanceolate, nearly entire. Stem simple, erect.—Native of mountain forests, in Siberia, Germany, Thrace, and Switzerland. The late Mr. Davall, who never met with this species, except in one little spot, in a forest near Orbe, was persuaded it was unknown to Haller, his n. 376, though taken for this, being probably our *medium*. Among fifteen or sixteen plants, Mr. Davall saw but one with two heads of flowers. The *root* is perennial. *Stem* straight, angular, downy, a foot high. *Leaves* most like *T. rubens*, as beautifully striated with veins, but far less visibly toothed. *Stipulas* hairy, linear, united to the *footstalk* about half its length only; their points almost thread-shaped, very long, hairy, shorter than the lower *footstalks*, longer than the upper. *Flowers* crimson, in a round head, overtopped by the upper leaves. Of no use for cultivation, affording few leaves, and never branching.

48. *T. bracteatum*. Morocco Clover. Willd. Enum. 792.—“Spikes conical, somewhat ovate, dense, solitary, sessile. Corolla monopetalous. Calyx-teeth nearly equal.

TRIFOLIUM.

Stipulas awned. Stem branched. Leaflets ovate, obtuse, slightly and minutely toothed."—Found by Mr. Schousboe in Morocco. Root annual, or biennial. Willd. We know nothing more of this species.

49. *T. pennsylvanicum*. Pennsylvanian Buffalo Clover. Willd. Enum. 793. Pursh n. 6.—"Spikes ovato-cylindrical, solitary, dense. Lowest tooth of the calyx shorter than the monopetalous corolla. Stipulas awned. Stem much branched, zigzag. Leaflets ovate-elliptical, obtuse, entire."—In woods and fields, from Pennsylvania to Virginia, flowering from June to September, and known by the name of Buffalo Clover. It resembles *T. medium* very much. The flowers are of a fine red. Pursh.

50. *T. pannonicum*. Hungarian Trefoil, or Clover. Jacq. Obs. fasc. 2. 21. t. 42. Linn. Mant. 276. Willd. n. 40. Ehrh. Pl. Select. n. 9. Allion. Pedem. v. 1. 304. t. 42. f. 2. (*T. orientale majus villosissimum, floribus flavescens*; Tourn. Cor. 27.)—Spikes dense, elliptic-oblong, solitary. Calyx hairy; its lowest tooth longest. Corolla monopetalous; standard very long and linear-lanceolate. Stipulas with awl-shaped points. Leaflets hairy, nearly entire, minutely pointed. Stem erect.—Native of meadows in Lower Hungary, Armenia, and about the Bithynian Olympus. Cultivated by professor Williams, at Oxford, in 1799. One of the most striking species, on account of its very large and dense oblong spikes of innumerable cream-coloured flowers, whose corolla is about an inch and a quarter long. The root is perennial. Stem a foot and a half or two feet high, sometimes a little branched. Leaflets an inch and a half or two inches long, elliptic-lanceolate, either quite entire, or bluntly toothed towards the end, which is tipped with a little spinous point. Stipulas oblong, ribbed, united to the lower half of each footstalk; their points nearly twice as long, awl-shaped, hairy. Calyx furrowed, its upper part, and long teeth, clothed with long and dense silky hairs. The prominent rounded angle of each wing of the corolla retains, in the dried specimens, a remarkable whiteness, something of which may be seen in *T. ochroleucum*.

Professor Willdenow, in a note to his *Enumeratio*, 793, has separated Tournefort's plant by the name of *armenium*, distinguishing it chiefly by the leaflets being linear-lanceolate, and emarginate; for the slight differences in the proportion of the lower calyx-tooth and tube of the corolla, as well as the casual branching of the stem, are of no moment. Our Bithynian specimens have certainly narrower leaflets than one sent from Piedmont; but those in the Linnæan herbarium, as well as the plates of Jacquin and Allioni, are intermediate between the two. We have not examined an authentic specimen of Tournefort, but there is no reason, from Willdenow's definition, to suppose his a different species.

51. *T. elongatum*. Long-beaked Trefoil. Willd. n. 41.—"Spikes lax, elliptical, solitary. Lower calyx-tooth the length of the wings of the monopetalous corolla. Standard very long. Stipulas lanceolate. Leaflets lanceolate, villous. Stem ascending, branched."—Native of Galatia. Perennial. The whole plant is villous. Stem half a foot high, branched from the base, round, striated. Leaflets toothed at the extremity. Stipulas oblong, with a lanceolate point. Calyx tubular, villous; with fetaceous teeth, four of which are nearly equal. Standard lanceolate, twice as long as the wings or keel. Differs from *T. alpestre* in having small leaves, a longer standard, a branched ascending stem, and in being a hairy plant. Willdenow.

52. *T. canescens*. Hoary Oriental Trefoil. Willd. n. 42. Ait. n. 31. Sims in Curt. Mag. t. 1168. (*T. trichocephalum*; Bieberst. Taur. v. 2. 212. *T. orientale canescens*,

capitulo oblongo, fordidè albo; Tourn. Cor. 27.)—Spikes ovate, lax, solitary. Calyx-teeth hairy, lanceolate, all nearly equal. Corolla monopetalous. Stipulas taper-pointed. Leaflets elliptical, villous. Stem simple, ascending.—Native of Cappadocia, and of the alpine heights of Caucasus, towards Armenia. Mr. Loddiges of Hackney received it from the neighbourhood of mount Caucasus. A hardy perennial, flowering in May. Root cylindrical, rather woody, branching at the top into several leafy tufts. Stems several, a span high, or not so much, covered with close silky hairs, slightly leafy. Leaflets hardly an inch long, more or less acute, very nearly entire; most striated with fine elevated ribs near the edge. Stipulas pale, membranous, gradually tapering into a hairy point. Spike thick, two inches long. Calyx hairy; its lower tooth very little the longest. Corolla cream-coloured. We conceive there can be no doubt of the correctness of the above synonyms, though we have not compared specimens.

53. *T. ochroleucum*. Sulphur-coloured Trefoil. Linn. Syst. Nat. ed. 12. v. 3. 233. Willd. n. 47. Ait. n. 36. Fl. Brit. n. 5. Engl. Bot. t. 1224. Jacq. Austr. t. 40. Curt. Lond. fasc. 6. t. 49. Mart. Ruft. t. 35. Afzel. Tr. of Linn. Soc. v. 1. 229. (*T. squarrosum*; Linn. Sp. Pl. 1082. Willd. n. 44. Ait. n. 33.)—Spikes elliptical, hairy. Lowest calyx-tooth very long, linear, finally reflexed and rigid. Stem erect, downy. Lowest leaflets inversely heart-shaped.—Found in dry, huffy, gravelly or calcareous pastures, in England, Switzerland, Austria, and the south of Europe, as far as Constantinople, flowering in June or July. Root branching, perennial. Habit of the plant between *pratense*, *medium*, &c. with which it agrees in size, and *pannonicum*, which it resembles in colour of the flowers. The white point of the wings, when dry, is conspicuous in both. The stems are twelve or eighteen inches high, solid, but little branched, and of a stiff, slender, bare aspect. Leaves distant, on longish stalks; the uppermost opposite; leaflets linear-oblong, or somewhat elliptical, those of the lower leaves short, rounded, or orbiculate; all hairy, and almost perfectly entire. Stipulas linear, tubular, close, with simple ribs, and a very taper point. Head terminal, stalked, erect. Calyx furrowed, hairy, with bristle-shaped teeth, the lower one thrice the length of the rest, and, after flowering, still more elongated, wiry, and reflexed, giving the head a teasel-like aspect. Corolla monopetalous, yellowish cream-coloured, with a long erect standard. Legume membranous, with one seed, in the swelling tube of the calyx.

We remove this species nearer to its allies than where Willdenow has placed it. In an advanced state, it was described by Linnæus as distinct, by the name of *squarrosum*, but the original specimen from Sauvages's herbarium has enabled us to correct this mistake. The synonym of Morison, sect. 2. t. 13. f. 1, evidently belongs to *T. angustifolium*, n. 57, though possibly his "other species, with a round leaf," may be *ochroleucum*; but this is of little importance. What *T. squarrosum* of Bieberst. Taur. v. 2. 214, with a purplish flower, may be, we cannot determine. It is requisite to correct an error in *Fl. Brit.* where Fuchs is cited improperly, his plant being *T. montanum*, hereafter described.

54. *T. pallidum*. Pale Hungarian Trefoil. Willd. n. 46. Ait. n. 35. "Waldst. et Kitaib. Hung. v. 1. 35. t. 36."—"Spikes solitary, roundish. Stipulas membranous; the upper ones opposite. Leaflets roundish. Corolla monopetalous. Border of the calyx bearded internally; its teeth nearly equal."—Native of meadows in Upper Hungary. Annual or biennial. Differs from *T. pratense* in having footstalks

TRIFOLIUM.

Footstalks even to its uppermost opposite *leaves*, and also an emarginate *standard*; from *ochroleucum* in the *stipulas* being ovato-lanceolate, with a long point, and the *calyx-teeth* nearly equal; from both it is distinguished by the annual or biennial *root*, roundish *leaflets*, white *flowers*, and whole aspect. *Willdenow.*

55. *T. maritimum.* Teasel-headed Trefoil. Hudf. ed. 1. 284. Fl. Brit. n. 8. Engl. Bot. t. 220. Willd. n. 43. (*T. stellatum*; Hudf. ed. 2. 326. *T. stellatum glabrum*; Ger. Em. 1208. Pluk. Phyt. t. 113. f. 4. *T. spicatum minus*, flore minore dilute purpureo; Morif. sect. 2. t. 14.)—Spikes terminal, nearly globose. Calyx-teeth lanceolate, leafy; finally spreading. *Stipulas* lanceolate. *Leaflets* obovate.—Native of muddy marshes, especially near the sea, in various parts of the English coast, from Norfolk to Somersetshire, nor does this *Trifolium* seem to be known in any other part of the world. The plant is annual, flowering in June and July. *Stems* numerous, near a foot high, spreading or decumbent, branched, very leafy, round, striated, a little hairy. *Leaflets* from half an inch to an inch long, of a narrow obovate form, nearly entire, dark green, hairy. *Footstalks* mostly longer than the leaflets, and usually much longer than the lanceolate, taper-pointed *stipulas*. Uppermost *leaves* opposite. *Spikes* dense, more or less stalked, about half an inch in length and breadth. *Calyx* chiefly hairy at the top of its tube; teeth, after flowering, enlarged, leafy, deep green, three-ribbed, permanent; the lower one rather longest. *Corolla* pale purple. *Legume* turbate, with one seed.

56. *T. incarnatum.* Crimson Trefoil. Linn. Sp. Pl. 1083. Willd. n. 45. Ait. n. 34. Curt. Mag. t. 328. Sm. Fl. Græc. Sibth. t. 748, unpublished. (*Lagopus maximus*; Clus. Hist. v. 2. 246. Ger. Em. 1192. *L. latifolius*; Rivin. Tetrap. Irr. t. 17.)—Spikes cylindrical, obtuse, leaflets, hairy. *Leaflets* inversely heart-shaped, rounded, crenate, hairy. *Calyx-teeth* awl-shaped, nearly equal.—Native of Italy, France, Switzerland, &c. Gathered by Dr. Sibthorp on the celebrated mount Athos. This is a hardy, annual, and considerably ornamental, plant, long known in our gardens, flowering in July, but not in such general cultivation as it deserves. The broad roundish *leaflets*; obtuse, wavy, red-veined *stipulas*; and especially the long dense *flower-spikes*, of a peculiarly rich and beautiful crimson or carmine colour, readily distinguish this species. As the seeds ripen, the spreading, rigid, pointed *calyx-teeth* render the *spikes* very prickly. The *stem* is erect, softly hairy, eighteen or twenty-four inches high.

57. *T. angustifolium.* Narrow-leaved Trefoil. Linn. Sp. Pl. 1083. Willd. n. 48. Ait. n. 37. Sm. Fl. Græc. Sibth. t. 749, unpublished. (*T. alopecurum angustifolium elatius*; Barrel. Ic. t. 698. *Lagopus hispanicus*; Rivin. Tetrap. Irr. t. 16. *L. angustifolius hispanicus*; Clus. Hist. v. 2. 247. Ger. Em. 1193.)—Spikes cylindrical, hairy. *Leaflets* linear, pungent. *Calyx-teeth* bristle-shaped; the lowermost rather longest.—Native of the south of France, Spain, Italy, Germany, Carniola, Caucasus, Greece, and the Archipelago, flowering early in summer. In the latter countries it goes by various modern Greek names, synonymous with Cat's-tail. This Trefoil has often been raised in our gardens, being a hardy annual, distinguished from the last by its long, very narrow, grassy *leaflets*, and the pale pink, or lilac, hue of its *corolla*.

58. *T. arvense.* Hare's-foot Trefoil. Linn. Sp. Pl. 1083. Willd. n. 50. Fl. Brit. n. 9. Engl. Bot. t. 944. Curt. Lond. fasc. 6. t. 50. Pursh n. 7. Fl. Dan. t. 724. (*Lagopus*; Fuchf. Hist. 494. Camer. Epit. 724. Rivin. Tetrap. Irr. t. 15. *Lagopodium*, *Pes leporis*; Ger. Em.

1193.)—β. *Lagopus perpusillus sarpinus perelegans maritimus*; Dill. in Raii Syn. 330. t. 14. f. 2.—Spikes very hairy, nearly cylindrical. *Calyx-teeth* bristle-shaped, longer than the corolla. *Leaflets* narrow-obovate.—Native of dry sandy fields, throughout Europe and the Levant, as well as in North America, from Canada to Virginia, flowering in July and August. *Root* annual. *Herb* very various as to luxuriance, erect or decumbent. *Stems* much branched, rather zigzag, round, hairy. *Leaflets* from half an inch to an inch long. *Stipulas* ovato-lanceolate, acute, ribbed, often red. *Spikes* from half an inch to an inch and a half long, but always about half an inch thick, very soft and downy, the slender, prominent, equal *calyx-teeth* being densely fringed, with fine, silky, reddish hairs, and projecting far beyond the little white *corolla*. *Legume* very small. An entirely useless weed, not eaten readily by any animals that we are acquainted with.

59. *T. stellatum.* Starry-headed Trefoil. Linn. Sp. Pl. 1083. Willd. n. 51. Ait. n. 39. Compend. Fl. Brit. ed. 2. 110. Engl. Bot. t. 1545. Sm. Fl. Græc. Sibth. t. 750, unpublished. Ger. Em. 1028. (*T. stellatum purpureum monspessulanum*; Bauh. Hist. v. 2. 376. f. 2. Morif. sect. 2. t. 13. f. 9. *Lagopus minor erectus*, capite globofo stellato, floribus purpureis; Barrel. Ic. t. 860.)—Spikes terminal, hairy, ovate. *Calyx-teeth* spreading, leafy, equal, taper-pointed. *Leaflets* inversely heart-shaped, toothed. *Stipulas* elliptical. *Stems* spreading.—Found in sandy fields throughout the south of Europe, and every part of the Levant, flowering in June and July. Tradescant cultivated this pretty plant, and Gerarde has left us a good description, but no figure. Hudson latterly mistook his own *maritimum*, n. 55, for the *stellatum*; but the latter was discovered by Mr. W. Borrer in Suffex, in 1804, growing plentifully between Shoreham harbour and the sea. The *herb* is annual, varying much as to luxuriance, always considerably hairy, spreading or diffuse. *Leaflets* small and abrupt. *Flowers* white, or bluish-coloured, monopetalous, the *standard* erect, rising much above the very hairy *calyx*, whose enlarged, red or tawny, teeth spread in a starry manner after flowering, when their crimson bases are elegantly contrasted with a dense tuft of white cottony hairs, which close the mouth, and conceal the little membranous single-seeded *legume*.

60. *T. leucanthum.* White-blossomed Tartarian Trefoil. Bieberst. Taur. v. 2. 214.—“Spikes villous, nearly globose, stalked. *Calyx* spreading, with nearly equal teeth, shorter than the corolla. *Stipulas* awl-shaped. *Leaflets* obovate-oblong, slightly ferrated at the extremity.”—Native of dry hills, in the southern parts of Tartary, flowering in May and June. Pallas mistook it for *T. stellatum*, to which it is described, in the above work, as being very near; but the *stems* are only about a finger's length, *stipulas* lanceolate-awl-shaped, entire, (which is the most material distinction,) *leaflets* more oblong, at least the upper ones, *flowers* smaller, the villous hairs of the *calyx* (we presume in its mouth) reddish, not white.

61. *T. clypeatum.* Buckler-shaped Trefoil. Linn. Sp. Pl. 1084. Willd. n. 52. Ait. n. 40. Allion. Pedem. v. 1. 306. Sm. Fl. Græc. Sibth. t. 751. (*T. clypeatum argenteum*; Alpin. Exot. 307. t. 306.)—Spikes terminal, ovate. *Calyx-teeth* ovate, leafy, very unequal, finally spreading; the lower one very large. *Stipulas* ovate. *Leaflets* roundish-obovate.—Native of Crete, Cyprus and Piedmont; also of Greece and Asia Minor. Cultivated in Chelsea garden, early in the last century, and at Cambridge by the late Mr. Donn. A hardy annual, flowering in summer. The general habit and size of the plant are not unlike

T. pratense, but the leaflets are shorter and rounder, sometimes marked at each side with a small marginal purple streak, not a central spot. Flowers either light rose-coloured, or white. Calyx very remarkable, especially as the fruit advances, for its broad, ovate, pointed, hairy, many-ribbed teeth, or segments, forming a sort of five-angled shield, green and leafy, its mouth closed by an oblong valve, under which is the small, membranous legume, with a gibbous seed. The great inequality of its calyx-teeth distinguishes this plant from the *stellatum* and *maritimum*; its broad *stipulas* approach the former, but are totally unlike the latter. Indeed these three species, though more naturally allied, by the peculiarities of their calyx, to each other than to any of the foregoing besides, are very unlike in habit. Many of the following accord with them in the leafy nature of their calyx, but differ in having lateral heads, to say nothing of their much smaller dimensions.

62. *T. albidum*. Whitish Starry Trefoil. Retz. Obf. fasc. 4. 30. Willd. n. 53. Ait. n. 41.—“Spikes stalked, nearly globular. Calyx spreading; its lower tooth linear-awl-shaped. Stipulas linear-awl-shaped. Leaflets oblong. Stems diffuse.”—The native country of this species is unknown. Professor Retzius raised the plant from seeds sent him under a wrong name. Mr. Aiton mentions it as introduced at Kew about 1796. It proves a hardy annual, flowering in July and August. The stems are branched, round, slightly downy; branches knotty at the base. Leaves opposite; leaflets of the lower ones ovate, of the upper lanceolate, with a short recurved terminal bristle, the margin and keel fringed. Stipulas streaked with green and white. Heads on long straight stalks, without floral leaves; nearly globular when in flower, ovate in fruit. Calyx cylindrical, downy, with close-pressed awl-shaped teeth; the lowermost three-ribbed, about the length of the corolla, which is yellowish-white and monopetalous; the dorsal ones, which are rather shorter than the two next, are clasped so close to the corolla, that their points are hidden under the lateral teeth. As the fruit advances, the calyx-teeth become dilated and spreading, as in *T. stellatum*. Retzius. We have seen no specimen.

63. *T. scabrum*. Rough Trefoil. Linn. Sp. Pl. 1084. Willd. n. 54. Fl. Brit. n. 10. Engl. Bot. t. 903. Curt. Lond. fasc. 6. t. 48. (*T. flosculus albis*, in glomerulis oblongis, asperis, caulibus proximè adnatis; Vaill. Parif. t. 33. f. 1. *T. minus*, capite subrotundo parvo albo et echinato; Barrel. Ic. t. 870.)—Heads ovate, sessile, axillary. Calyx-teeth unequal, lanceolate, rigid; at length recurved.—Native of England, France, Italy, Switzerland, Germany, the Morea, and about Constantinople, generally in dry chalky ground, or on sand over a stratum of chalk, flowering early in summer; chiefly occurring with us in Norfolk and Kent, but not commonly in either. This is a small, depressed, rigid, annual species, of no account in agriculture. Stems four to six inches long, zigzag, angular, hairy. Leaflets small, obovate or obovate, hairy, toothed and strongly veined. Stipulas broad-lanceolate, membranous. Heads lateral and terminal, always axillary, half an inch long. Calyx-teeth green and leafy, though narrow, rigid, hairy, finally recurved and spinous. Corolla white or flesh-coloured. Legume membranous, enclosed in the hardened furrowed calyx.

64. *T. echinatum*. Little Hedge-hog Trefoil. Bieberst. Taur. v. 2. 216.—“Heads ovate, terminal and axillary, stalked, leafless. Calyx-teeth awl-shaped, unequal, hairy, shorter than the corolla. Stem declining, branched. Leaflets obovate-oblong, entire.”—Native of mount Caucasus. Annual. Habit of *T. lappaceum*, n. 38. Stem rather hairy,

with subdivided branches. Stipulas awl-shaped, hairy. Leaflets entire, slightly hairy. Flower-stalks much longer than the heads. Calyx striated, downy all over; tube very short; teeth extremely narrow, finely pointed, clothed with spreading hairs; the lowermost longest; all widely expanded when the fruit ripens, as in *T. lappaceum*. Corolla monopetalous, pale, twice the length of the calyx, with a long lanceolate standard. We have seen no specimen. This species appears indeed to be very near *lappaceum*, though ranged after *scabrum* by the learned author who is our only guide.

65. *T. glomeratum*. Round-headed Smooth Trefoil. Linn. Sp. Pl. 1084. Willd. n. 55. Fl. Brit. n. 11. Engl. Bot. t. 1063. Curt. Lond. fasc. 4. t. 51. (*T. cum glomerulis ad caulium nodos rotundis*; Pluk. Phyt. t. 113. f. 5. *T. arvense fupinum verticillatum*; Barrel. Ic. t. 882.) Heads hemispherical, sessile, lateral, smooth. Calyx-teeth equal, heart-shaped, reflexed, veiny.—Native of Spain, and of gravelly meadows and pastures in various parts of England, but not universally. Annual, flowering about Midsummer. Root furnished with fleshy knobs. Whole plant destitute of pubescence. Stems slender, various in length, quite prostrate, scarcely branched. Leaflets neatly toothed and striated, often marked across with a white or yellowish stripe. Stipulas ovate, membranous. Flowers rose-coloured, very pretty, with little green leafy calyx-teeth. Seed minute.

66. *T. parviflorum*. Small-flowered Trailing Trefoil. Ehrh. Beitr. v. 7. 165. Pl. Select. n. 29. Willd. n. 56. Bieberst. Taur. v. 2. 218?—Heads globose, axillary, stalked, nearly smooth. Calyx-teeth awl-shaped, rather unequal, spreading, recurved, longer than the corolla. Stem procumbent. Leaflets obovate, toothed.—Native of Hungary and Siberia. Willdenow. Linnæus knew this plant, but confounded it with his *striatum*; see n. 20. It is most akin to *glomeratum*, in size, habit, smoothness, mode of growth, and peculiar characters; but differs essentially in the length and form of its calyx-teeth, as well as the stalked heads, and remarkably membranous pellucid stipulas, with green awl-shaped teeth. The corolla seems to be rose-coloured. A few hairs are sometimes seen on the calyx, which is very strongly ribbed.

67. *T. striatum*. Soft Knotted Trefoil. Linn. Sp. Pl. 1085. Willd. n. 57. Fl. Brit. n. 12. Engl. Bot. t. 1843. (*T. parvum hirsutum, floribus parvis dilutè purpureis, in glomerulis mollioribus et oblongis, femine magno*; Raii Syn. 329. t. 13. f. 3. Vaill. Parif. t. 33. f. 2.)—Heads ovate, sessile, lateral and terminal. Calyx elliptical, hairy, furrowed, with bristle-shaped, rather unequal, teeth. Leaves downy.—Native of dry, rather barren, sandy pastures, in Germany, Hungary, France, Spain, and England, flowering in June. Root annual, with small fleshy knobs. Whole herb downy, and very soft to the touch, by which it is known from all the species which it otherwise resembles. Stems procumbent, from three to six inches long, branched, round, often zigzag. Leaflets obovate, finely toothed. Stipulas ovate, broad, pointed, somewhat membranous between the ribs. Heads mostly terminal. Calyx-teeth green, fringed, lengthened out after flowering. Corolla pale rose-coloured, about as long as the calyx. Germen with rudiments of two seeds; legume with only one, which is thrice as large as that of *glomeratum*, n. 65.

68. *T. gemellum*. Twin-headed Trefoil. Willd. n. 58.—“Heads oblong, terminal, in pairs. Calyx hairy: its teeth bristle-shaped, unequal, longer than the corolla. Leaflets wedge-shaped, emarginate, finely toothed at the extremity. Stems simple.”—Native of Spain, from whence specimens were sent by the abbé Pourret, to professor Willdenow, under the above name. Root annual. Stems a finger’s

TRIFOLIUM.

finger's length, or more, diffuse, villous. *Leaflets* villous, hoary, lanceolate-wedge-shaped, striated with veins. *Stipulas* lanceolate-pointed, membranous, ribbed. One of the *beads* stalked, the other sessile. *Willd.*

69. *T. pbleoides*. Cat's-tail Trefoil. *Willd.* n. 59.—“Heads oblong. Calyx hairy; its teeth lanceolate-awl-shaped, unequal, rigid, spreading. *Leaflets* oblong, emarginate, nearly entire; the floral ones linear.”—Sent from Spain by Pourret. Annual. *Stems* nearly simple, about six inches long. *Leaflets* tapering at the base, clothed, like the stem, with close-pressed hairs: those of the floral leaves very narrow and entire. *Stipulas* lanceolate. *Spikes* nearly sessile, not unlike those of a *Pbleum*. Lowest tooth of the *calyx* longest. *Willd.*

70. *T. alexandrinum*. Egyptian Trefoil. *Linn. Sp. Pl.* 1085. *Amoen. Acad.* v. 4. 286. *Willd.* n. 60. *Ait.* n. 45. *Forsk. Ægypt.-Arab.* 139.—Heads ovate, on axillary stalks, longer than the leaves. Calyx hairy; teeth awl-shaped, unequal. Stem erect. Floral leaves opposite. *Leaflets* elliptic-lanceolate, with shallow teeth.—Native of Egypt. The root is annual. *Stem* a foot or more in height, naked in the lower half, round, striated, smooth. *Leaflets* uniform, an inch or inch and half long, somewhat downy, about the length of the common stalks. *Stipulas* oblong, veiny, with green leafy awl-shaped points, of their own length. The lowest leaves only are opposite, one of them embracing the flower-stalk, the other the main stem, which rises some inches above it, bearing many alternate leaves, and perhaps more flowers. *Heads* solitary, near an inch long. *Corolla* monopetalous, white; *standard* linear, obtuse, longer than the wings, which are marked by a small prominent callosity at their base. *Stigma* downy towards the standard.

Forskall says, this is the Trefoil universally cultivated in Egypt, being the best, and indeed the principal fodder for cattle in that country. It is sown only at the recesses of the Nile; and where the fields are too high to be inundated by that river, they are watered by means of hydraulic engines, the seeds being committed to the earth while it is wet. The produce is three separate crops, the plants growing each time about half an ell in height, and there are three months between each harvest. After the last they die. The first crop is the best. When the Trefoil is wanted for seed, it is sown along with the wheat. Both are gathered at once, by the hand, not reaped or mown, and are threshed out together, the Trefoil seed being afterwards separated by a sieve. Our British agriculturists do not appear to know any thing of this species of Clover, which being so important in its own country, might be worth trying, at least, in this. We beg leave to recommend it to their notice. The plant was introduced at Kew, in 1798, by Mr. Hunneemann, and we trust its progeny has been continued. For the occupiers of low oozy lands in the fens it promises most benefit, provided the Egyptian mode of culture be the most eligible.

71. *T. suffocatum*. Suffocated Trefoil. *Linn. Mant.* 276. *Willd.* n. 61. *Fl. Brit.* n. 13. *Engl. Bot.* t. 1049. *Tr.* of *Linn. Soc.* v. 2. 357. *Jacq. Hort.* Vind. v. 1. 24. t. 60.—Heads sessile, lateral, roundish, nearly smooth. Calyx-teeth lanceolate, acute, recurved, longer than the corolla.—Found in the loose blowing sand of the sea-coasts of Sicily and England, flowering in June and July. Mr. Wigg first discovered and ascertained it near Yarmouth. Others have met with the plant, along the coast, from that place to Landguard fort. This little annual species is more truly subterraneous than our n. 29, the stems and flowers being often buried entirely in dry sand, the leaves only

peeping above the surface, so that the species might well remain in obscurity. In smoothness and general habit it comes so near to *glomeratum*, n. 65, that we have sometimes doubted its being more than a variety, caused by peculiarity of situation. But the *calyx-teeth* are lanceolate, by no means heart-shaped, and extend considerably beyond the *corolla*, which is closed so as to protect the organs of impregnation, which perform their functions under the dry sand. To provide against accident, each legume has two seeds, both which are often perfected. The petals, naturally rose-coloured, are rendered whitish by the exclusion of light. The *stipulas* are broad. *Leaflets* wedge-shaped, finely toothed, smooth.

72. *T. uniflorum*. Dwarf White Trefoil. *Linn. Sp. Pl.* 1085. *Amoen. Acad.* v. 4. 285. *Willd.* n. 62. *Sm. Fl. Græc. Sibth.* t. 752, unpubl. (*T. vernum* repens, flore albo exiguo; *Buxb. Cent.* 3. 18. t. 31. f. 2. *Melilotus cretica* humillima humifusa, flore albo magno; *Tourn.* Cor. 28. *Spica trifolia*; *Alpin. Exot.* 169. t. 168.)—Stems much shorter than the footstalks, depressed. Stalks single-flowered, aggregate, shorter than the points of the stipulas. Tube of the calyx longer than its awl-shaped teeth.—Native of Syria, Arabia, and the neighbourhood of Constantinople. Dr. Sibthorp observed it on the loftiest mountains of Crete, as well as in Lemnos, Greece, and Asia Minor. The root is perennial. *Stems* several, most like those of *T. castitofum*, n. 21, in their depressed position, but still shorter, closely invested with sheathing membranous stipulas, whose long, green, awl-shaped points extend beyond the axillary flower-stalks. The latter, a quarter or half an inch long, grow usually three together, from one common base, attended by very minute bractæas, each of them bearing a large white flower, full an inch long, whose calyx is tubular, ten-ribbed, nearly smooth, with rather unequal hairy teeth, half the length of the tube, having curved points. *Standard* broadish, erect, emarginate, longer than the wings or keel. *Footstalks* twice as long as the flowers, measuring full two inches, slightly hairy. *Leaflets* broadly obovate, smoothish, strongly ribbed, with fine, sharp, partly hooked, marginal teeth. It is very probable this species may have several seeds in each legume, and may belong to the second section. This point we want materials to determine.

SECT. 4. VESICARIA. Calyx inflated, swelling after flowering.

73. *T. spumofum*. Bladdery Trefoil. *Linn. Sp. Pl.* 1085. *Willd.* n. 63. *Ait.* n. 47. *Sm. Fl. Græc. Sibth.* t. 753, unpubl. (*T. caule nudo, glomerulis glabris, &c.*; *Bauh. Hist.* v. 2. 379, bad.)—Heads ovate. Calyx of the fruit ovate, tumid, smooth, with bristle-shaped recurved teeth. Bractæas membranous, lanceolate. Stem and branches erect.—Native of Languedoc, Italy, and Cyprus, in cultivated fields. *Root* annual. *Stems* numerous, spreading, a span high, leafy, branched, smooth like the whole plant, which has the general aspect of our common purple Clover, though totally different when examined. *Footstalks* from two to four inches long. *Leaflets* obovate, striated, toothed, marked with white. *Stipulas* pale, membranous, ovate, taper-pointed, entire. *Heads* solitary, terminal, ovate or roundish. *Corolla* long and slender, crimson, with a white tube; *standard* ovato-lanceolate, erect, entire. *Calyx* tubular, membranous, fish-coloured, very smooth, with five nearly equal, green, slender, spreading teeth, one-third the length of the tube. As the fruit advances, the tube becomes inflated, obliquely elliptical, with many red ribs, connected by fine reticulations; the teeth rather unequal, and recurved; the *corolla* remaining dry and hardened in the mouth of the calyx, and investing the legume, which

which is four-seeded, furnished with a long prominent beak. Each flower has a narrow lanceolate *bractea*; besides the five broader ones under the head. The latter are said to be wanting in *T. turgidum*, Bieberst. Taur. v. 2. 216, which is perhaps a variety, with paler *flowers*.

74. *T. recurvum*. Recurve-branched Trefoil. Willd. Enum. 795. "Waldst. et Kitaib. Hung. v. 2. 179. t. 165."—"Heads ovate in flower, oblong in seed. Calyx of the fruit inflated, naked. Stems erect. Branches recurved. Leaflets with bristly ferratures."—Native of Hungary. Biennial. Willd.

75. *T. reflexinatum*. Reverfed, or Salamanca, Trefoil. Linn. Sp. Pl. 1086. Willd. n. 64. Ait. n. 48. (*T. folliculatum*, five vesicularium, minus, purpureum; Bauh. Hist. 379. *T. pratense folliculatum*, flore inverfo; Barrel. Ic. v. 1. 73. n. 824. t. 872.)—Heads roundish. Flowers reverfed. Calyx of the fruit inflated, oblong, membranous, reticulated, downy, with two terminal spinous teeth. Stems prostrate.—Native of Germany, Flanders, Italy, all Greece, and the Archipelago, flowering in the spring. A smooth annual plant, much agreeing in habit with our English *glomeratum*, but larger, and the lateral *heads* of little crimson *flowers* are supported by longish stalks. Each *flower* is turned on its back. The *heads* in seed are twice as large, being then near an inch broad. *Calyx* of the fruit much enlarged, split lengthwise, pale green, beautifully reticulated with strong veins, terminating in two teeth only, and besprinkled with short tawny hairs. *Legumes* two-seeded. *Leaflets* obovate, ribbed, serrated. *Stipulas* short, abrupt, with lanceolate teeth. We presume *T. bicorne*, Forsk. Egypt.-Arab. 139, can hardly be different from the present species.

76. *T. tomentosum*. Woolly Ball Trefoil. Linn. Sp. Pl. 1086. Willd. n. 65. Ait. n. 49. (*T. fragiferum*; Rivin. Tetrap. Irr. t. 10. f. 2. *T. fragiferum tomentosum*; Magn. Monsp. 265. t. 264. *T. glomerulis tomentosus per caulium longitudinem*; Bauh. Hist. v. 2. 379.)—Heads globose. Calyx of the fruit inflated, globose, membranous, reticulated, densely woolly, with two minute terminal teeth. Stems prostrate.—Native of the south of France, as well as of Spain, Portugal, Barbary, Greece, and the Levant. Cultivated by Parkinson, before 1640. Ait. Root perennial. Stems numerous, from two to six inches long, branched, prostrate, but not creeping. *Leaflets* obovate, smooth, obtuse, neatly ribbed, bordered with minutely spinous teeth. *Stipulas* ovato-lanceolate, pointed. *Heads* lateral, stalked, shorter than the leaves and footstalks, hemispherical while in flower, in which state the tube of the *calyx* is very smooth, with three teeth, on the under side; gibbous and woolly on the upper, with two teeth. As the *fruit* ripens, each head becomes an aggregate ball, half an inch in diameter, of globular, crowded, densely woolly *calyces*, exquisitely reticulated with pink veins. Nothing can be more distinct from the last, yet their specific characters are not easy to define in a striking manner. Linnæus justly remarks, that this species comes nearer to *reflexinatum*, with which its *corolla* agrees, than to *fragiferum*, which it so much resembles in *fruit*. Some copies of Rivinus want the figure above cited, which was added to the plate after its first publication.

77. *T. fragiferum*. Strawberry-headed Trefoil. Linn. Sp. Pl. 1086. Willd. n. 66. Fl. Brit. n. 14. Engl. Bot. t. 1050. Curt. Lond. fasc. 2. t. 55. Fl. Dan. t. 1042. Ger. Em. 1208. (*T. fragiferum, folio oblongo*; Vaill. Paris. t. 22. f. 2.)—Heads roundish, on stalks much longer than the leaves. Calyx of the fruit inflated, globose, membranous, reticulated, nearly smooth, with two awl-

shaped, terminal, curved teeth. Stems creeping.—Native of low moist pastures or heaths, especially by rivers, in a black boggy soil, throughout Europe, from Sweden to Greece, and in Asia Minor, flowering in summer. Root perennial. *Herbage* so like *T. repens* as to be easily confounded therewith, except that the heads of *flowers* are smaller, and most generally pink; though oftener white in Sweden. *Stipulas* lanceolate, large, acute, white and membranous, with green veins. The *heads*, when perfecting *fruit*, strikingly resemble a hautbois strawberry, in size and colour, being larger than those of the last species, nearly smooth, and more richly coloured with red and green. The two spinous points of the *calyx* are also far more considerable. *Legume* with two seeds. This Trefoil is eaten by cattle, but its crop is late, and of trifling amount.

78. *T. physodes*. Bladder-headed Trefoil. Bieberst. Taur. v. 2. 217.—"Heads roundish. Calyx of the fruit inflated, membranous, downy, with five nearly equal bristle-shaped teeth, as long as the tube. Flower-stalks as long as the leaves. Stems procumbent, very smooth."—Native of Georgia. Chev. de Steven. Resembles the last, but is a distinct species. Stems scarcely taking root, long and slender, very smooth, not clothed with scattered spreading hairs as in *T. fragiferum*, any more than the *footstalks* and *flower-stalks*. *Stipulas* narrower, with a longer point. *Leaflets* larger, and of a brighter green. *Flower-stalks* shorter. *Flowers* with partial stalks a line in length, which render the *head* less dense. *Calyx-teeth* all nearly equal, resembling the two terminal teeth of the last. *Corolla* redder; with a longer and narrower *standard*. Such is the description of the author quoted. The *calyx-teeth* appear to us to afford the most decided specific distinction. *T. tumens* of the same writer is probably, as he suspects, only a more slender variety of his *physodes*, with longer stalks, smaller heads, and fewer *flowers*; but especially smaller *calyx-teeth*.

SECT. 5. LUPULINA. Standards of the flowers inflexed.

79. *T. montanum*. White Mountain Trefoil. Linn. Sp. Pl. 1087. Willd. n. 67. Ait. n. 51. Bieberst. Taur. v. 2. 218. (*T. folio longiore, flore albo*; Rivin. Tetrap. Irr. t. 12. f. 2. *T. pratense album*; Fuchs. Hist. 818. Ic. 472. *T. majus primum*; Clus. Hist. v. 2. 245. *T. majus flore albo*; Ger. Em. 1185.)—Spikes roundish. Standard awl-shaped, withering. Stem erect. Leaflets elliptical, with bristly teeth.—Native of dry mountainous pastures, in Germany, Switzerland, Savoy, and Crete, flowering in August. Dr. Pitcairn is said to have imported it in 1786. The root is woody and perennial. Stems about a foot high, silky as well as the *footstalks*. Lower *leaflets* broadest and obtuse; upper more lanceolate and very acute; all smooth above, light green, neatly ribbed. *Heads* stalked, at first hemispherical, but from the drooping of the lowermost *flowers*, as they fade, soon becoming elliptical, and near an inch long. *Corolla* white. Tube of the *calyx* pale, hairy about the top only; teeth about as long, awl-shaped, erect, rather unequal, remaining unchanged. The *standard*, like the other *petals*, does indeed remain in a dried hardened state, but scarcely more than in *T. hybridum, repens*, &c. to which the present species is so nearly related in every other respect, and so little like the rest of this section, that we could wish to remove it from hence, were not Linnæus and every other author against us.

80. *T. speciosum*. Purple and Yellow Trefoil. Zant Hay. Willd. n. 68. Ait. n. 52. Sm. Fl. Græc. Sibth. t. 754, unpubl. (*T. creticum elegantissimum, magno flore*; Tourn. Cor. 27.)—Spikes hemispherical. Standard kidney-shaped, toothed as well as the wings. Stems zigzag, decumbent,

TRIFOLIUM.

decumbent.—Found wild on the mountains of Crete, and in the isles of Cyprus and Zant. Mr. Hawkins observed this beautiful Trefoil as the only plant made into hay in the latter country. It might perhaps be tried with advantage in the dry open parts of the south of England. The root is annual, if we may judge by appearances. *Herbage* rather glaucous, nearly smooth. *Stems* spreading in every direction, much branched, purplish, about a foot high, but by culture they would certainly become more luxuriant. *Leaflets* obovate, toothed, emarginate. *Stipulas* lanceolate. *Heads* numerous, above an inch broad, on axillary stalks, longer than the leaves. *Calyx* smooth or hairy, its tube very short, and two upper teeth not longer; three lower (Willdenow erroneously says the upper) thrice as long, though shorter than the claws of the *petals*. *Standard* of a dull but elegant lilac hue, strongly ribbed, sharply toothed, withering and permanent, turning brown as it fades. *Wings* and *keel* yellow, shorter, the latter very small. The *flowers* are not reversed. Willdenow was misled by a dried specimen.

81. *T. agrarium*. Golden Trefoil. Linn. Sp. Pl. 1087. Willd. n. 69. Sm. Prodr. Fl. Græc. Sibth. n. 1814. Dickf. Dr. Pl. n. 80. Ehrh. Herb. n. 29. Fl. Dan. t. 558. (*T. aureum*; Pollich Palat. v. 2. 344. *T. montanum lupulinum*; Bauh. Prodr. 140. *Lotus montanus aureus*, *amplu lupuli capite*, *annuus*; Barrel. Ic. t. 1024, excellent.)—Heads oval, nearly globular. *Standard* elliptical, deflexed, entire. *Calyx*-teeth linear-awl-shaped, elongated, unequal, smooth. *Leaflets* all equally sessile. *Stem* erect.—Native of Sweden, Germany, Switzerland, Savoy, Greece, Crete, and Asia Minor, but not of England; generally in woods and coppices, in hilly or alpine situations, flowering in July and August. *Root* annual. *Stems* from four to twelve or fifteen inches high, scarcely branched. *Leaflets* obovate-oblong, more or less toothed, ribbed, shorter than their common stalk. *Stipulas* ovato-lanceolate. *Heads* one, two, or three, full as big as the last, about the top of the stem, on longish, stout, angular, hairy stalks. *Corolla* of a bright golden yellow, large, shining, turning brown by age or drying only; *standard* furrowed, inflexed. *Tube* of the *calyx* short, bell-shaped, smooth as well as the teeth, which are all more or less elongated, though the two uppermost are shortest. *Legume* small, elliptical, single-seeded. See the next species.

82. *T. spadicum*. Bay-coloured Trefoil. Linn. Sp. Pl. 1087. Willd. n. 70. Ait. n. 53. Curt. Mag. t. 557. Ehrh. Herb. n. 19.—Heads oval, nearly cylindrical. *Standard* elliptical, deflexed, entire. Three lower calyx-teeth awl-shaped, hairy; two upper obsolete, or very short. *Leaflets* all equally sessile. *Stem* erect.—Native of Sweden, in mountainous meadows at Gottfund, near Upsal, and other places, but rarely. *Linnaeus*. Whether it be found also in Germany, we are not certain; but whatever has been taken for this species in other parts of Europe, we have ascertained to be the foregoing, to which all its synonyms, except the above, belong; even, probably, *Lupulinum montanum, capitulis spadicis*; Rupp. Jen. 248. ed. 2. 256. The excellent figure in Curtis is therefore a great acquisition. Indeed the synonyms of *agrarium*, cited by *Linnaeus*, are wrong. *T. agrarium* of *Dodonæus*, *Pempt.* 576, is actually *Medicago lupulina*! Yet hence the specific name, a very inapplicable one, was taken. *T. spadicum*, sent to Kew by M. Thouin in 1778, is a hardy annual, flowering in July and August. It differs very decidedly from the last, in being a smaller more slender plant, though equally upright. The *heads* in particular are but half the size of that species, or if sometimes nearly as long, they are much more slender and cylindrical. The *flowers*,

though at first yellow, soon change to a peculiarly rich dark snuff-colour, and are essentially distinguished by the very small upper teeth of their *calyx*, as well as the long bristly hairs which clothe the lower ones.

83. *T. procumbens*. Hop Trefoil. Linn. Sp. Pl. 1088. Fl. Suec. ed. 2. 261. Willd. n. 71. Fl. Brit. n. 15. 792. and 1403. Compend. 111. Engl. Bot. t. 945. Pursh n. 9. Fl. Dan. t. 796. (*T. agrarium*; Hudf. 328. Curt. Lond. fasc. 3. t. 45. Mart. Rust. t. 121. *T. lupulinum*; Rivin. Tetrap. Irr. t. 10. f. 1. *T. pratense luteum, capitulo Lupuli, vel agrarium*; Raii Syn. 330. *Melilotus, qui Trifolium pratense luteum, capitulo Lupuli, vel agrarium*; Vaill. Paris. t. 22. f. 3.)—Heads oval, many-flowered. *Standard* furrowed. *Stems* procumbent. *Leaflets* obovate. *Common footstalk* elongated in the lower part.—Native of dry gravelly pastures and fields throughout Europe, from Sweden to Greece and Asia Minor, as also in North America, flowering in June and July. This is one of three common annual procumbent species, with yellow flowers, all of which have been confounded, in some respect or other, by *Linnaeus* and his disciples, and for the right understanding of which we acknowledge ourselves obliged to the Rev. Dr. Beeke, now dean of Bristol; see Engl. Bot. v. 18. Before the publication of Fl. Brit. v. 1 and 2, the present plant was taken, by all British botanists, for the *Linnaean agrarium*, n. 81. From that it differs in being much smaller, with procumbent branching stems, which are only occasionally supported by neighbouring plants, or a little ascending at the end. From the two following it differs in having oval, many-flowered heads, which assume in fading a hop-like aspect; but they have never the shining bronzed hue of the real *agrarium*, though the *standard*, like that, is furrowed. The *leaflets* are obovate, emarginate, toothed, smooth, slightly glaucous; their common *footstalk* much longer below the side leaflets than beyond them, the odd leaflet being sometimes nearly sessile. *Stipulas* half-ovate, acute, ribbed, entire, often fringed, *branches* and *flower-stalks* more or less hairy, especially upward. *Heads* at most half an inch long. *Calyx*-teeth unequal, but variable. *Corolla* lemon-coloured, changing to a light, tawny brown; the *standard* rounded, strongly furrowed. *Legume* small, elliptical, pointed, with one seed. Professor Martyn recommends this species to the notice of the agriculturist. Cattle are fond of it, but the crop will probably not be so abundant as the *Nonfuch*, or *Medicago lupulina*.

84. *T. minus*. Lesser Yellow Trefoil. Relh. Cant. 290. Fl. Brit. 1403. Compend. 111. Engl. Bot. t. 1256. Ait. n. 55. (*T. filiforme* β ; Fl. Brit. 793. *T. filiforme*; Ehrh. Herb. n. 49. *T. procumbens*; Hudf. 328. Curt. Lond. fasc. 5. t. 53. *T. lupulinum alterum minus*; Raii Syn. 330. t. 14. f. 3. *T. luteum minimum*; Ger. Em. 1186.)—Heads hemispherical. *Flower-stalks* straight and rigid. *Standard* nearly smooth. *Stems* prostrate. *Common footstalk* very short below the leaflets.—Very frequent in dry gravelly pastures, of England, Germany, and Switzerland, flowering in June and July. *Root* small, annual, often furnished with little fleshy knobs. *Stems* but little branched, from six to twenty-four inches long; most succulent and brittle in the larger variety, Engl. Bot. f. 1, which Dr. Beeke recommends as likely to prove a most valuable plant, for cultivation in upland pastures, being highly acceptable to cows and sheep. The central leaflet is elevated on a much more considerable partial stalk than in the foregoing or the following species; while the common *footstalk*, though variable, is in general remarkably short. *Leaflets* obovate and emarginate, or orbiculate, ferrated. *Flowers* from twelve to fifteen only, pale yellow, making a little hemispherical head, and all finally deflexed. *Standard* scarcely wrinkled or furrowed. *Legume* obovate,

obovate, obtuse. *Seeds* rarely more than one in each legume. *Calyx-teeth* very unequal, taper, hairy. Linnæus confounded this with the preceding, as appears by his herbarium. Others have thought it not distinct from the following; but we trust both those mistakes are now sufficiently cleared up.

85. *T. filiforme*. Slender Yellow Trefoil. Linn. Sp. Pl. 1088. Fl. Suec. ed. 2. 261. Willd. n. 72. Fl. Brit. 1404. Engl. Bot. t. 1257. (*T. lupulinum minimum*; Dill. in Raii Syn. 331. t. 14. f. 4.)—Heads lax, of few flowers. Flower-stalks capillary, wavy. Standard smooth. Stems prostrate. Leaflets all nearly sessile.—Native of rather moist gravelly pastures, among short grass, in Scania, as well as in England, flowering in June and July. Annual, like the last, but usually more prostrate, and much smaller, discoverable chiefly by its little yellow heads of *flowers*, entangled by their capillary *stalks*, among the radical leaves of short grass, on grass-plats, where the soil, though gravelly or sandy, is somewhat moist, and prone to bear moss. The *stems* are about a finger's length, numerous, slender, and branched. *Leaflets* narrow, nearly or quite sessile, on a short common *stalk*. *Flowers* from three to eight, drooping, each on a very slender, though elongated, partial stalk, and all leaning toward one side. *Calyx* quite smooth; its teeth less remarkably disproportioned than in *T. minus*. *Legume* obovate, sometimes two-seeded, scarcely covered by the withered pale-brown *corolla*, whose standard is not at all furrowed.—Sometimes the size of this species exceeds that of the smaller variety of the last; but if the above characters be attended to, no confusion can arise.

For *T. biflorum*, Linn. Sp. Pl. 1088, and *T. guianense*, Aubl. Guian. t. 309, see STYLOSANTHES, n. 4 and 5.

Linnæus, at the end of this genus, classes the various species according to their inflorescence, whether racemose, umbellate, fasciculate, capitate, or spiked; which serves to shew the impropriety of any generic character derived from thence.

TRIFORIUM, the gallery which usually goes round a church of the pointed style, over the side-aisles, so called by Gervastus and other ancient writers.

TRIFORMIS, in *Mythology*, an epithet given to *Diana*; which see.

TRIGA, in *Antiquity*, a kind of car, or chariot, with three horses.

The triga, in reality, was only drawn by two horses; so that it was properly a biga; but it had, besides, a third horse tied to the others, like a led horse, for change. Statius calls the third horse, *equus funalis*; Hefychius, *παρρηγορος*; and Dionysius Halicarnassensis, *σείρατος*.

We do not find the triga on any ancient monument; but it was a long time in use among the Romans, at their *ludi Circenses*. The Greeks, who first introduced it, soon abandoned it.

TRIGAL, in *Geography*, a town of Prussia, in Natangen; 9 miles S. of Lick.

TRIGAMY, a third marriage; or the state of a person who hath been married three times.

In the ancient church, trigamy was only allowed to such as had no children by their former marriages.

If, having children by one or both the former, they married again, after forty years of age, they were excluded from communion for five years. If they were only forty years old, the penance was but four years. See BIGAMY.

TRIGAULT, NICHOLAS, in *Biography*, a Jesuit missionary, was born at Douay in 1577, and having entered into the Society of Jesus, was sent, in 1610, on a mission to the East Indies. After a year's residence in China, he came to Europe for a recruit of missionaries, and returned with forty-

four associates. At length his life and labours terminated at Nanking in 1628. Of his works, which were numerous, we shall only mention his treatise entitled "De Christiana Expeditione apud Sinas ex Matthei Ricci Commentariis," 1615, 4to. This work, composed from the memoirs of Ricci, contains a description of the manners, laws, and customs of the empire of China, with an account of the acts of the Jesuits in that country. "A Chinese Dictionary," 3 vols. printed in China. Moreri.

TRIGEMINI NERVI, in *Anatomy*, the nerves of the fifth pair of the head. See NERVE.

TRIGINTAL. See TRENAL.

TRIGLA, or GURNARD, in *Ichthyology*, a genus of fish of the order of the Thoracici; the characters of which are, that the head is large, mailed, and marked by rough lines; the eyes large and round at the vertex; the mouth large; the palate and mandibles armed with sharpened teeth; and the nostrils double; the aperture of the branchiæ or gills large; the gill-cover spiny, and the gill-membrane seven-rayed; the body covered with scales, wedge-formed; the back straight, with a longitudinal furrow on both sides spinous; the lateral line near the back, straight; the abdomen thick, the ventral and pectoral fins large, and, in some species, near the pectoral fins are finger-shaped processes.

Species.

CATAPHRACTA; Red Gurnard. With double fingers; forked elongated snout, and octagonal mailed body: its length is about twelve inches: the longitudinal rows or divisions of the body are marked by as many serrated or aculeated lines; beneath the throat is a pair of ramified cirri; the pectoral fins and tail are pale-brown; the other fins pale-yellow, and nearly transparent; rays of the first dorsal fin running out beyond the membrane. A native of the Mediterranean.

LYRA; Red Gurnard. Silvery beneath, with triple fingers, and bifid denticulated snout. This is the Piper of the British Zoology. Its length is from one to two feet or more; its lateral line formed of small scales; its scales are small, pectoral fins large, slightly tinged with dull blue; tail of like colour; the other fins yellowish, with red rays. Native of the European seas, and considered as an excellent fish for the table.

GURNARDUS; Grey Gurnard. With triple fingers, and lateral line mailed with rounded whitish scales: length the same as that of the former: colour above deep grey, with blackish and red spots, beneath silvery; scales small, lateral line strongly marked with a series of larger, rounded, whitish scales, with a dusky central spot. Native of the European seas, and not uncommon about our own coasts, feeding on worms, insects, &c.

CUCULUS; Red Cuckow Gurnard. Silvery beneath, with triple fingers, and first dorsal fin marked by a black spot: an elegant species, about a foot in length, of a more slender shape than the last; colour on the upper parts a beautiful red, more or less distinctly marked by whitish transverse bars; scales extremely small; lateral line composed of pointed white scales edged with black, and a similar row on each side of the back; fins transparent; the first dorsal marked on the edge by a black spot, the second tinged near its edge with yellow. Native of the European seas, and esteemed as a food.

LUCERNA. With triple fingers, sub-bifid snout, and lateral line bifid at the tail. Native of the Northern seas, and conjectured to be a variety of *T. hirundo*.

HIRUNDO; Grey-brown Gurnard. Silvery beneath, with triple fingers, and very large olivaceous pectoral fins spotted with

with blue: the Sapphiric gurnard of the British Zoology; and stock-fish of Willughby. Of the same size with the grey gurnard; scales middle-sized, lateral line rough, pectoral fins very large, of a violaceous olive, sometimes richly edged and spotted with blue. Native of the European seas, occasionally springing out of the water to some distance by means of its large pectoral fins.

LINEATA; Red Gurnard. Marked above by dusky-fanguine spots, with the body crossed on each side by numerous perpendicular lines: the streaked gurnard of the British Zoology. Size and habit of *T. cuculus*; colour bright-red, abdomen silvery; on each side of the back, close to the base of the dorsal fins, a row of broad, serrated, short processes of a yellow colour; lateral line formed by a row of similar ones; scales small, sides above and below the lateral line marked into very numerous, narrow perpendicular divisions; pectoral fins large, rounded, of a dusky-brown, spotted with black; rest of the fins yellowish, with a tinge of red, especially the tail, which is slightly lunated. Native of the Mediterranean sea.

ASIATICA; Silvery Gurnard. With quadruple fingers; body smooth, snout smooth and prominent; anterior gill-covers serrated; pectoral fins falcated. Native of the Indian seas.

EVOLANS; Springing Gurnard. With triple fingers, and three serrated spines between the dorsal fins; allied to the *T. volitans*, but furnished with three separate pectoral processes; the pectoral fins very large, but less than those of the next species; the pectoral fins blackish. Native of the American seas.

VOLITANS; Red Gurnard. With aculeated scales, very large pectoral fins spotted with blue, and sextuple fingers connected by a membrane; the *Milvus* of Salvan, Aldrovandus, Willughby, &c. This is a highly singular and beautiful species; length about twelve inches; colour crimson above, pale or whitish beneath; head blunt, armed on each side with two very strong large spines, pointing backwards; the whole body covered with very strong carinated and sharp-pointed scales, hardly separable; first dorsal fin pale violet, crossed with deeper lines, and at its origin two separate rays longer than the rest; second dorsal fin pale, with the rays barred by brown; pectoral fins very large, transparent, of an olive-green, richly varied with numerous bright-blue spots, six pectoral processes, not separate, but united, and appearing like a small fin on each side of the thorax; tail pale violet, with the rays crossed by dusky spots, and strengthened on each side of the base by two obliquely transverse bony ribs or bars. Native of the Mediterranean, Atlantic, and Indian seas, where it swims in shoals, and is often seen flying out of the water to a considerable distance.

JAPONICA, or ALATA; the Japanese Gurnard. With eleven fingers on each side, palmated by a membrane. About four inches in length; head angular; lower jaw and hinder margin of the gill-covers furnished with two strong spines. Native of the Japanese sea.

ADRIATICA. With the body verticillated by scales, with aculeated lateral line; pectoral fins black beneath, and triple fingers; supposed to be a variety of *T. lineata*, and differing from it by being varied with bands of black spots, and having the spots of the pectoral fins disposed into two transverse bands, the edges being marked beneath by a row of blue spots. Observed in the Adriatic sea.

MINUTA. With triple fingers, and bicarinated back. A small species: head hard and rough, emarginated and denticulated in front, and furnished with two spines above the eyes; posterior gill-covers spiny; pectoral and ventral

fins very sharp-pointed; tail rounded. Native of the Indian seas.

CAROLINA; Whitish Gurnard. Speckled with red, with triple fingers, and brown pectoral fins transversely banded with black; length about ten inches; dorsal fins pale orange spotted with brown; the first fin marked by a black spot; tail slightly rounded at the end, and crossed by three or four rows of brown spots. Native of the American seas.

CAVILLONE; Red Gurnard. With a single spine above each eye, and six on each side of the back of the head. Length about three inches; body covered with small, denticulated, rough scales; colour red; pectoral fins white above, and dark-green or olive beneath. Native of the Mediterranean, and known on the French coasts by the appellation of Cavillone.

PUNCTATA; Rose-red Gurnard. With blood-red specks, and broad obtuse head, spined on the hind-part. Length about eight inches; head broad, obtuse, and furnished behind with strong spines; scales middle-sized; pectoral fins very large, rounded, and of a dusky-blue colour, speckled with red, and inclining to yellow towards their tips; rest of the fins and tail yellow speckled with red. Native of the American seas.

PINI; Red Gurnard. With triple fingers, and body marked on each side by numerous transverse convex lines. Similar in habit to that of *T. piper*, but in other respects much allied to *T. lineata*: colour red, with yellowish abdomen; scales small; dorsal and lateral line aculeated, from which pass perpendicular convex lines terminating rather obtusely above and below, and bearing some resemblance to pine-leaves; fins and tail yellowish; ventral fins red, with an obscure blueish cast. Native region unknown.

CHABRONTERA. With the body mailed beneath, and red fins. Allied to the *T. cataphracta*, but differing by not having the body marked into an octagonal form; the under parts only being furnished with bony divisions: above the snout are several spines pointing backwards: and above and below the tail are also placed three spines: all the fins, except the tail, are of a bright red. Native of the Mediterranean. Shaw's Zoology, vol. iv. pt. 2.

TRIGLA, in *Mythology*, the name of a divinity among the Germans with three heads, which was undoubtedly Diana Trivia, or Hecate.

TRIGLAND, JAMES, in *Biography*, a learned theologian, was born at Haerlem in 1652, and educated at the universities of Harderwyk and Leyden, where he diligently studied the Oriental languages. He became a candidate for the ministry in 1676, and having exercised it for some time at different places, he at length settled at Leyden, where, in 1686, he was made professor of theology, to which was afterwards added the office of explaining Hebrew antiquities. He was twice nominated rector of the university by William prince of Orange, by whom he was greatly esteemed. He died in 1705. His erudition was profound, and his works, on literary and theological subjects, various. Moreri.

TRIGLOCHIN, in *Botany*, very well named by Linnaeus, from *τρις*, three, and *γλωχιν*, the point of a dart, or arrow, alluding to the three sharp lower ends of the capsule-valves, which, when started from their original situation, give to the fruit the appearance of a triple-barbed dart; whence also its English name of Arrow-head, or Arrow-grass.—Linn. Gen. 179. Schreb. 239. Willd. Sp. Pl. v. 2. 264. Mart. Mill. Dict. v. 4. Sm. Fl. Brit. 398. Ait. Hort. Kew. v. 2. 325. Brown Prodr. Nov. Holl. v. 1. 343. Pursh 247. Juss. 47. Lamarck Illustr. t. 270. Gartn. t. 84. (Juncago; Tourn. t. 142. Mich. Gen. K k

Gen. t. 31.)—Class and order, *Hexandria Trigynia*. Nat. Ord. *Tripetaloidæ*, Linn. *Junci*, Juss. *Alismaceæ*, Brown.

Gen. Ch. *Cal.* Perianth inferior, of three roundish, obtuse, concave, deciduous leaves. *Cor.* Petals three, ovate, concave, obtuse, similar to the calyx. *Stam.* Filaments six, very short; anthers at the back of the filaments, shorter than the corolla. *Pist.* Germen superior, large; styles none; stigmas three or six, reflexed, feathery. *Peric.* Capsule ovate-oblong, obtuse, with as many cells as there are stigmas, bursting at the base, with acute valves. *Seeds* solitary, oblong, erect.

Obf. Gærtner and Brown, perhaps more justly, consider the fruit as an assemblage of three or six single-seeded capsules, without valves. Analogy confirms this opinion.

Ess. Ch. Calyx of three leaves. Petals three, like the calyx. Styles none. Capsule superior, of three or six cells, separating at the base. Seeds solitary.

1. *T. palustre*. Marsh Arrow-grafs. Linn. Sp. Pl. 482. Willd. n. 1. Fl. Brit. n. 1. Engl. Bot. t. 366. Fl. Dan. t. 490. Leers 92. t. 12. f. 5. Pursh n. 2? (*Gramen aquaticum spicatum*; Ger. Em. 13.)—Capsules of three cells, nearly linear; tapering at the base. Stigmas erect.—Native of boggy inundated places, in various parts of Europe, particularly towards the North. Common in England, flowering in July. The root is fibrous, perennial. Leaves radical, two-ranked, erect, sheathing, linear, channelled, smooth, six inches high. Flower-stalk radical, simple, round, or partly angular, taller than the leaves, terminating in a long, linear, simple, slender cluster, of small green flowers. These are succeeded by upright prismatic capsules, slightly elliptical, half an inch long, separating at the base into three sharp points.

2. *T. bulbosum*. Bulbous Arrow-grafs. Linn. Mant. 226. Willd. n. 2. Jacq. Ic. Rar. t. 454.—Capsules of three cells, linear-lanceolate, tapering upwards. Stigmas spreading. Root bulbous.—Native of the Cape of Good Hope. Smaller than the foregoing, with shorter leaves, and ovate bulbous roots, concealed by the numerous fibrous remains of old leaves. Germen with three spreading points, each crowned by a little starry stigma. Capsule rounded at the base.

3. *T. mexicanum*. Mexican Arrow-grafs. Kunth Nov. Gen. and Sp. v. 1. 244.—Capsules of six cells. Spike very long. Leaves cylindrical. Root tuberous.—Native of moist exposed situations in New Spain, flowering in January. Root perennial, oblong, horizontal, the thickness of a swan's quill, very densely clothed with the rudiments (rather probably the remains) of leaves. All the leaves are radical, linear, narrow, bluntish, smooth, two or three inches long, sheathing at the base. Stalk erect, round, smooth, six or eight inches high, including its cluster, which measures half as much. Stamens six. Stigmas red. Two or three of the cells, or capsules, are generally abortive. Kunth.

4. *T. procerum*. Tall Arrow-grafs. Brown n. 1.—“Capsules of six cells. Stigmas linear, recurved. Spike very long. Leaves linear, rather cylindrical at the base.”—Found by Mr. Brown, near Port Jackson, as well as in the tropical part of New Holland.

5. *T. maritimum*. Sea Arrow-grafs. Linn. Sp. Pl. 483. Willd. n. 3. Fl. Brit. n. 2. Engl. Bot. t. 255. Pursh n. 1. Fl. Dan. t. 306. (*Gramen marinum spicatum*; Lob. Ic. 16. *G. spicatum alterum*; Ger. Em. 20.)—Capsules elliptical, of six cells, rounded at the base. Leaves semicylindrical. Root tuberous.—Native of salt-marshes, in England and other parts of Europe, as well as North America, flowering throughout the summer. Much

stouter in habit than our other British species, n. 1, from which also it is readily known by its short rounded capsules, and their six cells. Cattle are said to eat this plant with avidity.

6. *T. triandrum*. Triandrous American Arrow-grafs. Michaux Boreal-Amer. v. 1. 208. Pursh n. 3.—“Stamens three. Capsules roundish, triangular. Leaves almost fetaceous, nearly as tall as the stalk and its spine.”—Native of overflowed marshes, near Charlestown, Carolina. Michaux.

7. *T. dubium*. Doubtful Arrow-grafs. Brown n. 2.—“Capsules of three, oblong-cylindrical, distinct cells; one or two of them here and there abortive. Spike elongated.”—Gathered in the tropical part of New Holland by Mr. Brown.

8. *T. decipiens*. Deceitful Arrow-grafs. Brown n. 3.—“Capsules roundish, of three cells, with three dorsal keels: pointless at the summit: three alternate ones abortive, without stigmas. Leaves semicylindrical. Stipula intrafoliaceous, undivided.”—Found in New South Wales, Van Diemen's island, and the south part of New Holland by Mr. Brown. The abortive cells look like partitions.

9. *T. mucronatum*. Pointed-fruited Arrow-grafs. Brown n. 4.—“Capsules somewhat turbinate; the points of their three perfect cells divaricated; three abortive ones like partitions. Leaves nearly cylindrical. Spike of few flowers.”—Gathered by Mr. Brown, without flowers, on the southern coast of New Holland.

TRIGLOCHINE, in *Anatomy*, a synonym of the tricuspidal valve. See TRICUSPID.

TRIGLYPHS, formed from *τριγλωφος*, *q. d.* three engravings, from *γλωφος*, *sculpo*, in *Architecture*, a sort of ornaments repeated at equal intervals in the Doric frieze. Each triglyph consists of two entire gutters, or channels, cut to a right angle, called *glyphes*, and separated by three interstices, called by Vitruvius *femora*, from each other, as well as from two other half-channels which are at the sides.

The ordinary proportion of triglyphs, is to be a module broad, and one and a half high. But this proportion, M. le Clerc observes, sometimes occasions ill-proportioned intercolumnations in the porticoes; for which reason he chooses to accommodate the proportion of his triglyphs to that of the intercolumnation.

The intervals between the triglyphs are called *metopes*.—Under the channels, or glyphs, are placed guttæ, or drops.

The triglyphs make the most distinguishing character of the Doric order. Some imagine them originally intended for the conveyance of the guttæ that are underneath them: others fancy they bear some resemblance to a lyre, and thence conjecture the ornament to have been originally invented for some temple sacred to Apollo. See DORIC.

TRIGLYPH, *Capital of a*. See CAPITAL.

TRIGLYPTON, in *Ancient Geography*, a town of Italy, on the other side of the Ganges, in the country called Randa-marcotta.

TRIGNO, in *Geography*, a river of Naples, which runs into the Adriatic, 12 miles N.W. of Termoli.

TRIGOLO, a town of Italy, in the department of the Upper Po; 5 miles S.E. of Crema.

TRIGON, TRIGONUS, formed from *τριγωνος*, *triangle*, in *Geometry*, a triangle.

TRIGON, in *Astrology*. See TRIPPLICITY.

TRIGON, in *Astronomy*, denotes an aspect of two planets, wherein they are 120 degrees distant from each other: this is called also *trine*.

The trigons of Mars and Saturn are by astrologers held malific aspects.

TRIGON, *Trigonum*, was also a musical instrument, used among the ancients.

The trigon was a kind of triangular lyre, or harp, and was invented by Ibycus.

It was used at feasts, and played on by women, who struck it either with a quill, or beat it with small rods of different lengths and weights, to occasion a diversity in the sounds. See TRIGONUM.

TRIGON or *Triangle of Signs*, is the name of an instrument used for drawing the arcs of the signs upon dials: it may be made of brass or any other solid matter, and of any size at pleasure. This instrument is constructed after the following manner: first draw the line *ab* (*Plate XXI. Astronomy, fig. 5.*) representing the axis of the world, and *ac* perpendicular to it, representing the radius of the equinoctial; and about the point *a* describe the circular arc *dce* at pleasure. Then reckon $23\frac{1}{2}^{\circ}$ both ways from the point *c* upon the said arc for the sun's greatest declination, and draw the two lines *ad*, *ae*, for the summer and winter tropics: likewise draw the line *de*, which will be bisected by the radius of the equinoctial in *o*; about which point, as a centre, draw a circle, whose circumference passes through the points *d* and *e* of the tropics, and divide the circumference into 12 equal parts, beginning from *d*: through each point of division equally distant from *d* and *e*, draw occult lines parallel to the radius of the equinoctial circle: these lines will intersect the arc *dce* in the points, through which and the centre *a*, lines being drawn, will represent the beginnings of the signs of the zodiac at 30° distance from each other. But to divide the signs into every 10th or 5th degree, the circumference must be divided into thirty-six or seventy-two equal parts. The characters of the signs are annexed as in the figure; and when the trigon is divided into every 10th or 5th degree, the letter of the month is placed to the first 10° of each sign agreeing with it. However, this instrument may more readily be made by means of a table of the sun's declination; for having drawn the two lines *ab* and *ac* at right angles, lay the centre of a protractor on the point *a*, with its limb towards the point *c*; and keeping it fixed, count $23\frac{1}{2}^{\circ}$ on both sides of the radius *ac* for the tropics of \varnothing and ♋ , $20^{\circ} 12'$ for the beginnings of the signs \varnothing , ♈ , ♉ , and ♊ , and $11^{\circ} 30'$ for ♌ , ♍ , ♎ , and ♏ . And thus the spaces for each sign may be graduated in every 10th and 5th degree by means of a table. The equinoctial points of φ and \sphericalangle are placed at the end of the radius of the equinoctial *ac*.

TRIGON of *Diurnal and Nocturnal Arcs*. These are drawn upon sun-dials by curve-lines, like the arcs of the signs, and by means of them the shadow of the style shews how many hours the sun is above the horizon, in any given day, &c.

The trigon of signs is the same for all latitudes, the sun's declination being the same for the whole earth; but the diurnal arcs are different for every particular latitude, and as many of these arcs are drawn upon a dial, as there are hours of difference between the longest and shortest days of the year. For the construction of this sort of trigon, draw the right line *RZ* (*fig. 6.*) for the radius of the hour-line of 12, or of the equinoctial: and about the point *R*, with any opening of the compasses at pleasure, describe the circular arc *TSV*, and lay off both ways on it from the point *S* two arcs, *SV*, *ST*, each equal to the complement of the latitude. Then draw the right line *TXV*, and about the point *X*, as a centre, describe the circumference of a circle *TZVY*, which divide into forty-eight equal parts by dotted

lines, drawn parallel to the radius of the equinoctial *RZ*: then these lines will intersect the diameter *TXV* in points, through which and the point *R* you may draw the radii of the hours. The angles which all the radii make at the point *R* may be found trigonometrically by the following proportion: as radius is to the co-tangent of the latitude, so is the tangent of the difference between the semidiurnal arc at the time of the equinox, and the arc proposed to the tangent of the sun's required declination.

The trigon of signs may be annexed to a rule or index *A* (*fig. 7.*) in order to draw the arcs of the signs upon great dials. The diurnal arcs may be drawn likewise upon this trigon, but the arcs of the signs and diurnal arcs too must not be drawn upon one and the same dial, for avoiding confusion. In the centre of the index there is a small hole, through which is put a pin, that the instrument may turn about the centre of a dial. The trigon slides along the index, and may be fixed in any part of it by means of the screw *B*. The arcs of the signs with their characters are round about the circumference, and there is a fine thread fixed in the centre, in order to extend over the radii quite to the hour-lines of a dial.—For a farther account of these instruments and their use, see Bion's *Constr. and Use of Math. Instr.* by Stone, p. 231, &c.

TRIGONAL LEAF, among *Botanists*. See LEAF.

TRIGONAL Numbers. See TRIANGULAR Numbers.

TRIGONELLA, in *Botany*, the diminutive of *trigona*, three-sided, alluding to its little triangular flower.—Linn. Gen. 388. Schreb. 510. Willd. Sp. Pl. v. 3. 1398. Mart. Mill. Dict. v. 4. Sm. Prodr. Fl. Græc. Sibth. v. 2. 107. Ait. Hort. Kew. v. 4. 397. Juss. 356. Lamarek Illustr. t. 611. Gært. t. 152. (*Fœnum græcum*; Tourn. t. 230.)—Class and order, *Diadelphia Decandria*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminosæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, bell-shaped, divided half way down into five little, awl-shaped, nearly equal, teeth. *Cor.* papilionaceous, apparently tripetalous; standard nearly ovate, obtuse, reflexed and spreading; wings two, ovate-oblong, reflexed and spreading outwards, in such a manner that, with the standard, they almost constitute a regular tripetalous corolla; keel very short, obtuse, occupying the centre of the flower. *Stam.* Filaments in two distinct sets, one simple, one in nine segments, short, ascending; anthers simple, roundish. *Pist.* Germen ovate-oblong, compressed; style simple, ascending; stigma simple. *Peric.* Legume linear-oblong, somewhat curved, compressed, much longer than the calyx, of one cell, and two valves. *Seeds* numerous, roundish.

Ess. Ch. Standard and wings nearly equal, spreading, in the form of a tripetalous corolla. Stigma smooth. Legume of one cell, with many seeds, compressed, longer than the calyx.

Obs. Linnæus remarks that the figure of the corolla alone stamps this as a distinct genus. We could wish that character were more evident. The closest affinity exists between some *Trigonellæ*, which we shall indicate, and the *Meliloti*, constituting the first section of TRIFOLIUM. See that article.

The species of this genus, seventeen in Willdenow, are herbaceous, for the most part annual, strong-scented plants, with three leaflets on a stalk, and indeed the general habit of *Trifolium*. Their flowers are tufted rather than properly capitate, usually yellow. *T. Fœnum græcum* has blueish flowers, which are quite sessile, or truly capitate, their corolla that of a *Trifolium*, and their beaked legume splitting chiefly along its upper margin. This species certainly does not well accord with the rest.

1. *T. ruthenica*. Small, or Russian, Fenugreek. Linn. Sp. Pl. 1093. Willd. n. 1. Ait. n. 1; excluding the synonym of Gmelin, which Linnæus subsequently discovered to belong to *Medicago falcata*. (Lotus n. 156; Amm. Ruth. 119, and Melilotus n. 159; *ibid.* 120.)—Legumes stalked, crowded, drooping, linear-lanceolate, straight. Leaflets lanceolate-obovate, abrupt, with three terminal teeth.—Common throughout Siberia. A hardy perennial, flowering in June and July, sent by the Siberian botanist Amman, to Miller, before the year 1741. *Herb* nearly smooth. *Stems* numerous, spreading or decumbent, much branched, round, leafy. *Leaves* alternate, stalked, of three narrow, delicate leaflets, tapering and entire towards the base, toothed about the extremity; the odd one largest, an inch long, on an elongated partial stalk. *Stipulas* small, awl-shaped. *Flowers* yellow within, purplish externally, in short, axillary, capitate clusters. *Standard* broad, almost orbicular. *Calyx* hairy, bell-shaped, with five lanceolate, rather unequal, teeth. *Legume* half an inch long, compressed, with four or five kidney-shaped seeds. We know of no figure of this species.

2. *T. platycarpus*. Round-leaved Fenugreek. Linn. Sp. Pl. 1093. Willd. n. 2. Ait. n. 2. (T. n. 34; Gmel. Sib. v. 4. 25. t. 9. Melilotus n. 158; Amm. Ruth. 119. "Comm. Petrop. v. 8. 209. t. 12. Comm. Goett. v. 1. 213. t. 13.")—Legumes stalked, crowded, pendulous, half-oval, compressed. Stem diffuse. Leaflets roundish-obovate, sharply ferrated.—Native of Siberia. Sent to England by Dr. Amman, with the foregoing. A hardy biennial, flowering from June to September. *Stem* angular. *Leaflets* often an inch long, and nearly as broad, smooth. *Stipulas* half arrow-shaped, toothed. *Flowers* like the last, but larger, sweet-scented, yellow streaked with brown. *Calyx* hairy. *Legume* above an inch long, somewhat veiny, many-seeded.

3. *T. hybrida*. Mule Fenugreek. Pourret in Act. Tolof. v. 3. 331.—Legumes stalked, rather crowded, pendulous, half-oval, compressed, reticulated with prominent veins. Stem diffuse. Leaflets roundish-obovate, nearly entire.—Native of the south of France. A specimen from the author cited shews this to be nearly related to the last; but the *legume*, though full-grown, is but one-third of an inch long, most elegantly marked with elevated reticulations. The *leaves* too are smaller, and scarcely toothed or wavy.

4. *T. striata*. Striated, or Abyssinian, Fenugreek. Linn. Suppl. 340. Willd. n. 3.—Legumes umbellate, linear, compressed, incurved, reticulated; their common stalk longer than the leaves. Leaflets wedge-shaped, toothed.—Native of Abyssinia, according to the herbarium of Linnæus, who cultivated the plant at Upsal. *Root* annual. *Stems* square, diffuse. *Leaflets* half an inch long, ribbed, sharply toothed, as well as the *stipulas*. *Flowers* light yellow, about six in each long-stalked head, or umbel. *Legumes* an inch long, narrow, slightly hairy, with six or seven seeds.

5. *T. polycerata*. Many-horned, or Spanish, Fenugreek. Linn. Sp. Pl. 1093. Willd. n. 4. Ait. n. 3. (Fœnum græcum sylvestre; Ger. Em. 1196. Lob. Ic. v. 2. 45.)—Legumes nearly sessile, crowded, erect, nearly straight, longer than the leaves; the common stalk pointless.—Native of Spain, Italy, and the south of France. Cultivated here in the middle of the seventeenth century. Annual. *Stem* branched from the bottom, diffuse, twelve or eighteen inches long. *Leaflets* obovate, toothed. *Flowers* yellow, three or four together in little, axillary, almost sessile, heads. *Calyx* hairy, as well as the young leaves. *Legumes* three or four,

an inch and half long, narrow, clothed with close hairs, and beautifully reticulated.

6. *T. hamosa*. Hooked Egyptian Fenugreek. Linn. Sp. Pl. 1094. Willd. n. 5. Ait. n. 4. Sm. Fl. Græc. Sibth. t. 764, unpubl. (Melilotus ægyptius, Alchimelech vocatus; Alpin. Ægypt. 122. t. 124. Bauh. Hist. v. 2. 357.)—Legumes racemose, stalked, declining, recurved, nearly cylindrical, even, hairy; their common stalk spinous, longer than the leaf.—Native of Egypt, from whence the Linnæan specimen was brought by Hasselquist. Dr. Sibthorp met with it in Cyprus. A small, diffuse, annual, hairy herb, whose *leaflets* are wedge-shaped, strongly toothed, on a long common stalk. *Flowers* deep yellow, fragrant, in stalked clusters, half an inch long. *Legumes* an inch long, curved into a femicircle, quite destitute of reticulations, both futures peculiarly dilated, pale and even; the sides green and very hairy. The *seeds* are said to be used by the Egyptians, in fomentations, for all kinds of pains.

7. *T. torta*. Twisted Egyptian Fenugreek.—Legumes umbellate, cylindrical, twisted, reticulated; their common stalk much shorter than the leaves. Leaflets inversely heart-shaped, toothed, obscurely ribbed.—Native of Egypt, from whence Dr. Delisle favoured us with wild specimens, under the name of *hamosa*, but they do not agree with the Linnæan specimen, nor with the specific character, any more than with the figure in *alpinus*, as far as any thing can be determined therefrom. The plant of Dr. Delisle is as smooth as possible in every part. Its *stems* round, branched, firm, hardly a span high. *Leaves* on long footstalks, rather fleshy; *leaflets* all of equal size and shape, one-third of an inch long; the odd one on a stalk nearly its own length. *Flowers* yellow, drooping, five or six in each axillary umbel, whose stalk is not half the length of the adjoining common footstalk, and, after flowering, becomes very stout, round, and firm. *Legumes* drooping, rather more than half an inch long, rigid, pale, slightly twisted spirally, quite destitute of hairiness, but marked with peculiar oblong reticulations of elevated veins.

8. *T. flexuosa*. Zigzag Egyptian Fenugreek. Delisle Ægypt. MSS.—Legumes in nearly sessile umbels, compressed, reticulated, zigzag. Leaflets inversely heart-shaped, toothed, obscurely ribbed.—Native of Egypt. A figure of this plant was defined, under the above name, for the great work on Egypt, but we have not heard that it has proceeded so far. This species very closely accords with the last in habit, and precisely in foliage, but the *umbels* are nearly sessile, *flowers* smaller, *calyx-teeth* longer and more pointed. The *legumes* are essentially different, not only in their compressed figure, but in being strongly folded, or plaited, as it were, into a zigzag position. If expanded, they might possibly equal the length of the last. Both appear to be annual, and perhaps grow prostrate.

9. *T. hirsuta*. Hairy Cape Fenugreek. Thunb. Prodr. 137. Willd. n. 6.—"Legumes racemose, reflexed. Leaflets oblong, obtuse, villous."—Gathered by Thunberg, at the Cape of Good Hope.

10. *T. villosa*. Villous Cape Fenugreek. Thunb. Prodr. 137. Willd. n. 7.—"Legumes racemose, villous. Leaflets obovate, smooth."—From the same country.

11. *T. armata*. Thorny-branched Cape Fenugreek. Thunb. Prodr. 137. Willd. n. 8.—"Legumes lateral, hairy. Leaflets ovate, smooth. Branches becoming spinous."—Native also of the Cape.—We have no further information concerning the three last species.

12. *T. spinosa*. Thorny-stalked Fenugreek. Linn. Sp. Pl. 1094. Willd. n. 9. Ait. n. 5. (Fœnum græcum

TRIGONELLA.

cum sylvestre polyceraton majus creticum; Breyn. Cent. t. 33. f. 1.)—Legumes linear, declining, compressed, falcate, transversely veiny, two or three on each very short, axillary, spinous-tipped stalk.—Native of Crete. A hardy annual, cultivated in England above one hundred years ago, flowering in July and August. The stem divides at the base into several rather slender, smooth, simple, diffuse branches, a span long. *Leaflets* obovate, toothed, emarginate, equal, tapering at the base. *Flowers* small. *Legumes* naked, an inch and a half long, narrow, with transverse, interbranching, but scarcely reticulated, veins. Their length exceeds that of the leaves and footstalks.

13. *T. corniculata*. Horse-shoe Fenugreek. Linn. Sp. Pl. 1094. Willd. n. 10. Ait. n. 6. Sm. Fl. Græc. Sibth. t. 761, unpubl. (*Melilotus italica*; Fuchf. Hist. 528. *M. major*; Trag. Hist. 592. *M. coronata*; Ger. Em. 1205.)—Legumes numerous, crowded, declining, compressed, falcate, transversely veiny, on a spinous-tipped axillary stalk, longer than the leaves.—Native of the south of Europe. A hardy annual, cultivated by Gerarde, flowering in June and July. The stems are numerous, a foot high, nearly erect, zigzag, leafy, and many-flowered, smooth, or a little hairy. *Stipulas* nearly entire. *Leaflets* obovate, toothed. *Flower-stalks* spreading, stout, each bearing a dense, umbellate tuft, of about ten yellow, highly fragrant flowers, like a little *Coronilla*. *Corolla* thrice the length of the calyx. *Legume* only an inch long, though twice as broad as the last, which it imitates in the style of its veins. *Seeds* kidney-shaped, rough. The modern Greeks know this *Trigonella* by the name of *νικάνι*. Dr. Sibthorp observed it in Rhodes, the Morea, and other places in the Levant.

14. *T. elatior*. Tall Fenugreek. Sm. Prodr. Fl. Græc. Sibth. n. 1830. Fl. Græc. t. 762. (*Melilotus syriaca odora*; Lob. Ic. v. 2. 42. f. 2. *Trifolium italicum*, five *Melilotus italica*, *corniculis incurvis*; Bauh. Hist. v. 2. 372. f. 2. *Lotus sylvestris*, ex codice cæsareo; *ibid.* 373.)—Legumes racemose, pendulous, linear, slightly curved; their stalk longer than the leaves, pointless. Stems erect. *Stipulas* lanceolate, toothed.—Found by Dr. Sibthorp in Asia Minor, and the isle of Cyprus. Annual. The stem is twice or thrice as tall as the last, and less zigzag. *Leaflets* three or four times as large, often an inch long, obovate, but varying in breadth, sharply toothed, except about the base. *Stipulas* copiously and deeply toothed, or jagged. *Flowers* and *legumes* in clusters about an inch in length; their common stalks of a longer proportion than the foregoing, destitute of a spinous point. *Legumes* compressed, nearly or quite straight, and, as far as we can judge of them in a half-ripe state, not marked with elevated veins. *Seeds* six or seven. A specimen of this is attached, in the Linnean herbarium, to the *corniculata*, from which it is very distinct, and, except its legume and seeds, more nearly allied to the Melilots, (see TRIFOLIUM, sect. 1.) than to the other *Trigonella*. Dr. Sibthorp very justly suspected the *λωτος αργεως* of Dioscorides to be *T. corniculata*, or near it; nor can we doubt this *T. elatior* being the very plant. If the famous old manuscript at Vienna be admitted as authority, it confirms our opinion. The figure in John Bauhin, copied from thence, though rudely and unscientifically drawn, is sufficiently indicative of this species. From what occurs, here and there, in the old botanical writers, this *Trigonella*, neglected by modern systematics, appears to be not of rare occurrence in the south of Europe, and may possibly be met with in botanic gardens. It is well worth the notice of the farmer, for experiment at least, on account of its luxuriant growth, and the qualities of many

plants to which it is related; as they may possibly be found in great perfection in this species.

15. *T. spicata*. Spiked Fenugreek. Sm. Prodr. Fl. Græc. Sibth. n. 1831. Fl. Græc. t. 763, unpublished.—Legumes spiked, pendulous, short, hairy, on a spinous-tipped axillary stalk, longer than the leaves. *Stipulas* awl-shaped, entire.—Gathered by Dr. Sibthorp in the isle of Seriphus. This is an annual species, with many stems, about a foot high, which partakes of the same ambiguity, respecting the Melilots, as the foregoing. At least the shortness of the legume, and consequent small number of seeds, answers best to *Trifolium*. But we want certain information on this point, having not seen any ripe fruit. The habit of the plant, especially the spinous flower-stalk, belongs to *Trigonella*. The leaflets are half an inch in length, obovate-oblong, narrow, smooth, serrated. *Flowers* yellow, in crowded clusters resembling spikes, half an inch long, becoming afterwards twice that length, beset with the numerous reflexed beaks of the crowded pendulous legumes. The lowest tooth of the calyx is very short; the four others long and awl-shaped.

16. *T. parviflora*. Small-flowered Fenugreek.—Legumes in capitate clusters, ascending, linear-lanceolate, compressed, slightly curved, with about two seeds; their stalk as long as the leaves, pointed. Stem ascending. *Stipulas* ovate, pointed, toothed.—Found by M. Du Cros, in a meadow near the mill of Coinsins, in Switzerland. The stems are a span high, decumbent at the base. Size and aspect of the plant like *T. monspeliaca*, hereafter described, but some of its characters accord more with *elatior*, to which it has otherwise little resemblance. The stalks, calyx, legumes, and young leaves, are more or less silky. *Leaflets* broadly obovate, the lower ones rather quadrangular, none more than half an inch long, most of them less; all toothed, ribbed, of a light green. *Flowers* very small, yellow, on partial stalks as long as themselves, collected into hemispherical silky heads. *Calyx-teeth* lanceolate, as long as the corolla, somewhat unequal. *Legume* half an inch long, curved upwards, veinless, contracted at each end, containing only one or two seeds. This species seems to have escaped the notice of all authors that have fallen in our way. It was sent for *corniculata*, but the legumes are totally different, and the flowers not a quarter so large, neither is the stem zigzag.

17. *T. monspeliaca*. Trailing Fenugreek. Linn. Sp. Pl. 1095. Willd. n. 11. Ait. n. 7. "Waldst. et Kitaib. Hung. v. 2. 152. t. 142." Sm. Fl. Græc. Sibth. t. 765, unpublished. (*Fœnugræcum polyceraton*; Rivin. Tetrap. Irr. t. 82. *F. minus monspeliacum*; Breyn. Cent. t. 33. f. 2. *Securidacæ* genus *triphylon*; Bauh. Hist. v. 2. 373.)—Legumes spreading, crowded, curved, compressed, hairy, obliquely veined, shorter than the leaves, on a very short pointed stalk. Stems prostrate.—Native of the south of France, Hungary, Switzerland, Greece, Cyprus, and Asia Minor. A hardy annual with us, sometimes cultivated for curiosity, flowering in June and July. Stems quite flat on the ground, hardly a span long, a little hairy, like the rest of the plant. *Leaflets* sharply toothed; their common footstalks an inch long. *Flowers* deep yellow, twice the size of the last. *Calyx* hairy, with rather unequal teeth, scarcely half so long as the corolla. *Legumes* declining, not an inch in length, prettily marked with oblique transverse ribs, and clothed with scattered close hairs. *Seeds* several, rough.

18. *T. glabra*. Smooth Cape Fenugreek. Thunb. Prodr. 137. Willd. n. 12.—"Legumes umbellate, reflexed, smooth. Leaflets ovate, smooth, toothed."—Found by Thunberg, at the Cape of Good Hope. We have not seen

feen this plant. If the *leaflets* be really ovate, not obovate, it is a very remarkable species indeed.

19. *T. tomentosa*. Downy Cape Fenugreek. Thunb. Prodr. 137. Willd. n. 13.—“Legumes stalked, three together. Leaflets and branches downy.”—From the same country.

20. *T. laciniata*. Jagged Fenugreek. Linn. Sp. Pl. 1095. Willd. n. 14. (*Melilotus ægyptia annua, foliis elegantèr incisiss; Lippi MSS.*)—Legumes stalked, somewhat umbellate, elliptical, reticulated. Leaflets wedge-shaped, toothed. Stipulas lacinated. The Linnæan specimen of this rare species was sent by Burmann, with the above synonym, by which we learn that it was gathered in Egypt by Lippi, who did not live to publish his discoveries. (See LIPPIA.) This is a slender, delicate, smooth, apparently decumbent, plant, resembling *Medicago laciniata*. The stems are about six inches long, unbranched, angular. Leaflets a quarter of an inch long, abrupt, ribbed, very deeply and sharply toothed at the end. Stipulas palmate, acute. Flower-stalks axillary, shorter than the footstalks, tipped with a small point. Flowers from three to six, yellow. Calyx pale, slightly hairy, with awl-shaped teeth of its own length. Legume twice the length of the calyx, minutely reticulated, rather hairy, acute at each end.

21. *T. pinnatifida*. Pinnatifid Fenugreek. Cavan. Ic. v. 1. 26. t. 38. Willd. n. 15. Ait. n. 8.—Legumes nearly sessile, axillary, linear, compressed, two or three together. Leaflets pinnatifid. Stipulas toothed.—Native of the borders of fields about Madrid, flowering in May. Its seeds were brought from thence to Kew, by the late marchioness of Bute. This little annual species is closely related to the last, being of the same size, with several quadrangular stems. But the leaflets are more oblong, and deeply pinnatifid, not merely cut about the extremity. Flowers from three to five in the bosom of each leaf, on very short stalks, pale yellow. Calyx like the last. The legumes, as Cavanilles observes, are totally different, an inch or more in length, very narrow, slightly curved, with many seeds. Only two or three legumes seem to be perfected, though the flowers are described as rather more numerous.

22. *T. Fœnum-græcum*. Common Fenugreek. Linn. Sp. Pl. 1095. Willd. n. 16. Ait. n. 9. Woodv. Med. Bot. t. 158. Sm. Fl. Græc. Sibth. t. 766, unpublished. (*Fœnum græcum; Camer. Epit. 199. Ger. Em. 1196. f. 1. Fœnogræcum; Rivin. Tetrap. Irr. t. 81. Fœnogræcum; Fuch. Hist. 798. Matth. Valgr. v. 1. 374.*)—Legumes axillary, sessile, oblong, compressed, hairy, with an oblique, awl-shaped beak. Stems spreading. Stipulas ovate, entire.—Native of the south of Europe. Dr. Sibthorp found it plentifully on the shores of Asia Minor, as well as in Rhodes and Cyprus; more sparingly on mount Hymettus near Athens. It has long been cultivated for the sake of its seeds, which from the days of Dioscorides have been thought cooling and detergent. Their scent is very powerful, resembling Melilot; which renders them disagreeable in fomentations and cataplasms, the only uses for which they have been retained in the apothecaries' shops. They are now nearly exploded. (See FENUGREEK.) The herbage is used in some European countries for fodder. The root is annual. Stems various in luxuriance and direction, from one to two feet long, reddish, stout, leafy and hairy. Leaflets inversely heart-shaped, various in size from a quarter of an inch to an inch, mostly smooth, of a deep, rather glaucous, green, more or less toothed. Footstalks hairy, rather longer than the leaflets. Flowers two or three, axillary, sessile, yellow, white, or pale blue; standard an inch long, emarginate, erect; wings and keel much shorter, by

no means answering to the generic character. Calyx hairy, with awl-shaped, nearly equal, teeth. Legume, in a wild state, about an inch long, veiny, a quarter of an inch broad, tapering into an oblique beak, longer than itself, but very various in that respect: in the cultivated plant, the length of the legume, containing above a dozen seeds, greatly exceeds that of the beak. Dr. F. Buchanan, in his Journey through the Myfore, v. 1. 374. relates, that this herb, known by the name of *Mentea*, when cultivated in gardens is always used green. When sown for the seed, as grain, the ground is plowed twice at the same season, and divided into plots like a kitchen-garden. The seed is sown, covered by hand, and according to the nature of the soil, and watered once in ten or fifteen days. “The ripe seed,” says this author, “falls very high, and is reckoned the most delicate kind of pulse. The young leaves are used as greens, and the unripe legumes put into Curries.” We find these seeds are one ingredient in the receipts for Curry powder, communicated from India. *T. gladiata*, Bieberst. Taur. v. 2. 222, must be presumed a variety of the species before us.

23. *T. indica*. Indian Fenugreek. Linn. Sp. Pl. 1095. Willd. n. 17. Ait. n. 100. (*Lotus maderaspatanus, villosus, ornithopodii siliquâ singulari; Pluk. Phyt. t. 200. f. 7, faulty, as representing the legumes terminal.*)—Legumes linear, nearly sessile, mostly solitary, slightly curved, much longer than the leaves. Leaflets entire. Stem diffuse.—Native of the East Indies, from whence its seeds were sent by Dr. Roxburgh to Kew, in 1793. An annual stove plant, flowering in July and August. The whole herb is minutely hairy, or silky. Stems a foot long, round, branched. Leaflets obovate, narrow, three-quarters of an inch long, all equally nearly sessile, on a stalk of their own length. Flowers small, yellow or reddish, drooping, on very short stalks, usually two together, from the bosoms of the leaves. Calyx-teeth lanceolate, leafy. Legumes an inch and a quarter or an inch and a half long, compressed, narrow, pale, hairy, with many seeds. We should have supposed the seeds of this species to have made an ingredient in the Curry powders of India; but we find nothing of this kind recorded, nor is the plant mentioned in the admirable work of Dr. Buchanan, cited under the last species.

TRIGONELLA *Fossilis*, in *Natural History*, the name of a fossil shell, of the cockle kind, but approaching to a triangular figure, having a broad bottom to which it descends, almost in straight lines: on each side from the head or cardo, these are usually found small, but there are some met with of four or five inches round: they are found at different depths, in stone quarries, bedded in the matter of the strata; and that often in the hardest stone. In some instances, the shells are found remaining in their native state; but most frequently the shell itself is perished and gone, and there is a stony or sparry matter deposited in its place. Hill.

TRIGONIA, in *Botany*, so named from *τρεῖς*, three, and *γωνία*, an angle, alluding to its triangular fruit.—Aubl. Guian. 387. Schreb. Gen. 493. Willd. Sp. Pl. v. 3. 921. Mart. Mill. Dict. v. 4. Vahl Eclog. fasc. 2. 53. Schrad. Tour. v. 1. 355. Juss. 253. Lamarck Illustr. t. 347.—Class and order, *Diadelphia Decandria*. Nat. Ord. *Lomentaceæ*, Linn.? *Malpighiis affine*, Juss.

Gen. Ch. Cal. Perianth inferior, of one leaf, turbinate; limb in five segments, the two upper ones most deeply divided, erect, spreading. Cor. papilionaceous, of five petals; standard erect, pitted at the base, flat, with a claw; wings longer and narrower, reflexed; keel of two converging petals. Nectary two scales at the base of the germen. Stam. Filaments ten, united into one common sheath,

sheath, separate above, some of them often abortive, and the common sheath finally splits into two; anthers oblong. *Pist.* Germen superior, ovate, small; style short, ascending; stigma capitate, flat, with a membranous border. *Peric.* Capsule oblong, acute, with three angles and three intermediate channels, of one cell and three valves, which are boat-shaped, double, the outer coat coriaceous, inner membranous, lined with wool. *Seeds* numerous, roundish, enveloped in long wool, and connected with a triple thread-shaped receptacle.

Eff. Ch. Calyx in five deep segments. Corolla papilionaceous; standard pitted at the base. Nectary two scales at the base of the germen. Some filaments imperfect. Capsule leguminous, triangular, with three cells and three valves. Seeds woolly.

1. *T. villosa*. Villous Trigonia. Aubl. 388. t. 149. Willd. n. 1.—Leaves obovate, downy and hoary beneath.—Native of Guiana, growing chiefly by way sides, in cultivated grounds, or in the borders of groves and thickets, bearing flowers and fruit at various seasons. The *stem* is shrubby, with twining *branches*, supporting themselves upon neighbouring trees, round, downy and leafy. *Leaves* opposite, stalked, entire, three inches long and one and a half broad, veiny. *Stipulas* ovate, in pairs, deciduous. *Clusters* compound, terminal. *Flowers* aggregate, small, yellow, with a red keel. *Fruit* three inches, or more, in length, clothed with reddish down, splitting from the base.

2. *T. lavis*. Smooth Trigonia. Aubl. 390. t. 150. Willd. n. 2.—Leaves elliptical, smooth and shining on both sides.—Found on the banks of a rivulet, near the base of the hill of Courou, in Guiana. The *branches* of this species are smooth, but twine round any thing in their way, like the preceding. *Leaves* only one and a half or two inches long, oval, entire, on shortish stalks. *Clusters* several at the ends of the branches, accompanied by some leaves. *Flowers* opposite, accompanied by small bractees, white, with yellow *anthers*. *Fruit* about an inch long, greenish, rather rough to the touch. *Seeds* enveloped in soft white wool. Nothing is mentioned of any useful properties in either of these plants.

TRIGONIS, so called by Jacquin, because each of its petals forms an inverted isosceles triangle. See CUPANIA.

TRIGONOMETER, ARMILLARY. See ARMILLARY *Trigonometer*.

TRIGONOMETRY, from *τριγωνος*, *triangle*, and *μετρον*, *measure*, signifies literally the measure of triangles; but it is used here to denote that science which relates to the determination of the sides and angles of triangles, from certain parts which are given. When it is applied to the solution of plane triangles, it is called *plane trigonometry*; and its application to spherical triangles, is called *spherical trigonometry*.

Trigonometry, from its numerous and important uses, may be considered as one of the most interesting branches of the pure mathematics: practical and physical astronomy, navigation, surveying, geodesia, mechanics, in short nearly every branch of the pure and mixed mathematics, with the exception of geometry and arithmetic, are either wholly or in part connected with the principles of trigonometry; and we accordingly find that the improvements in this department have kept pace with, or rather perhaps have preceded, those which modern authors have introduced into all the other branches of the exact sciences: in fact, the trigonometry of the Greeks, and that of the moderns, which immediately followed the invention of logarithms, and, lastly, the analytical form given to it by Euler, Lagrange, &c. exhibit the same science under three very distinct characters,

of which it will be proper to give a slight sketch as an introduction to the present article.

It is very uncertain at what time trigonometry first began to be cultivated as a science, no records having yet been discovered which enable us to trace it to a higher age than to that of Hipparchus, who flourished about 150 years before Christ, and who, as we are informed by Theon, wrote a work, in twelve books, on the chords of circular arcs, which, from the nature of the title, must have been a treatise on trigonometry: but the earliest work extant on this subject is the Spherics of Theodosius, in which the several propositions are demonstrated after the manner of Euclid; and the next in order to this, is a work by Menelaus, who flourished about the middle of the first century of the Christian era, and who is said to have written nine books on this subject; but of which, only three have been transmitted down to our times. The six that are lost consisted principally of tables and the nature of their construction, which if we possessed them would, in all probability, be rather matters of curiosity than of real utility. The earliest tables of trigonometry, of any importance, that we possess of the ancients, are those given by Ptolemy in his *Almagest*, in which he adopts the sexagesimal division of the radius, and of the arc whose chord is equal to radius, and then estimates all the other arcs by 60ths of that arc, and all the other chords by 60ths of that chord. From the time of Ptolemy, *viz.* from about the beginning of the second century, nothing of importance, except what we owe to Theon, was added to the science of trigonometry, till about the close of the eighth century after Christ, when the ancient method of computing by chords was changed for that of sines, an alteration first introduced by the Arabians, to whom we are also indebted for several axioms and theorems which are at present considered as the foundation of modern trigonometry; but they still continued the sexagesimal division; and in this state it remained till Purbach, about the middle of the 15th century, constructed a table of sines to the division of the radius into 600,000 equal parts, and computed them for every ten minutes of the quadrant; and afterwards Regiomontanus, the disciple and friend of Purbach, carried the computation to every minute, dividing the radius into 1,000,000. He also enriched this science with many new theorems and precepts, which, except for the use of logarithms, render the trigonometry of this author little inferior to that of our times.

Soon after the period here mentioned, several other mathematicians also contributed to the advancement of this science, either by some useful alterations in the form of the tables, or by other improvements; amongst whom we may mention, as the most distinguished, Werner, Copernicus, Rheindold and Maurolycus: but the most complete work which had yet appeared, was published by Vieta in 1579; and some other tracts on the same subject and due to the same author were published by Schooten in 1646.

The first part of the work to which we have above alluded, was entitled "Canon Mathematicus seu ad Triangula, cum Appendicibus," in which there is given a table of sines, tangents, and secants for every minute of the quadrant to radius 100,000, with their differences; and towards the end of the quadrant, the tangents and secants are extended to eight or nine places of figures. They are also arranged after the manner of our modern tables, increasing from the left-hand side to 45°, and then returning backwards from the right-hand to 90°; so that each number and its complement stand upon the same line.

The second part, entitled "Universalium inspectionum ad canonem mathematicum," contains, besides a regular account

count of the construction of the tables, a compendious treatise on plane and spherical trigonometry, with their application to a variety of curious subjects in geometry and mensuration, and other branches of mathematics; as also a number of particulars relating to the quadrature of the circle, the duplication of the cube, and similar problems, which are all treated of in a manner worthy of the genius of their author. The tract published by Schooten likewise contains many curious theorems due to Vieta, particularly those relating to what the author calls angular sections; *viz.* to the multiples and submultiples of arcs; and general formulæ for the chords and consequently for the sines of the sums and differences of arcs; and of such as are in arithmetical progression, which have since been so extensively and usefully applied, both in this science and in some of the higher branches of analysis. See *Arithmetic of SINES*.

The next writer on this subject, deserving of particular notice, was Rheticus, who formed the design of computing the trigonometrical canon for every ten seconds of the quadrant to fifteen places of figures; and although he did not execute the whole of this laborious enterprize, he nevertheless accomplished that part of it which related to the sines and cosines, all of which he calculated according to his original plan; besides those of every single second for the first and last degrees of the quadrant; but was deterred from publishing the table on account of the expence attending the impression. The work, however, was afterwards completed and published by his disciple and friend Otho, under the title of "Opus Palatinum de Triangulis" (folio 1596); but it was found to contain many errors, which were afterwards corrected by Pitiscus, and the whole published under the new title of "Theaurus Mathematicus, &c." folio 1613. The Trigonometry of the same author, which was published in 1599, is also a very complete work, and was long considered, both with respect to its tables and its numerous practical applications, as the most commodious and useful treatise on the subject then extant.

We might here enumerate many other writers of this period, who distinguished themselves either by their computation of new tables, or by their inventions of theorems; but the discovery of the use of logarithms, which happened about this time, produced a complete revolution in the method of treating this subject, and which therefore renders it unnecessary for us to enter into any minute explanation of the particular inventions and improvements of the authors to whom we have above alluded.

Amongst the earliest promoters of trigonometry, after the invention of logarithms, was Napier himself, to whom we are not only indebted for that admirable discovery, but also for the new and excellent analogies which he introduced into trigonometry, and which still bear his name, as likewise for the well-known rules called the *five circular parts*. (See PARTS.) Our limits, however, will not allow of tracing the history of this science, through all its successive improvements, from the time of Napier to the present day; we shall therefore content ourselves with referring to the article LOGARITHM for an account of many of the most useful and valuable tables of the logarithmic kind, and shall merely mention Briggs as an author who contributed much to the advancement of this science, both by the assistance that he afforded to the practical calculator in many intricate and abstruse computations, and by the numerous improvements of a higher kind, with which his works abound. Other writers afterwards, either by the construction of tables, or by the simplification of the rules and processes hitherto adopted, reduced the practice of trigonometrical operations to their simplest possible state, at least while it retained that geometrical

form, which in the earlier stages of this science it naturally assumed. But about the middle or rather towards the close of the last century, trigonometry was again subjected to another complete revolution, by changing the geometrical form for the analytical one; and it is probable that to this change we are indebted for many of the most brilliant discoveries that of late years have enriched the two great branches of astronomical science. The foundation of this method, however, may be traced to a much higher date than that to which we have above alluded; *viz.* to the time of Vieta, whose theorems for the differences and sums, as also for the multiples and submultiples of the chords of arcs, which, although left without demonstration, and in the latter case probably formed by induction from the law of the terms and their co-efficients, have nevertheless been the germ of most of the numerous and elegant formulæ which have since enlarged and enriched this branch of the mathematics.

The exponential formulæ also for the sines and cosines of arcs, first given by De Moivre, greatly contributed to the progress of the analytical branch of this subject, by abridging its operations, and shortening the labour of investigation. See *Arithmetic of SINES*.

Having given this brief sketch of the history of trigonometry, it now remains for us to explain and illustrate its principles, and the various methods of applying it and of performing the requisite computation. With this view we shall commence with the definitions of all the terms which most frequently occur in this doctrine, in order to save the references which it would otherwise become necessary to make to the different articles in the body of the work.

In plane trigonometry, the circle is supposed to be divided into 360 equal parts, called degrees; every degree into 60 equal parts, called minutes; and every minute into 60 equal parts, called seconds; and so on into thirds, fourths, &c.; and the measure or quantity of an angle is estimated by the number of degrees, minutes, and seconds, contained in the arc by which it is bounded; the degrees being marked or denoted by a small °, the minutes by one dash, as ', the seconds by two dashes'', &c.; thus, 70 degrees 16 minutes 17 seconds, is written $70^{\circ} 16' 17''$.

It may be observed, however, that the division of the circle is perfectly arbitrary, and that any other number might have been employed instead of 360; and the subdivisions might also have proceeded upon any other scale as well as the sexagesimal; and accordingly, the modern French mathematicians have adopted a different division; *viz.* they suppose the entire circle to be divided into 400 degrees, or each quadrant into 100 degrees; the next subdivision is the 10th of a degree, the next 100th, and so on; and hence the measure of an angle is expressed by them in the same manner as any other integral and decimal quantity, which notation is undoubtedly far superior to that in common use.

The *complement of an arc or angle*, is what it wants of 90° , or of a quadrant; and the *supplement of an angle*, is what it wants of 180° , or of a semicircle: thus, if an angle measures 50° , its complement is 40° , and its supplement 130° . As to the several lines made use of in this science, they will be readily understood by a reference to *Plate II. Trigonometry, fig. 14.* aided by the following definitions; *viz.*

The *sine* or *right sine* of an arc, is a line drawn from one extremity of an arc perpendicular to the diameter which passes through the other extremity: thus, B F is the sine of the arc A B, or of the supplemental arc B D E.

The *versed sine* of an arc, is that part of the diameter which is intercepted between the arc and its sine: thus, A F is the versed sine of the arc A B, and D F the versed sine of the arc E D B.

TRIGONOMETRY.

The *tangent* of an arc, is a line touching the circle in one extremity of that arc, and continued thence to meet a line drawn from the centre through the other extremity of it, which last line is called the *secant* of the same arc: thus, A H is the tangent, and C H the secant of the arc A B; also E I is the tangent, and C I the secant of the supplemental arc B D E; and this latter tangent and secant are equal to the former, but are accounted negative, as being drawn in an opposite or contrary direction to the former.

The *cosine*, *cotangent*, and *cosecant*, of an arc, are the sine, tangent, and secant of the complement of that arc; the letters *co.* being only a contraction of the word complement. Thus, the arcs A B, B D, being the complement of each other, the sine, tangent, and secant of the one of these, is respectively the cosine, cotangent, and cosecant of the other: thus,

B F, the sin. of A B, is the cof. of B D.
 B K, the sin. of B D, is the cof. of A B.
 A H, the tan. of A B, is the cotan. of B D.
 D L, the tan. of B D, is the cotan. of A B.
 C H, the sec. of A B, is the cosec. of B D.
 C L, the sec. of B D, is the cosec. of A B.
 F A, the vers. of A B, is the coverf. of B D.
 D K, the vers. of B D, is the coverf. of A B.

The above are the principal definitions relating to plane trigonometry, as far as regards the solution of plane triangles, which is that part of the subject to which we must more particularly confine our remarks in this article: what concerns the mutations or changes in the quantities above defined in passing successively round the circumference, and their particular values at certain points, have been already explained under the article *Arithmetic of SINES*, to which the reader is referred. In every triangle there are six parts; *viz.* three sides and three angles, any three of which being given (except the three angles), the other three may be found; and that either by geometrical construction, arithmetical or logarithmic computation, or by instrumental operation: that is, either by constructing the figure with the compasses and a scale of chords, or other instrument for measuring angles; or by means of tables of natural or logarithmic sines, tangents, &c. in which the computation depends upon the proportionality of the sides of similar triangles; and lastly, by means of a Gunter or other scale constructed for this particular purpose, by which the results are obtained by the proper application of a pair of compasses to certain lines on the scale: in the present article, however, we shall only attempt an illustration of the second method.

There are only three distinct cases in trigonometry; *viz.*

1. When a side and its opposite angle are two of the given parts.
2. When two sides and the included angle are given.
3. When the three sides are given.

Case 1.—When a side and its opposite angle are two of the given parts.

As any one side :
 Is to any other side ::
 So is the sine of the angle opposite to the former :
 To the sine of the angle opposite to the latter.

This analogy supposes two sides and one angle to be given: if two angles and one side be given, the order of the terms becomes,

As the sine of any angle :
 Is to the sine of any other angle ::
 So is the side opposite to the former :
 To the side opposite to the latter.

For let A B C (*fig. 15.*) represent any triangle; take A c, B c, equal to each other, and let them represent the tabular radius; then c a, c b, will also be the tabular sines of the angles A and B. Now by similar triangles,

$$\begin{aligned} AC : A c &:: CD : c a \\ BC : B c &:: CD : c b. \end{aligned}$$

Consequently, since A c = B c, and the third terms being equal, we have

$$\begin{aligned} AC : BC &:: c b : c a, \text{ or} \\ AC : BC &:: \sin. B : \sin. A ; \end{aligned}$$

which is the same as the theorem in words.

Hence in the triangle A B C (*fig. 16.*), let A B, B C, and the angle A be given; then it will be

$$\begin{aligned} BC : BA &:: \sin. A : \sin. C, \\ \text{or } \sin. C &= \frac{BA \times \sin. A}{BC}, \end{aligned}$$

$$\text{or } \log. \sin. C = \log. BA + \log. \sin. A - \log. BC.$$

Again, if the angles A and B were given, and the side B C; then,

$$\begin{aligned} \sin. A : \sin. B &:: BC : AC, \\ \text{or } AC &= \frac{\sin. B \times BC}{\sin. A}, \end{aligned}$$

$$\text{or } \log. AC = \log. \sin. B + \log. BC - \log. \sin. A.$$

It should be observed here, that the angle found by the first of these analogies is ambiguous, or uncertain, *viz.* whether it be acute or obtuse, unless its magnitude be such as to prevent the ambiguity; for when this is not the case, there will be two different triangles, which have the same three parts, but the other three different in each; and there is nothing in the abstract solution to determine which of the two is the required one: but in any practical case, there will be always found some circumstance or other to decide the question. This will be understood from *fig. 17.* where there are two triangles A B C, A B C'; in each of which the sides A B, B C, or B C', and the angle A, are the same; and, therefore, the angle C, determined by the analogy, may be either B C A or B C' A, which are the supplements of each other, and which two angles, we have shewn in the definitions, have always the same sine. The tabular sine, however, is always that belonging to the acute angle; and, therefore, when the obtuse angle is required, the acute angle must be subtracted from 180°, which will be the obtuse angle. But if the angle be a right angle, or greater than a right angle, the acute angle found by the table must be the required angle; and, therefore, in this case, there is no ambiguity.

Let us propose, as an example, a triangle A B C, in which the side A B = 345, B C = 232, and angle A = 37° 20'.

First, to find the angle at C.

As the side B C = 232	2.3654880
Is to side A B = 345	2.5378191
So is sine < A = 37° 20'	9.7827958
To sin. < C = 64° 24'	9.9551269

That is, by adding together the logarithms of the second and third terms, and subtracting the first, we obtain the logarithmic value of the sine of < C, which is found in the table to answer to the angle 64° 24'. But we have seen that

TRIGONOMETRY.

an angle and its supplement have the same sine; therefore, the sine we have found may either answer to the angle $64^{\circ} 24'$, or to its supplement $115^{\circ} 36'$. This question, therefore, involves that ambiguity to which we have above alluded; and we must proceed to find the third side under each of the values of the angle C, and the two corresponding values of the angle B.

Since the sum of the three angles of a triangle = 180° ,

$$\begin{array}{r} \angle A = 37^{\circ} 20' \\ \angle C = 64 \quad 24 \\ \hline 180^{\circ} - (101 \quad 44) = 78^{\circ} 16' = \angle B. \end{array}$$

Again,

$$\begin{array}{r} \angle A = 37^{\circ} 20' \\ \angle C = 115 \quad 36 \\ \hline 180^{\circ} - (152 \quad 56) = 27^{\circ} 4' = \angle B. \end{array}$$

Hence, from the first values of the angles C and B, we have,

$$\begin{array}{r} \text{As sin. } \angle A = 37^{\circ} 20' \quad 9.7827958 \\ \text{Is to sin. } \angle B = 78^{\circ} 16' \quad 9.9908291 \\ \text{So is BC} = 232 \quad 2.3654880 \\ \hline \text{To AC} = 374.56 \quad 2.5735213 \end{array}$$

Again, assuming the second values of the angles B and C, we have,

$$\begin{array}{r} \text{As sin. } \angle A = 37^{\circ} 20' \quad 9.7827958 \\ \text{Is to sin. } \angle B = 27^{\circ} 4' \quad 9.6580371 \\ \text{So is BC} = 232 \quad 2.3654880 \\ \hline \text{To AC} = 174.07 \quad 2.2407293 \end{array}$$

The side and angles sought are, therefore, $AC = 374.56$, or 174.07 ; and the angle $B = 78^{\circ} 16'$, or $27^{\circ} 4'$; and angle $C = 64^{\circ} 24'$, or $115^{\circ} 36'$; either of which results equally answer all the conditions of the original data. But it is obvious, that if the given angle A had been a right angle, or greater than a right angle, this ambiguity could not have had place; because, in that case, the other two angles are necessarily acute.

Case 2.—When two sides and their included angle are the three given parts.

As the sum of the sides :
Is to the difference of the sides ::
So is the tangent of half the sum of the required angles :
To the tangent of their half difference.

Then to half the sum add half the difference for the greater angle, and subtract it for the less. The three angles of the triangle being thus known, the required side may be found by *Case 1*.

Note.—The half sum of the angles is found by subtracting the given angle from 180° , and taking half the remainder; or, instead of the tangent of the half sum, the cotangent of half the given angle may be used, being the same thing.

Let ABC (*fig. 18.*) be any triangle; produce AB , making $BE = BC$; also take $BD = BC$; join DC and CE , and draw DF perpendicular to DC . Now since DB, BC , and BE , are all equal to each other, a semi-circle described from the centre B , and with the radius DB , would pass through D, C , and E ; consequently DCE is a right angle, or CE is perpendicular to DC , and is there-

fore parallel to DF ; and hence DF and EC are respectively the tangents to the angles DCF , and CDE to the same radius DC . But CDE or $CDB =$ half the sum of the angles BAC and BCA ; for since $DB = BC$, the angle BDC is obviously = to half the external angle CBE , which is equal to the sum of the angles at A and C ; therefore, CDB is = to half that sum, and $DCF =$ half the difference of the same angles ACB and CAB ; for $ACB = BCD + DCA$, and consequently $BAC = BDC$, or $BCD - DCA$; therefore $DCA =$ half their difference. Whence $CE =$ tangent of half the sum, and DF the tangent of half the difference of the angles A and C ; and it is evident from the construction that $AE =$ the sum of the sides, and $AD =$ the difference of the same; consequently, since DF and CE are parallel, we have

$$AE : AD :: CE : DF;$$

that is,

As the sum of the sides $AB + BC$:
Is to the difference of the sides $AB - BC$::
So is the tangent of half the sum of the angles A and C :
To the tangent of half their difference.

Let us take as an example a triangle (*fig. 19.*), in which the following dimensions are given, *viz.*

$$\begin{array}{r} AB = 75, \quad AC = 58, \quad A = 108^{\circ} 24'; \\ \text{then will } AB = 75 \quad AC = 58 \quad A + B + C = 180^{\circ} 0' \\ \quad \quad \quad AC = 58 \quad AC = 58 \quad \quad \quad A = 108 \quad 24 \\ \hline \text{Sum } 133 \text{ differ. } 17 \quad \quad \quad BC = 71 \quad 36 \\ \hline \frac{1}{2} (B + C) = 35 \quad 48 \end{array}$$

$$\begin{array}{r} \text{Log. of } AB + AC, \quad 2.1238516 \\ \text{Log. of } AB - AC, \quad 1.2304489 \\ \text{Log. of tan. } \frac{1}{2} (B + C), \quad 9.8580694 \end{array}$$

$$\begin{array}{r} \text{Sum of log.} \quad 11.0885183 \\ \text{Log. of tan. } \frac{1}{2} (C - B) \quad 8.9646667 \quad \text{The nearest} \\ \text{corresponding number to which is } 5^{\circ} 16'. \\ \hline \frac{1}{2} (B + C) = 35^{\circ} 48' \quad \frac{1}{2} (B + C) = 35^{\circ} 48' \\ \hline \frac{1}{2} (C - B) = 5^{\circ} 16' \quad \frac{1}{2} (C - B) = 5^{\circ} 16' \\ \hline C = 41^{\circ} 4' \quad \quad \quad B = 30^{\circ} 32' \end{array}$$

If the other side CB were required, having found the angles, it may be easily determined by the first case.

Case 3.—When the three sides of a triangle are given, to find the three angles.

Assume any side of the triangle as a base (*fig. 20.*), and let fall a perpendicular upon it from the opposite angle; then say,

As the base :
Is to the sum of the other two sides ::
So is the difference of the same sides :
To the difference of the segments of the base.

To the base or sum of the segments add the half difference for the greater segment, and subtract it for the less.

The segments being thus found, the angles may be determined by the first case. The demonstration is here very obvious; for, by the 47th proposition of the first book of Euclid,

$$\begin{array}{r} AD^2 + DC^2 = AC^2 \\ BD^2 + DC^2 = BC^2; \end{array}$$

therefore,

TRIGONOMETRY.

therefore, $AD^2 - BD^2 = AC^2 - BC^2$;

consequently,

$$AD + DB : AC + BC :: AC - BC : AD - DB;$$

which is the same as the theorem in words.

As an example, let a triangle be proposed (*fig. 21.*), in which the three sides are as follow, *viz.*

$$\begin{aligned} AB &= 36, AC = 45, BC = 40 \\ AC &= 45, AC = 45 \\ AB &= 36, AB = 36 \end{aligned}$$

AC + AB = 81	FC = 9
Log. of BC	= 1.6020600
Log. of AC + AB	= 1.9084850
Log. of FC	= 0.9542425

Sum of log.	= 2.8627275
-------------	-------------

Log. of CG = 1.2606675 The nearest corresponding number to which, in the tables, is 18.22

$$\begin{aligned} BC &= 40.00 & EG &= 10.89 \\ CG &= 18.22 & CG &= 18.22 \end{aligned}$$

$$BG = 21.78 \quad CE = 29.11$$

BE = 10.89	
Log. of AB	= 1.5563025
Log. of whole sine	= 10.0000000
Log. of EB	= 1.0370279

Log. of sin. of EAB = 9.4807254 The corresponding number to which, in the tables, is $17^\circ 36'$; consequently, the angle ABE $72^\circ 24'$.

Log. of AC	= 1.6532125
Log. of the whole sine	= 10.0000000
Log. of CE	= 1.4640422

Log. of sin. of EAC = 9.8108297 To which the nearest correspondent number, in the tables, is $40^\circ 18'$; therefore ACE $49^\circ 42'$, and CAB $57^\circ 54'$.

The three preceding cases include all the possible varieties that can arise in the solution of plane triangles; but, under certain relations of the data, more simple operations may frequently be employed. Some of these solutions we shall investigate analytically at the conclusion of this article, and it will therefore be sufficient to point out in this place a few particulars relative to the solution of right-angled plane triangles.

In any right-angled triangle, any of the unknown parts may be found by the following proportions.

- As radius :
- Is to either leg of the triangle ::
- So is the tangent of the adjacent angle :
- To the opposite leg ; and ::
- So is the secant of the same angle :
- To the hypotenuse.

For AB (*fig. 22.*) being supposed the given leg, let AD represent the tabular radius, describe the arc DE, and draw DF perpendicular to AD; so shall DF represent the tabular tangent, and AF the tabular secant of the angle A; and because of the parallels, as AD : AB :: DF : BC :: AF : AC, which is the same as the theorem in words.

$$\text{Whence } BC = \frac{AB \times DF}{AD} = \frac{AB \times \tan. A}{\text{rad.}}$$

$$AC = \frac{AB \times AF}{AD} = \frac{AB \times \sec. A}{\text{rad.}}$$

When the hypotenuse is given, each of the legs will represent, or have the ratio of, the sines of their opposite angles, the hypotenuse itself being assumed for the radius.

In this case, therefore, it will be

- As radius :
- Is to the hypotenuse ::
- So is the sine of either acute angle :
- To the opposite side.

That is, AE : AC :: AG : BC;

$$\text{or } \begin{cases} \text{rad.} : AC :: \sin. A : \frac{AC \times \sin. A}{\text{rad.}} = BC \\ \text{rad.} : AC :: \sin. B : \frac{AC \times \sin. B}{\text{rad.}} = AB \end{cases}$$

Note.—The radius is equal to the sine of 90° , or to the tangent of 45° .

The preceding theorems have been deduced from the geometrical properties of triangles and of their several parts; and they exhibit the simplest and most direct mode of solution that can be obtained generally for each case; but there are certain other forms of solution which are much more readily applied under particular relations of the data, which it will be proper now to consider, and in which we shall adopt the analytical mode of investigation instead of the geometrical one hitherto pursued.

Let ABC (*Plate III. fig. 1.*) be any plane triangle; C the vertical angle; CD a perpendicular let fall upon the base AB; and let *a, b, c*, denote the sides respectively that are opposite to the angles A, B, C.

Then because AC = *b*, AD is the cosine of A to that radius; consequently, when radius = 1, AD = *b* cof. A. In like manner, BD = *a* cof. B; therefore AD + BD = AB = *a* cof. B + *b* cof. A. If one of the angles, as A, were obtuse, the result would still be the same; because, while on the one hand cof. A would be negative, AD, lying on the contrary side of A to what it does in the figure referred to, it must be deducted from BD to leave AB; and a negative quantity subtracted, is equivalent to a positive quantity added: and by letting fall perpendiculars from the angles A and B upon the opposite sides, or upon their continuations, precisely analogous results will be obtained; and hence we derive immediately the following fundamental equations.

$$\left. \begin{aligned} a &= b \text{ cof. } C + c \text{ cof. } B \\ b &= a \text{ cof. } C + c \text{ cof. } A \\ c &= a \text{ cof. } B + b \text{ cof. } A \end{aligned} \right\} \quad (I.)$$

Again, it is obvious, that in the same manner as we found AD = *b* cof. A, and DB = *a* cof. B, we might also obtain DC = *b* sin. A, and DC = *a* sin. B; therefore *a* sin.

$$B = b \text{ sin. } A; \text{ whence also } \frac{a}{b} = \frac{\text{sin. } A}{\text{sin. } B}; \text{ and in like}$$

$$\text{manner we have } \frac{a}{c} = \frac{\text{sin. } A}{\text{sin. } C} \text{ and } \frac{b}{c} = \frac{\text{sin. } B}{\text{sin. } C}. \text{ Or chang-}$$

ing the denominators, the relations of all the six quantities may be thus expressed:

$$\frac{\text{sin. } A}{a} = \frac{\text{sin. } B}{b} = \frac{\text{sin. } C}{c} \quad (II.)$$

TRIGONOMETRY.

These formulæ shew immediately the truth of our first theorem, viz. "the sides of plane triangles have the same ratio as the sines of their opposite angles."

Again, since $a : b :: \sin. A : \sin. B$, we have $a + b : a - b :: \sin. A + \sin. B : \sin. A - \sin. B$; that is,

$$\frac{a + b}{a - b} = \frac{\sin. A + \sin. B}{\sin. A - \sin. B}.$$

But $\frac{\sin. A + \sin. B}{\sin. A - \sin. B} = \frac{\tan. \frac{1}{2}(A + B)}{\tan. \frac{1}{2}(A - B)}$.

See *Arithmetic of SINES*; consequently

$$\frac{a + b}{a - b} = \frac{\tan. \frac{1}{2}(A + B)}{\tan. \frac{1}{2}(A - B)}$$

Or $a + b : a - b :: \tan. \frac{1}{2}(A + B) : \tan. \frac{1}{2}(A - B)$;

that is, "the sum of the sides is to the difference of the sides, as the tangent of half the sum of the opposite angles is to the tangent of half the difference," which is our second theorem: and other forms of solution are readily obtained from the two fundamental equations (I.) and (II.) viz.

$$\begin{aligned} a &= b \cos. C + c \cos. B \\ b &= a \cos. C + c \cos. A \\ c &= a \cos. B + b \cos. A \end{aligned}$$

For multiplying the first of these equations by a , the second by b , and the third by c , and each of the equations thus obtained being taken from the sum of the other two, there will arise

$$\left. \begin{aligned} b^2 + c^2 - a^2 &= 2bc \cos. A \\ a^2 + c^2 - b^2 &= 2ac \cos. B \\ a^2 + b^2 - c^2 &= 2ab \cos. C \end{aligned} \right\} \text{(III.)}$$

$$\cos. \frac{1}{2} A = \sqrt{\frac{\frac{1}{2}\{a + b + c\} \left\{ \frac{1}{2}(a + b + c) - a \right\}}{bc}} \quad \text{(VII.)}$$

which is purely logarithmic: the $\cos. \frac{1}{2} B$, and $\cos. \frac{1}{2} C$, being precisely analogous to the above, are omitted.

And in a similar manner, we find

$$\sin. \frac{1}{2} A = \sqrt{\left\{ \frac{\frac{1}{2}(a + b + c) - c}{bc} \left\{ \frac{1}{2}(a + b + c) - b \right\} \right\}} \quad \text{(VIII.)}$$

And again, by division,

$$\tan. \frac{1}{2} A = \sqrt{\left\{ \frac{\left\{ \frac{1}{2}(a + b + c) - b \right\} \left\{ \frac{1}{2}(a + b + c) - c \right\}}{\left\{ \frac{1}{2}(a + b + c) - a \right\} \left\{ \frac{1}{2}(a + b + c) \right\}} \right\}} \quad \text{(IX.)}$$

Of these several rules for the determination of the sides and angles of plane triangles, we have before observed, that the formulæ (IV.) and (V.) are best adapted to small integral values of the sides; and to real fractional values of the cosine, in other cases, one or other of the three latter will best apply. When the angle sought is very small, it is usually better to employ N° (VIII.) than N° (VII.) The method indicated in N° (IX.) is commodious, and very correct, except when A is either very small or near 180° .

In some cases, where great accuracy is required, the operator may wish to obviate the uncertainties that would arise from the use of some of these formulæ; for which purpose Dr. Maskelyne has given, in the Introduction to Taylor's Logarithms, the following rules in reference to the sines and tangents of very small arcs.

1. *To find the Sine.*—To the log. of the arc reduced into seconds, with the decimal annexed, add the constant quantity

Hence, when two sides and the contained angle are given, we have

$$\left. \begin{aligned} a &= \sqrt{b^2 + c^2 - 2bc \cos. A} \\ b &= \sqrt{a^2 + c^2 - 2ac \cos. B} \\ c &= \sqrt{a^2 + b^2 - 2ab \cos. C} \end{aligned} \right\} \text{(IV.)}$$

And when the three sides are given,

$$\left. \begin{aligned} \cos. A &= \frac{b^2 + c^2 - a^2}{2bc} \\ \cos. B &= \frac{a^2 + c^2 - b^2}{2ac} \\ \cos. C &= \frac{a^2 + b^2 - c^2}{2ab} \end{aligned} \right\} \text{(V.)}$$

These formulæ are very convenient for computation, the former when the cosine of the given angle has any real fractional value, and the latter, when the three sides are completely integral, and small numbers: in other cases, they will be found more convenient under the following form, viz.

$$\left. \begin{aligned} \cos. A &= \frac{(b + c - a)(b + c - a)}{2bc} - 1 \\ \cos. B &= \frac{(a + c - b)(a + c - b)}{2ac} - 1 \\ \cos. C &= \frac{(a + b - c)(a + b - c)}{2ab} - 1 \end{aligned} \right\} \text{(VI.)}$$

Or we may substitute for $\cos. A$ its equal $2 \cos. \frac{1}{2} A - 1$, (see *SINE*), and we have,

4.6855749, and from the sum subtract one-third of the arithmetical complement of the log. cosine, and the remainder will be the log. sine of the given arc.

2. *To find the Arc from the Sine.*—To the given log. sine of a small arc, add 5.3144251, and one-third of the arithmetical complement of log. cosine; subtract 10 from the index of the sum, the remainder will be the logarithm of the number of seconds and decimals in the given arc.

3. *To find the Tangent.*—To the log. arc and the constant quantity 4.6855749, add two-thirds of the arithmetical complement of the log. cosine, and the sum is the log. tangent of the given arc.

4. *To find the Arc from the Tangent.*—To the log. tangent add 5.3144251, and from the sum subtract two-thirds of the arithmetical complement of log. cosine; take 10 from the index, and there will remain the logarithm of the number of seconds and decimals in the given arc.

TRIGONOMETRY.

TRIGONOMETRY, *Spherical*, relates to the resolution and calculation of the sides and angles of spherical triangles, which are formed by the intersection of three great circles of the sphere, and which, like plane triangles, consist of six parts, *viz.* three sides and three angles. See *SPHERICAL Triangle*.

In plane trigonometry, any three of the six parts of a triangle being given, except the three angles, the other parts may be found; but in spherical trigonometry this exception has not place, for any three of the six parts being given, the rest may thence be determined, the sides being measured or estimated by degrees, minutes, &c. the same as the angles.

Spherical trigonometry is divided into right-angled and oblique-angled, or the resolution of right and oblique-angled spherical triangles. When a spherical triangle has a right angle, it is called a right-angled spherical triangle; and when one of its sides is a quadrant, or 90°, it is called a quadrantal triangle.

The solution of all the cases of spherical trigonometry, although much more numerous than those in plane trigonometry, depends upon only three fundamental equations.

Theorem 1.—In any spherical triangle, the sines of the sides have the same ratio as the sines of their opposite angles.

Let *O* (*fig. 2.*) be the centre of the sphere, and having joined *OA, OC, OB*, draw *AD* perpendicular to the plane *OBC*; also make *DE* perpendicular to *OB*, and *DF* to *OC*; and join *AE, AF*.

Then, because *AD* is perpendicular to the plane *OBC*, each of the planes *ADE, AFD*, which pass through *AD*, will also be perpendicular to that plane; and since *ED* is perpendicular to *OB*, and the plane *ADE* to the plane *OBC*, the line *AE*, which lies in the plane *ADE*, and is drawn from the same point *E*, is also perpendicular to *OB*. Again, in like manner, because *FD* is perpendicular to *OC*, and the plane *AFD* to the plane *OBC*, the line *FA*, which lies in the plane *AFD*, and is drawn from the same point *F*, is perpendicular to *OC*; and, therefore, the angles *AED* and *AFD*, which measure the inclination of the planes *AOB, AOC*, will measure the angles *CBA, BCA*, of the spherical triangle *ABC*. Also *AF*, being perpendicular to *OC*, is the sine of the angle *AOB*, or of the arc *AC*; and *AE*, which is perpendicular to *OB*, is the sine of the angle *AOB*, or of the arc *AB*. But *ADE, AFD*, being right-angled plane triangles, right-angled at *D*, we shall have *AD = AE sin. AED*, and *AD = AF sin. AFD*. Whence, by equality, *AE sin. AED = AF sin. AFD*; consequently

$$AE : \sin. AFD :: AF : \sin. AED, \text{ or}$$

$$\sin. AB : \sin. opp. < C :: \sin. AC : \sin. opp. < B;$$

that is, the sines of the sides have the same ratio as the sines of their opposite angles.

Hence, if *A, B, C*, be supposed to denote the three angles of any spherical triangle, and *a, b, c*, corresponding opposite sides, we may from the above deduce the following fundamental equation, *viz.*

$$\frac{\sin. A}{\sin. a} = \frac{\sin. B}{\sin. b} = \frac{\sin. C}{\sin. c} \quad (I.)$$

Theorem 2.—In any spherical triangle,

As the rectangle of the sines of any two sides :
Is to the radius :

So is the rectangle of radius and the cosine of the other side, *minus* the rectangle of the cosines of the same two sides :

To the cosine of the angle included by those sides.

For, having joined *OA, OB, OC*, (*fig. 3.*) draw *FD* in the plane *OBC*, and *DE* in the plane *OAB*, each perpendicular to their common section *OB*, and join *EF*. Then, because the angle *EDF* is the measure of the inclination of the planes *OBC, OAB*, it is also the measure of the spherical angle *ABC* or *B*. And because

$$\text{cof. EDF} = \frac{DE^2 + DF^2 - EF^2}{2 DE \times DF}, \text{ and}$$

$$\text{cof. EOF} = \frac{OE^2 + OF^2 - EF^2}{2 OE \times OF}, \text{ or}$$

$$EF^2 = OE^2 + OF^2 - 2 OE \times OF \times \text{cof. EOF}.$$

See Form (V.) Plane Trigonometry.

And by substituting this in the first equation, $\text{cof. EDF} = \frac{DE^2 + DF^2 - OE^2 - OF^2 + 2 OE \times OF \text{cof. EOF}}{2 DE \times DF}$.

But $OE^2 - ED^2$, and $OF^2 - DF^2$, are each equal to OD^2 ; whence cof. EDF , or its equal,

$$\text{cof. B} = \frac{OE \times OF \text{cof. EOF} - OD^2}{DE \times DF}, \text{ or}$$

$$\text{cof. B} = \frac{OE \times OF \text{cof. AC} - OD^2}{DE \times DF}.$$

Or, since $\frac{OE}{DE} = \frac{1}{\sin. DOB} = \frac{1}{\sin. AB}$, and $\frac{OF}{DF} = \frac{1}{\sin. DOF}$, &c. if these values be substituted in the former equation, we shall have

$$\text{cof. B} = \frac{\text{cof. AC} - \text{cof. AB} \cdot \text{cof. BC}}{\sin. AB \cdot \sin. BC},$$

which necessarily involves the conditions given in the enunciation of the theorem.

Here again, assuming *A, B, C*, to denote the angles, and *a, b, c*, the corresponding opposite sides, we deduce the following set of equations, *viz.*

$$\left. \begin{aligned} \text{cof. } a &= \text{cof. } b \text{ cof. } c + \sin. b \sin. c \text{ cof. } A \\ \text{cof. } b &= \text{cof. } a \text{ cof. } c + \sin. a \sin. c \text{ cof. } B \\ \text{cof. } c &= \text{cof. } a \text{ cof. } b + \sin. a \sin. b \text{ cof. } C \end{aligned} \right\} (II.)$$

These equations will apply equally to the supplemental triangle; thus putting for the sides *a, b, c*, $180^\circ - A', 180^\circ - B', 180^\circ - C'$; and for the angles *A, B, C*, $180^\circ - a', 180^\circ - b', 180^\circ - c'$, we shall have

$$- \text{cof. } A' = \text{cof. } B' \text{ cof. } C' - \sin. B' \sin. C' \text{ cof. } a'.$$

And here, again, we have three symmetrical equations applying to any spherical triangles, *viz.*

$$\left. \begin{aligned} \text{cof. } A &= \text{cof. } a \sin. B \sin. C - \text{cof. } B \text{ cof. } C \\ \text{cof. } B &= \text{cof. } b \sin. A \sin. C - \text{cof. } A \text{ cof. } C \\ \text{cof. } C &= \text{cof. } c \sin. A \sin. B - \text{cof. } A \text{ cof. } B \end{aligned} \right\} (III.)$$

Another important relation may also thence be readily deduced; for, substituting for the $\text{cof. } b$ in the third of the equations *N*° (II.) its value in the second; substituting also for $\text{cof. } a$, its value $1 - \sin.^2 a$, and then striking out the common factor $\sin. a$, we shall have

$$\text{cof. } c \sin. a = \sin. c \text{ cof. } a \text{ cof. } B + \sin. b \text{ cof. } C.$$

But equation *N*° (I.) gives $\sin. b = \frac{\sin. B \sin. c}{\sin. C}$; and

hence,

hence, by substitution,

$$\text{cof. } c \sin. a = \sin. c \text{ cof. } a \text{ cof. } B + \frac{\sin. B \text{ cof. } C \sin. c}{\sin. C}$$

Dividing by $\sin. c$, we have

$$\frac{\text{cof. } c}{\sin. c} \sin. a = \text{cof. } a \text{ cof. } B + \frac{\sin. B \text{ cof. } C}{\sin. C}$$

But $\frac{\text{cof. } c}{\sin. c} = \text{cot. } c$. See *Arithmetic of SINES*.

Therefore, $\text{cot. } c \sin. a = \text{cof. } a \text{ cof. } B + \sin. B \text{ cot. } C$.

Thus, again, we get three symmetrical equations ;

$$\left. \begin{aligned} \text{cot. } a \sin. b &= \text{cof. } b \text{ cof. } C + \sin. C \text{ cot. } A \\ \text{cot. } b \sin. c &= \text{cof. } c \text{ cof. } A + \sin. A \text{ cot. } B \\ \text{cot. } c \sin. a &= \text{cof. } a \text{ cof. } B + \sin. B \text{ cot. } C \end{aligned} \right\} \text{(IV.)}$$

The classes of equations Nos. (I.) (II.) (III.) and (IV.) comprehend the whole of spherical trigonometry ; or, in fact, N° (II.), from which all the others can be derived, may be regarded as comprehending the whole. They require, however, some modifications to adapt them to logarithmic computations, which we shall now endeavour to illustrate.

I. *Solution of right-angled Spherical Triangles.*—Let us suppose the angle A to be the right angle, then since $\sin. A = 1$, N° (I.) gives

$$\frac{1}{\sin. a} = \frac{\sin. B}{\sin. b} = \frac{\sin. C}{\sin. c}; \text{ consequently}$$

$$\left. \begin{aligned} \sin. B &= \frac{\sin. b}{\sin. a} \sin. C = \frac{\sin. c}{\sin. a} \\ \sin. b &= \sin. B \sin. a; \text{ or } \sin. c = \sin. c \sin. a \end{aligned} \right\} \text{(V.)}$$

Also, since $\text{cof. } 90^\circ = 0$, we have from N° (II.)

$$\text{cof. } a = \text{cof. } b \text{ cof. } c. \quad \text{(VI.)}$$

For the same reason, Equation 1. N° (III.) gives

$$\text{cof. } a \cdot \sin. B \sin. C = \text{cof. } B \text{ cof. } C. \quad \text{(VII.)}$$

And upon the same hypothesis, $\text{cot. } A$ becomes $= 0$; so that Equation 1. N° (IV.) becomes

$$\left. \begin{aligned} \text{cot. } a \sin. b &= \text{cof. } b \text{ cof. } C, \text{ or} \\ \text{cot. } a &= \frac{\text{cof. } b}{\sin. b} \text{ cof. } C, \text{ or} \\ \text{cot. } a &= \text{cot. } b \text{ cof. } C \end{aligned} \right\} \text{(VIII.)}$$

The Equations 2. and 3. of N° (III.) give also upon the same hypothesis, that is, angle $A = 90^\circ$,

$$\left. \begin{aligned} \text{cof. } B &= \sin. C \text{ cof. } b \\ \text{cof. } C &= \sin. B \text{ cof. } c \end{aligned} \right\} \text{(IX.)}$$

And, lastly, from N° (IV.)

$$\left. \begin{aligned} \text{cot. } B &= \text{cot. } b \sin. c \\ \text{cot. } C &= \text{cot. } c \sin. b \end{aligned} \right\} \text{(X.)}$$

From these equations, by a few obvious transformations, the six usual cases of spherical right-angled triangles may be solved as follow.

Case 1.—Given the hypotenuse a , and an angle B, to find the other parts.

Here, $\sin. b = \sin. a \sin. B$;
 or, $\sin. \text{side req.} = \sin. \text{opp. ang.} \times \sin. \text{hyp.}$
 Again, $\tan. c = \tan. a \text{ cof. } B$;
 or, $\tan. \text{side req.} = \tan. \text{hyp.} \times \text{cof. includ. ang.}$
 Lastly, $\text{cot. } C = \text{cof. } a \tan. B$;
 or, $\text{cot. ang. req.} = \text{cof. hyp.} \times \tan. \text{giv. ang.}$

In this case there can be nothing ambiguous, for in applying the first form, it is known that the angle and the

opposite side are always of the same affection; and in the two latter, the rules for the change of sines in the different quadrants (see *Arithmetic of SINES*), will determine to which the result belongs.

Case 2.—Given the hypotenuse a , and one of the sides, to find the other parts:

$$\sin. B = \frac{\sin. b}{\sin. a}, \text{ or } \sin. \text{ang. req.} = \frac{\sin. \text{giv. side}}{\sin. \text{hyp.}}$$

$$\text{cof. } c = \frac{\text{cof. } a}{\text{cof. } b}, \text{ or } \text{cof. side req.} = \frac{\text{cof. hyp.}}{\text{cof. giv. side}}$$

$$\text{cof. } C = \tan. b \text{ cot. } a, \text{ or } \text{cof. ang. req.} = \tan. \text{giv. side and cot. hyp.}$$

Case 3.—Given two sides, including the right angle, namely b and c , to find the other parts.

Here, $\text{cof. } a = \text{cof. } b \text{ cof. } c$;
 or, $\text{cof. hyp.} = \text{rect. of cof. given sides.}$

Again, $\tan. B = \frac{\tan. b}{\tan. c}$, and $\tan. C = \frac{\tan. c}{\tan. b}$;

or, $\tan. \text{ang. req.} = \frac{\tan. \text{opp. side}}{\tan. \text{adj. side}}$.

Case 4.—Given a side c , and its opposite angle B, to find the other parts.

Here, $\sin. a = \frac{\sin. b}{\sin. B}$, or $\sin. \text{hyp.} = \frac{\sin. \text{giv. side}}{\sin. \text{opp. side}}$

Again, $\sin. c = \tan. b \text{ cot. } b$;

or, $\sin. \text{side req.} = \tan. \text{giv. side} \times \text{cot. opp. ang.}$

Lastly, $\sin. C = \frac{\text{cof. } B}{\text{cof. } b}$, or $\sin. \text{req. ang.} = \frac{\text{cof. giv. ang.}}{\text{cof. giv. side}}$

Case 5.—Given a side c , and its adjacent angle B, to find the other parts.

Here, $\tan. b = \tan. B \sin. c$;

or, $\tan. \text{side req.} = \tan. \text{opp. ang.} \times \sin. \text{giv. side.}$

Again, $\tan. a = \frac{\tan. c}{\text{cof. } B}$, or $\tan. \text{hyp.} = \frac{\tan. \text{giv. side}}{\text{cof. giv. ang.}}$;

or, $\text{cot. } a = \text{cof. } B \text{ cot. } c$; that is,

$$\text{cot. hyp.} = \text{cof. giv. ang.} \times \text{cot. giv. side.}$$

Lastly, $\text{cof. } C = \text{cof. } c \sin. B$;

or, $\text{cof. ang. req.} = \text{cof. opp. side} \times \sin. \text{giv. ang.}$

Case 6.—Given the two oblique angles B and C, to find the rest.

Here, $\text{cof. } a = \text{cot. } B \cdot \text{cot. } C$;

or, $\text{cof. hyp.} = \text{cot. of one side} \times \text{cot. of the other}$;

$$\left. \begin{aligned} \text{cof. } b &= \frac{\text{cof. } B}{\sin. C} \\ \text{cof. } c &= \frac{\text{cof. } C}{\sin. B} \end{aligned} \right\} \text{ or, } \text{cof. req. side} = \left\{ \begin{aligned} &\text{cof. opp. ang.} \\ &\sin. \text{adj. ang.} \end{aligned} \right.$$

It may be proper to observe, that the rule of the signs, given under the article *Arithmetic of SINES*, will serve in all these cases to determine the kind or affection of the unknown parts.

In working by logarithms it must be observed, that when the resulting logarithm is the logarithm of a quotient, 10 must be added to the index; and when it is the logarithm of a product, 10 must be subtracted from the index.

TRIGONOMETRY.

II. *Resolution of oblique-angled spherical Triangles.*—This may be effected by means of four general cases, comprehending two or more problems.

Case 1.—Given three of these four things, *viz.* two sides b, c , and their opposite angles B and C , to find the fourth.

This case comprehends two problems, in one of which the unknown quantity is an angle, in the other a side; which are both resolved by means of equation N° (I.) from which we have

$$\sin. C = \frac{\sin. c \sin. B}{\sin. b}; \sin. c = \frac{\sin. C \sin. b}{\sin. B}.$$

Case 2.—Of the four following things; *viz.* a, b, c , and an angle, any three being given, to find the fourth.

This case comprises three problems.

1. When the three sides are given, to find an angle.

Here, from equation N° (II.) we have

$$\cos. A = \frac{\cos. a - \cos. b \cos. c}{\sin. b \sin. c}$$

$$\cos. B = \frac{\cos. b - \cos. a \cos. c}{\sin. a \sin. c}$$

$$\cos. C = \frac{\cos. c - \cos. a \cos. b}{\sin. a \sin. b}$$

In this form, however, the equations are not adapted to logarithmic computation. We must therefore refer

$$\begin{aligned} \tan. \frac{1}{2} A &= \sqrt{\left\{ \frac{\sin. \frac{1}{2} (a + b - c) \sin. \frac{1}{2} (a + c - b)}{\sin. \frac{1}{2} (a + b + c) \sin. \frac{1}{2} (b + c - a)} \right\}} \\ \tan. \frac{1}{2} B &= \sqrt{\left\{ \frac{\sin. \frac{1}{2} (a + b - c) \sin. \frac{1}{2} (b + c - a)}{\sin. \frac{1}{2} (a + b + c) \sin. \frac{1}{2} (a + c - b)} \right\}} \\ \tan. \frac{1}{2} C &= \sqrt{\left\{ \frac{\sin. \frac{1}{2} (a + c - b) \sin. \frac{1}{2} (b + c - a)}{\sin. \frac{1}{2} (a + b + c) \sin. \frac{1}{2} (a + b - c)} \right\}} \end{aligned} \quad \text{(XI.)}$$

The expressions for the sines of the half angles might be obtained with equal facility. As they are symmetrical, we shall put down but one; *viz.*

$$\sin. \frac{1}{2} A = \sqrt{\frac{\sin. \frac{1}{2} (a + b - c) \sin. \frac{1}{2} (a + c - b)}{\sin. b \sin. c}}$$

And expressions for the cosines and cotangents of the half angles may be readily found from the above by the forms $\cos. = \frac{\sin.}{\tan.}$, $\cot. = \frac{\cos.}{\sin.}$.

When two sides, as b and c , become equal, the expression

$$\text{for } \sin. \frac{1}{2} A, \text{ becomes } \sin. \frac{1}{2} A = \frac{\sin. \frac{1}{2} a}{\sin. b}.$$

If $a = b = c = 90^\circ$, then $\sin. \frac{1}{2} A = \frac{\frac{1}{2} \sqrt{2}}{1} = \frac{1}{2} \sqrt{2}$
 $= \sin. 45^\circ$; and $A = B = C = 90^\circ$.

Leaving other corollaries to be deduced by the reader, let us proceed to the next problem in this case.

2. To find the side c opposite to the given angle C : that is, given two sides and the included angle, to find the third side.

Find from the data a dependent angle ϕ such, that

$$\tan. \phi = \cos. C \tan. b. \quad \text{(XII.)}$$

Substitute for $\cos. C$, in the third equation N° (II.) its value in this, and it will become

$$\begin{aligned} \cos. c &= \cos. a \cos. b + \sin. a \cos. b \tan. \phi \\ &= \cos. b \left(\frac{\cos. a \cos. \phi + \sin. a \sin. \phi}{\cos. \phi} \right) \text{ or} \end{aligned}$$

to the formulæ given under the article **SINE**, where we have

$$1 + \cos. A = 2 \cos.^2 \frac{1}{2} A, \text{ and } 1 - \cos. A = 2 \sin.^2 \frac{1}{2} A.$$

Hence,

$$2 \cos.^2 \frac{1}{2} A = \frac{\sin. b \sin. c}{\sin. b \sin. c} + \frac{\cos. a - \cos. b \cos. c}{\sin. b \sin. c} = \frac{\cos. a - \cos. (b + c)}{\sin. b \sin. c}.$$

$$\text{Hence, also, } 2 \sin.^2 \frac{1}{2} A = \frac{\cos. (b - c) - \cos. a}{\sin. b \sin. c}.$$

The latter of these, divided by the former, gives

$$\tan.^2 \frac{1}{2} A = \frac{\cos. (b - c) - \cos. a}{\cos. a - \cos. (b + c)};$$

which is equivalent to

$$\tan.^2 \frac{1}{2} A = \frac{\sin. \frac{1}{2} (a + b - c) \sin. \frac{1}{2} (a + c - b)}{\sin. \frac{1}{2} (a + b + c) \sin. \frac{1}{2} (b + c - a)}.$$

See **SINES**.

Hence we have, for the tangents of the half angles, these three symmetrical equations; *viz.*

$$\cos. c = \frac{\cos. b \cos. (a - \phi)}{\cos. \phi}. \quad \text{(XIII.)}$$

Note.—The equation N° (XII.) obviously reduces to

$$\frac{1}{\tan. \phi} \cos. C = \frac{1}{\tan. b}, \text{ or } \cot. \phi \cos. C = \cot. b; \text{ which}$$

is analogous to N° (VIII.) So that b is the hypotenuse, and ϕ one leg of a right-angled triangle. The above transformation, therefore, is equivalent to the division of the proposed triangle into two, by an arc from the vertical angle A falling perpendicularly upon the opposite side a .

3. To find the side a , not opposite to the given angle; b, c , and C being given

Here find ϕ , as before, by N° (XII.) then from N° (XIII.) we have

$$\cos. (a - \phi) = \frac{\cos. c \cos. \phi}{\cos. b}. \quad \text{(XIV.)}$$

Hence a is known by adding ϕ .

Case 3.—Of the four following parts; *viz.* two sides, a and c , and two angles, B and C , one opposite, the other adjacent; three being given, to find a fourth.

This case presents four problems.

1. Given a, c, B , to find C .

Determine an arc ϕ' by this condition,

$$\cot. c = \cot. \phi' \cos. B, \text{ or } \frac{\cot. c}{\cos. B} = \cot. \phi'. \quad \text{(XV.)}$$

Substitute

TRIGONOMETRY.

Substitute this value of $\cot. c$ for it in Equation 3. N° (IV.) and it will become

$$\sin. a \cot. \phi' \cos. B = \cos. a \cos. B + \sin. B \cot. C.$$

$$\text{Whence } \cot. C = \frac{(\cot. \phi' \sin. a - \cos. a) \cos. B}{\sin. B} =$$

$$(\cot. \phi' \sin. a - \cos. a) \cot. B; \text{ or}$$

$$\cot. C = \frac{\cot. B \sin. (a - \phi')}{\sin. \phi'} \quad (\text{XVI.})$$

It may be observed, that equation N° (XV.) is analogous to N° (VIII.); which shews, that the operation here performed, is equivalent to letting fall a perpendicular arc from the angle A to the base a ; the subsidiary arc ϕ' being the segment adjacent to the given angle B.

2. Given B, C, c , to find a .

Here ϕ' must be found by N° (XV.) and then from N° (XVI.) we have

$$\sin. (a - \phi') = \frac{\cot. C \sin. \phi'}{\cot. B} \quad (\text{XVII.})$$

Whence a becomes known.

3. Given B, C, a , to find c .

Find a dependent angle ϕ'' , by making

$$\cot. C = \cos. a \tan. \phi'', \text{ or } \frac{\cot. C}{\cos. a} = \tan. \phi'' \quad (\text{XVIII.})$$

$$\cot. \frac{1}{2} a = \sqrt{\left\{ \frac{\cos. \frac{1}{2} (A + B - C) \cos. \frac{1}{2} (A - B + C)}{-\cos. \frac{1}{2} (B + C + A) \cos. \frac{1}{2} (B + C - A)} \right\}}$$

$$\cot. \frac{1}{2} b = \sqrt{\left\{ \frac{\cos. \frac{1}{2} (B + C - A) \cos. \frac{1}{2} (A + B - C)}{-\cos. \frac{1}{2} (B + C + A) \cos. \frac{1}{2} (A + C - B)} \right\}} \quad (\text{XXI.})$$

$$\cot. \frac{1}{2} c = \sqrt{\left\{ \frac{\cos. \frac{1}{2} (A + C - B) \cos. \frac{1}{2} (B + C - A)}{-\cos. \frac{1}{2} (B + C + A) \cos. \frac{1}{2} (A + B - C)} \right\}}$$

The following are the expressions for the sines of the half angles; *viz.*

$$\sin. \frac{1}{2} a = \sqrt{\left\{ \frac{\cos. \frac{1}{2} (A + B + C) \cos. \frac{1}{2} (B + C - A)}{-\sin. B \sin. C} \right\}}$$

$$\sin. \frac{1}{2} b = \sqrt{\left\{ \frac{\cos. \frac{1}{2} (A + B + C) \cos. \frac{1}{2} (A + C - B)}{-\sin. A \sin. C} \right\}} \quad (\text{XXII.})$$

$$\sin. \frac{1}{2} c = \sqrt{\left\{ \frac{\cos. \frac{1}{2} (A + B + C) \cos. \frac{1}{2} (A + B - C)}{-\sin. A \sin. B} \right\}}$$

It may here be observed, that notwithstanding the denominators are negative in the above expressions, the whole fraction under the radical are always positive.

2. Given A, B, c , to find C.

Here, by applying in like manner the equations N° (XII.) and N° (XIII.) to the supplemental triangle, we shall have

$$\cot. \phi = \cos. c \tan. B; \quad (\text{XXIII.})$$

from which the subsidiary angle ϕ may be determined, and thence

$$\cot. C = \frac{\cos. B \sin. (A - \phi)}{\sin. \phi} \quad (\text{XXIV.})$$

3. Given B, C, and c , to find A.

Find ϕ from N° (XXIII.) then from N° (XXIV.) there results

$$(\sin. A - \phi) = \frac{\cot. C \sin. \phi}{\cos. B} \quad (\text{XXV.})$$

from which A becomes known.

Of the Analogies of Napier.—In the introduction to the

Substitute the value of $\cot. C$ for it in equation N° (IV.) and it will reduce to

$$\cot. c = \frac{\cot. a \cos. (B - \phi'')}{\cos. \phi''} \quad (\text{XIX.})$$

4. Given a, c, C , to find B.

Determine ϕ'' from N° (XVIII.); then

$$\cos. (B - \phi'') = \frac{\cot. c \cos. \phi''}{\cot. a} \quad (\text{XX.})$$

from which B becomes known.

Case 4.—Of these four parts; *viz.* the three angles and a side, (suppose c), any three being given, to find the fourth.

This case comprises three problems.

1. Given three angles to find a side.

Suppose Equation 1. N° (XI.) to be applied to the solution of the supplemental triangle, by changing a, b, c , and C, into a', b', c' , and C'. Then to bring it back to the triangle proposed, let there be substituted for a', b', c' , and C', the corresponding values $180^\circ - A, 180^\circ - B, 180^\circ - C$, and $180^\circ - c$; those equations will then be transformed into the following, which are applicable to the present problem.

present article we had occasion to mention the analogies of Napier, which it may not be amiss to illustrate before we proceed any farther in our investigations. These analogies are four simple and elegant formulæ, which we owe to the celebrated inventor of logarithms, of which two serve to determine any two angles of a spherical triangle by means of two opposite sides and their included angle; while the other two serve to find any two sides by means of their opposite angle and the contained side. They, therefore, together with equation N° (I.), will serve for the solution of all the cases of oblique-angled spherical triangles. The investigation of these analogies may be given as follow.

If from Equation 1. N° (II.) $\cos. c$ be exterminated, there will result, after a little reduction,

$$\cos. A \sin. c = \cos. a \sin. b - \cos. C \sin. a \cos. b;$$

and, by a simple permutation of letters,

$$\cos. B \sin. c = \cos. b \sin. a - \cos. C \sin. b \cos. a.$$

Adding these equations together, and reducing them, we have

$$\sin. c (\cos. A + \cos. B) = (1 - \cos. C) \sin. (a + b).$$

Now

TRIGONOMETRY.

Now from N^o (I.) we have

$$\frac{\sin. a}{\sin. A} = \frac{\sin. b}{\sin. B} = \frac{\sin. c}{\sin. C}$$

Clearing these equations of their denominators, and respectively adding and subtracting them, there results

$$\sin. c (\sin. A + \sin. B) = \sin. C (\sin. a + \sin. b)$$

$$\sin. c (\sin. A - \sin. B) = \sin. C (\sin. a - \sin. b)$$

Dividing each of these two equations by the preceding, there will be obtained,

$$\frac{\sin. A + \sin. B}{\cos. A + \cos. B} = \frac{\sin. C}{1 - \cos. C} \times \frac{\sin. a + \sin. b}{\sin. (a + b)}$$

$$\frac{\sin. A - \sin. B}{\cos. A + \cos. B} = \frac{\sin. C}{1 - \cos. C} \times \frac{\sin. a - \sin. b}{\sin. (a + b)}$$

Consequently, from the relation established under *Arithmetic of SINES*,

$$\tan. \frac{1}{2} (A + B) = \cot. \frac{1}{2} C \cdot \frac{\cos. \frac{1}{2} (a - b)}{\cos. \frac{1}{2} (a + b)}$$

$$\tan. \frac{1}{2} (A - B) = \cot. \frac{1}{2} C \cdot \frac{\sin. \frac{1}{2} (a - b)}{\sin. \frac{1}{2} (a + b)}$$

And these equations, expressed as analogies, are,

$$\begin{aligned} \cos. \frac{1}{2} (a + b) : \cos. \frac{1}{2} (a - b) :: \cot. \frac{1}{2} C : \tan. \frac{1}{2} (A + B) \\ \sin. \frac{1}{2} (a + b) : \sin. \frac{1}{2} (a - b) :: \cot. \frac{1}{2} C : \tan. \frac{1}{2} (A - B) \end{aligned}$$

These analogies being applied to the supplemental triangle, by putting $180^\circ - A$, $180^\circ - B$, &c. for a , b , &c. we have

$$\begin{aligned} \cos. \frac{1}{2} (A + B) : \cos. \frac{1}{2} (A - B) :: \tan. \frac{1}{2} c : \tan. \frac{1}{2} (a + b) \\ \cos. \frac{1}{2} (A + B) : \cos. \frac{1}{2} (A - B) :: \tan. \frac{1}{2} c : \tan. \frac{1}{2} (a - b) \end{aligned}$$

From a due consideration of these four analogies, it results,

1. That $\frac{1}{2} (A - B) < 90^\circ$, or that the difference of two angles of a spherical triangle is less than 180° .

2. That $\frac{1}{2} (a + b)$ and $\frac{1}{2} (A + B)$ are always of the same affection.

3. That the difference of two sides is always less than 180° .

4. That $(a - b)$ and $(A - B)$ have always the same sign; whence it follows, that the greatest angle is opposite to the greatest side, and reciprocally.

To these it may be added,

5. That the least angle is opposite to the least side, and the mean angle to the mean side.

One or other of these observations will serve to remove the ambiguity in the doubtful cases where a , b , and B , or A , B , and b , are given.

We may now collect the most commodious of these theorems, and present in one place all that will be usually required in the solution of oblique-angled spherical triangles.

$$1. \frac{\sin. A}{\sin. a} = \frac{\sin. B}{\sin. b} = \frac{\sin. C}{\sin. c}$$

$$2. \tan. \frac{1}{2} A = \sqrt{\frac{\sin. \frac{1}{2} (a + b - c) \sin. \frac{1}{2} (a + c - b)}{\sin. \frac{1}{2} (b + c - a) \sin. \frac{1}{2} (a + c + b)}}$$

$$3. \tan. \frac{1}{2} B = \sqrt{\frac{\sin. \frac{1}{2} (b + c - a) \sin. \frac{1}{2} (a + b - c)}{\sin. \frac{1}{2} (a + c - b) \sin. \frac{1}{2} (a + b + c)}}$$

$$4. \tan. \frac{1}{2} C = \sqrt{\frac{\sin. \frac{1}{2} (a + c - b) \sin. \frac{1}{2} (b + c - a)}{\sin. \frac{1}{2} (a + b - c) \sin. \frac{1}{2} (a + b + c)}}$$

$$5. \tan. \frac{1}{2} a = \sqrt{\frac{-\cos. \frac{1}{2} (B + C - A) \cos. \frac{1}{2} (A + B + C)}{\cos. \frac{1}{2} (A + B - C) \cos. \frac{1}{2} (A + C - B)}}$$

$$6. \tan. \frac{1}{2} b = \sqrt{\frac{-\cos. \frac{1}{2} (A + C - B) \cos. \frac{1}{2} (A + B + C)}{\cos. \frac{1}{2} (B + C - A) \cos. \frac{1}{2} (A + B - C)}}$$

$$7. \tan. \frac{1}{2} c = \sqrt{\frac{-\cos. \frac{1}{2} (A + B - C) \cos. \frac{1}{2} (A + B + C)}{\cos. \frac{1}{2} (A + C - B) \cos. \frac{1}{2} (B + C - A)}}$$

$$8. \tan. \frac{b - a}{2} = \tan. \frac{1}{2} c \frac{\sin. \frac{1}{2} (B - A)}{\sin. \frac{1}{2} (B + A)}$$

$$9. \tan. \frac{b + a}{2} = \tan. \frac{1}{2} c \frac{\cos. \frac{1}{2} (B - A)}{\cos. \frac{1}{2} (B + A)}$$

$$10. \tan. \frac{c - b}{2} = \tan. \frac{1}{2} a \frac{\sin. \frac{1}{2} (C - B)}{\sin. \frac{1}{2} (C + B)}$$

$$11. \tan. \frac{c + b}{2} = \tan. \frac{1}{2} a \frac{\cos. \frac{1}{2} (C - B)}{\cos. \frac{1}{2} (C + B)}$$

$$12. \tan. \frac{a - c}{2} = \tan. \frac{1}{2} b \frac{\sin. \frac{1}{2} (A - C)}{\sin. \frac{1}{2} (A + C)}$$

$$13. \tan. \frac{a + c}{2} = \tan. \frac{1}{2} b \frac{\cos. \frac{1}{2} (A - C)}{\cos. \frac{1}{2} (A + C)}$$

$$14. \tan. \frac{B - A}{2} = \cot. \frac{1}{2} C \frac{\sin. \frac{1}{2} (b - a)}{\sin. \frac{1}{2} (b + a)}$$

TRIGONOMETRY.

15. $\text{Tan. } \frac{B + A}{2} = \text{cot. } \frac{1}{2} C \frac{\text{cof. } \frac{1}{2} (b - a)}{\text{cof. } \frac{1}{2} (b + a)}$
16. $\text{Tan. } \frac{C - B}{2} = \text{cot. } \frac{1}{2} A \frac{\text{fin. } \frac{1}{2} (c - b)}{\text{fin. } \frac{1}{2} (c + b)}$
17. $\text{Tan. } \frac{C + B}{2} = \text{cot. } \frac{1}{2} A \frac{\text{cof. } \frac{1}{2} (c - b)}{\text{cof. } \frac{1}{2} (c + b)}$
18. $\text{Tan. } \frac{A - C}{2} = \text{cot. } \frac{1}{2} B \frac{\text{fin. } \frac{1}{2} (a - c)}{\text{fin. } \frac{1}{2} (a + c)}$
19. $\text{Tan. } \frac{A + C}{2} = \text{cot. } \frac{1}{2} B \frac{\text{cof. } \frac{1}{2} (a - c)}{\text{cof. } \frac{1}{2} (a + c)}$
20. $\text{Tan. } \frac{1}{2} c = \text{tan. } \frac{1}{2} (b - a) \frac{\text{fin. } \frac{1}{2} (B + A)}{\text{fin. } \frac{1}{2} (B - A)}$
21. $\text{Tan. } \frac{1}{2} c = \text{tan. } \frac{1}{2} (b + a) \frac{\text{cof. } \frac{1}{2} (B + A)}{\text{cof. } \frac{1}{2} (B - A)}$
22. $\text{Tan. } \frac{1}{2} a = \text{tan. } \frac{1}{2} (c - b) \frac{\text{fin. } \frac{1}{2} (C + B)}{\text{fin. } \frac{1}{2} (C - B)}$
23. $\text{Tan. } \frac{1}{2} a = \text{tan. } \frac{1}{2} (c + b) \frac{\text{cof. } \frac{1}{2} (C + B)}{\text{cof. } \frac{1}{2} (C - B)}$
24. $\text{Tan. } \frac{1}{2} b = \text{tan. } \frac{1}{2} (a - c) \frac{\text{fin. } \frac{1}{2} (A + C)}{\text{fin. } \frac{1}{2} (A - C)}$
25. $\text{Tan. } \frac{1}{2} b = \text{tan. } \frac{1}{2} (a + c) \frac{\text{cof. } \frac{1}{2} (A + C)}{\text{cof. } \frac{1}{2} (A - C)}$
26. $\text{Cot. } \frac{1}{2} C = \text{tan. } \frac{1}{2} (B - A) \frac{\text{fin. } \frac{1}{2} (b + a)}{\text{fin. } \frac{1}{2} (b - a)}$
27. $\text{Cot. } \frac{1}{2} C = \text{tan. } \frac{1}{2} (B + A) \frac{\text{cof. } \frac{1}{2} (b + a)}{\text{cof. } \frac{1}{2} (b - a)}$
28. $\text{Cot. } \frac{1}{2} A = \text{tan. } \frac{1}{2} (C - B) \frac{\text{fin. } \frac{1}{2} (c + b)}{\text{fin. } \frac{1}{2} (c - b)}$
29. $\text{Cot. } \frac{1}{2} A = \text{tan. } \frac{1}{2} (C + B) \frac{\text{cof. } \frac{1}{2} (c + b)}{\text{cof. } \frac{1}{2} (c - b)}$
30. $\text{Cot. } \frac{1}{2} B = \text{tan. } \frac{1}{2} (A - C) \frac{\text{fin. } \frac{1}{2} (a + c)}{\text{fin. } \frac{1}{2} (a - c)}$
31. $\text{Cot. } \frac{1}{2} B = \text{tan. } \frac{1}{2} (A + C) \frac{\text{cof. } \frac{1}{2} (a + c)}{\text{cof. } \frac{1}{2} (a - c)}$

We are indebted for many of the above transformations to Gregory's Trigonometry; others have been derived from Bonnycastle's treatise on the same subject.

We shall now conclude this article, by illustrating the solution of spherical triangles by means of Napier's five circular parts. See PART and CIRCULAR PART.

Solution of right-angled spherical Triangles, by Napier's circular Parts.—If either one or both the sides, including the right angle, come into the question, for it among the data, write its complement to a quadrant. Since then by the general rule delivered under the article CIRCULAR PARTS, and rendered logarithmic, the whole sine, with the sine complement of the middle part, must be equal to the sines of the disjunct parts, and the cotangents of the conjunct parts; from the sum of those data subtract the third datum; the remainder will be some sine or tangent, the side or angle corresponding to which, in the table of sines, &c. is the side or angle sought.

This universal rule being of great service in trigonometry, we shall apply it to the various cases thereof, and illustrate it with examples; which examples, in the case of disjunct or separate parts, will at the same time illustrate the common

method; but in the case of contiguous parts they admit of other solutions.

1. Given the hypotenuse BC, 60°, and the angle C, 23° 30'; to find the opposite leg AB (*fig. 4.*) Since AB is the middle part, C and BC are disjunct (see PART); the product of the whole sine, into the cofine of the complement A B, *i. e.* the sine itself of A B, is equal to the product of the sines of C and BC.

Therefore from the log. sine of C 9.6006997
+ sine of BC 9.9375306

Sum 19.5382303
Subtract whole sine 10.0000000

Remains sine of AB 9.5382303 The nearest corresponding number to which, in the tables, is 20° 12'.

2. Given the hypotenuse BC, 60°, and the leg AB, 20° 12'; to find the opposite angle C. It is evident from the preceding problem, that from the sum of the whole sine, and the sine of the leg AB, the sine of the hypotenuse BC is to be subtracted, the remainder is the sine of the angle C. The example therefore of the former case is easily converted into an example of this.

3. Given the leg AB, 20° 12', and the opposite angle C, 23° 30'; to find the hypotenuse BC. It is evident from the first case, that from the sum of the whole sine, and the sine of A B, is to be subtracted the sine of the angle C, and the remainder is the sine of the hypotenuse BC.

4. Given the hypotenuse BC, 60°, and one leg AB, 20° 12'; to find the other leg. Since BC is a mean part, and AB and AC are disjunct parts, the product of the whole sine, into the cofine of the hypotenuse BC, is equal to the product of the sines of the complements, *i. e.* the cosines of the legs AB and AC.

Therefore from the whole sine 10.0000000
Cofine of BC 9.6989700

Sum 19.6989700
Subtract cofine of AB 9.9724310

Remains cofine of AC 9.7265390 The corresponding number to which, in the tables, is 32° 11'; therefore AC = 57° 49'.

5. Given the legs AC, 57° 49', and AB, 20° 12'; to find the hypotenuse BC. It is evident from the preceding case, that the whole sine is to be subtracted from the sum of the cosines of the legs AB and AC; the remainder is the cofine of the hypotenuse BC. The example, therefore, of the preceding case is easily applied to this.

6. Given the leg AC, 57° 49', and the adjacent angle C, 23° 30'; to find the opposite angle B. Since B is a middle part, and A and C are disjunct parts; the product of the whole sine, by the cofine of B, is equal to the product of the sine of C, and the sine of the complement, *i. e.* the cofine of A C.

Therefore from the sine of C 9.6006997
Cofine A C 9.7265310

Sum 19.3272307
Subtract whole sine 10.0000000

Remains cofine of B 9.3272307 The nearest number corresponding to which, in the tables, is 12° 15'; therefore B = 77° 45'.

7. Given the leg AC, 57° 49', and the opposite angle B, 77° 45'; to find the adjacent angle C. It is evident from the preceding case, that the cofine of AC is to be subtracted

TRIGONOMETRY.

subtracted from the sum of the whole sine, and the cosine of B, the remainder, is the sine of C. The former example, therefore, is easily accommodated to the present case.

8. Given the oblique angles B, $77^{\circ} 45'$, and C, $23^{\circ} 30'$; to find the leg adjacent to the other, A C. From problem the sixth, it is evident that the sine of C is to be subtracted from the sum of the whole sine, and the cosine of B; and that the remainder is the cosine of A C. The example of the sixth problem may be easily applied to this.

9. Given the leg A C, $57^{\circ} 49'$, and the adjacent angle C, $23^{\circ} 30'$; to find the opposite leg A B. Since A C is a mean part, and C and A B conjunct parts, the product of the whole sine, by the sine of A C, is equal to the product of the cotangent of C, and the tangent of A B.

Therefore from the whole sine	10.0000000
Sine of A C	9.9275490

	Sum	19.9275490
Subtract cotangent of C		10.3616981

Remains tangent of A B 9.5658519 To which the nearest corresponding number, in the tables, is $20^{\circ} 12'$.

10. Given the leg A B, $20^{\circ} 12'$, and the opposite angle C, $23^{\circ} 30'$; to find the adjacent leg A C. From the sum of the cotangent of C, and the tangent of A B, subtract the whole sine; the remainder is the sine of A C.

11. Given the legs A B, $20^{\circ} 12'$, and A C, $57^{\circ} 49'$; to find the angle C, opposite to one of them. From the sum of the whole sine, and sine of A C, subtract the tangent of B A; the remainder is the cotangent of C.

12. Given the hypotenuse B C, 60° , and the oblique angle C, $23^{\circ} 30'$; to find the adjacent leg A C. Since C is a middle part, and B C and A C conjoint parts; the product of the whole sine into the cosine of C, will be equal to the product of the cotangents of A C and B C.

Therefore from the whole sine	10.0000000
Cosine of C	9.9623978

	Sum	19.9623978
Subtract cotangent of B C		9.7614394

Remains tangent of A C 10.2009584 The nearest number corresponding to which, in the tables, is $57^{\circ} 49'$.

13. Given the leg A C, $57^{\circ} 49'$, and the adjacent angle C, $23^{\circ} 30'$; to find the hypotenuse B C.

From the sum of the whole sine, and the cosine of C, subtract the tangent of A C; the remainder is the cotangent of B C.

14. Given the hypotenuse B C, 60° , and the leg A C, $57^{\circ} 49'$; to find the adjacent angle C.

From the sum of the cotangent of B C, and tangent of A C, subtract the whole sine; and the remainder is the cosine of C.

15. Given the hypotenuse B C, 60° , and one angle C, $23^{\circ} 30'$; to find the other, B.

Since B C is the middle part, and B and C disjunct parts, the product of the whole sine, into the cosine of B C, will be equal to the product of the cotangents of B and C; and

Therefore from the whole sine	10.0000000
Cosine of B C	9.6989700

	Sum	19.6989700
Subtract cotangent of C		10.3616981

Remains cotangent of B 9.3372719 The nearest corresponding number to which, in the tables, is $12^{\circ} 16'$; therefore B = $77^{\circ} 44'$.

16. Given the oblique angles B, $77^{\circ} 44'$, and C, $23^{\circ} 30'$; to find the hypotenuse B C. From the sum of the cotangents of C and B, subtract the whole sine; the remainder is the cosine of B C.

Solution of oblique-angled spherical Triangles.—1. In an oblique-angled spherical triangle A B C, (*fig. 5.*) two sides, A B and B C, being given, together with an angle, A, opposite to one of them, to find the other, C: the rule is,

As the sine of the side B C is to the sine of the opposite angle A; so is the sine of the side B A to the sine of the opposite angle C.

Suppose, for example, B C, $39^{\circ} 29'$; A, $43^{\circ} 20'$; B A, $66^{\circ} 45'$; then will

Sine of B C	9.8033572
Sine of A	9.8364771
Sine of B A	9.9632168

	-	19.7996939
Sine of C	9.9963367	The nearest corresponding number to which, in the tables, is $82^{\circ} 34'$.

2. Given two angles C, $82^{\circ} 34'$, and A, $43^{\circ} 20'$, together with the side A B, $66^{\circ} 45'$, opposite to one of them, C; to find the side B C opposite to the other of them, A; say, as the sine of the angle C is to the sine of the opposite side A B; so is the sine of the angle A to the sine of the opposite side B C. The former example may suffice for the present case.

3. Given two sides A B, $66^{\circ} 45'$, and B C, $39^{\circ} 29'$, together with an angle opposite to one of them A, $43^{\circ} 20'$; to find the angle included by them, B. Suppose the angle C to be acute, since the other, A, is also acute, the perpendicular B E falls within the triangle. In the right-angled triangle A B E, therefore, from the given angle A, and side A B, find the angle A B E. Since B E is assumed as a lateral part in the triangle A E B, the angle E B C is a middle part, and the side B C must be a conjoint part: the cosine of the angle E B C will be found by subtracting the cotangent of A B from the sum of the cosine of the angle A B E, and the cotangent of B C. If then the angles A B E and E B C be added together, or in case the perpendicular fall without the triangle, be subtracted from each other, you will have the angle required B.

E. gr. Whole sine	10.0000000
Cosine of A B	9.5963154

	Sum	-	19.5963154
Cotangent of A	-	10.0252805	

	Cotangent of A B E	9.5710349	The nearest number corresponding to which, in the tables, is $20^{\circ} 26'$.
A B E, therefore, is $69^{\circ} 34'$.			

	Cosine of A B E	9.5429713
Cotangent of B C	10.0841529	

	Sum	-	19.6271242
Cotangent of A B	-	9.630985	

	Cosine of E B C	-	9.9940257	The nearest number corresponding to which, in the tables, is $9^{\circ} 29'$; therefore A B C = $79^{\circ} 3'$.
--	-----------------	---	-----------	--

4. Given two angles A, $43^{\circ} 20'$, and B, $79^{\circ} 3'$, together with the adjacent side A B, $66^{\circ} 45'$; to find the side B C opposite to one of them.

From one of the given angles B, let fall a perpendicular E B to the unknown side of A C; and in the right-angled triangle A B E, from the given angle A, and hypotenuse A B, find the angle A B E; which, subtracted from the angle

angle $A B C$, leaves the angle $E B C$. But if the perpendicular shall fall without the triangle, the angle $A B C$ should have been subtracted from $A B E$. Since as the perpendicular $B E$ is taken for one of the lateral parts, the middle part in the triangle $A B E$ is the angle B , and the conjoint part $A B$; in the triangle $E B C$ the middle part is the angle B , and the conjoint part $B C$; the cotangent of the side $B C$ is found by subtracting the cosine of $E B A$ from the sum of the cotangent of $A B$, and the cosine of $E B C$. The example of the preceding case is easily applied to this.

5. Given two sides $A B$, $66^{\circ} 45'$, and $B C$, $39^{\circ} 29'$, with the angle A opposite to one of them, $43^{\circ} 20'$; to find the third side $A C$.

Letting fall, as before, the perpendicular $B E$; in the right-angled triangle $A B E$, from the given angle and hypotenuse $A B$, find the side $A E$. Since assuming $B E$ for a lateral part in the triangle $A E B$, $A B$ is the middle part, and $A E$ is the separate part; and in the triangle $B E C$, $B C$ is the mean part, and $E C$ a disjunct part; the cosine of $E C$ is found by subtracting the cosine of $A B$ from the sum of the cosines of $A E$ and $C B$. If then the segments $A E$ and $E C$ be added together, or in case the perpendicular fall without the triangle, be subtracted from each other, the side $A C$ will be had.

6. Given two sides $A C$, $65^{\circ} 31'$, and $A B$, $66^{\circ} 45'$, together with the included angle A , $43^{\circ} 20'$; to find the third side $B C$ opposite thereto.

Letting fall the perpendicular $B E$, find, in the right-angled triangle, the segment $A E$; which, subtracted from $A C$, leaves $E C$. If the perpendicular fall without the triangle, $A C$ is to be subtracted from $A E$. Since by assuming the perpendicular $B E$ for a lateral part in the triangle $A E B$, $A B$ becomes a middle part, and $A E$ a separate part; in the triangle $E B C$, $C B$ is the middle part, $E C$ a separate part: the cosine of $B C$ is found by subtracting the cosine of $A E$ from the sum of the cosines of $A B$ and $E C$.

7. Given two angles A , $43^{\circ} 20'$, and B , $79^{\circ} 3'$, together with the side $C B$, $39^{\circ} 29'$, opposite to one of them; to find the side $A B$ adjacent to both.

Letting fall the perpendicular $C D$ from the unknown angle C , to the opposite side $A B$; and that falling within the triangle; from the given angle B , and the hypotenuse $B C$, seek in the right-angled triangle $B C D$ for the segment $B D$. Since assuming the perpendicular $C D$ for a lateral part in the triangle $C D B$, $D B$ is the mean part, and the angle B a conjoint part; and in the triangle $C D A$, $A D$ is the middle part, and the angle A a conjoint part: the sine of the segment $A D$ is found by subtracting the cotangent of the angle B from the sum of the sine of $D B$, and the cotangent of the angle A . If then the segments $A D$ and $D B$ be added, or in case the perpendicular fall without the triangle, be subtracted from each other, the result will be the side $A B$ required.

8. Given two sides $A B$, $66^{\circ} 45'$, and $B C$, $39^{\circ} 29'$, with the included angle $79^{\circ} 3'$; to find the angle A opposite to one of them.

Letting fall the perpendicular $C D$, find the segment $B D$, as in the preceding problem. This, subtracted from $A B$, leaves $A D$. If the perpendicular fall without the triangle, $A B$ is to be added to $D B$. And since by assuming the perpendicular $C D$ for a lateral part in the triangle $C D B$, $B D$ is the middle part, and the angle B a conjoint part; and in the triangle $C D A$, $A D$ is the middle part, and the angle A a conjoint part, the cotangent of the angle A is formed by subtracting the sine of $D B$ from the sum of the cotangent of the angle B , and of the sine of $A D$.

9. Given two angles A , $43^{\circ} 20'$, and B , $79^{\circ} 3'$, together with the adjacent side $A B$, $66^{\circ} 45'$; to find the angle C opposite to the same.

From one of the given angles B , letting fall the perpendicular $B E$ to the opposite side $A C$; in the right-angled triangle $A B E$, from the given angle A , and hypotenuse $A B$, we find the angle $A B E$; which, subtracted from $A B C$, leaves the angle $E B C$. In case the perpendicular fall without the triangle, $A B C$ is to be subtracted from $A B E$. Since by assuming $B E$ for a lateral part in the triangle $C E B$, the angle C is a middle part, and the angle $C B E$ a disjunct part; and in the triangle $A B E$, the angle A is the middle part, and the angle $A B E$ the disjunct part: the cosine of the angle C is found by subtracting the sine of the angle $A B E$, from the sum of the cosine of the angle A , and the sine of $E B C$.

10. Given two angles A , $43^{\circ} 20'$, and C , $82^{\circ} 34'$, together with the side $B A$, $66^{\circ} 45'$, opposite to one of them; to find the other angle.

From the angle B sought, let fall a perpendicular $B E$; and in the right-angled triangle $A E B$, from the given angle A , and hypotenuse $B A$, find the angle $A B E$. Since assuming the perpendicular $E B$ for a lateral part in the triangle $E C B$, the angle C is the middle part, and the angle $C B E$ a disjunct part; and in the triangle $A B E$, the angle A is the middle part, and the angle $A B E$ is a disjunct part: the sine of the angle $E B C$ is found by subtracting the cosine of A from the sum of the cosine of C , and of the sine of $A B E$. If then $A B E$ and $E B C$ be added, or in case the perpendicular fall without the triangle, be subtracted from each other, the result will be the angle required $A B C$.

11. Given the three sides, to find an angle opposite to one of them. 1. If one side $A C$ (*Plate II. fig. 8.*) be a quadrant, and the leg $A B$ be less than a quadrant, find the angle A . Continue $A B$ to F , till $A F$ become equal to a quadrant; and from the pole A draw the arc $C F$, to cut the arc $B F$ at right angles in F . Since in the right-angled triangle $C B F$, we have given the hypotenuse $B C$, and the side $F B$, or its complement $A B$ to a quadrant; we shall find the perpendicular $C F$, which being the measure of the angle $C A B$, that angle is found of course.

2. If one side $A C$ be a quadrant, and the other $A B$ greater than a quadrant, seek again the angle A : from $A B$ subtract the quadrant $A D$, and from the pole A describe the arc $C D$, cutting the arc $A B$ at right angles in D . Since in the right-angled triangle $C D B$, the hypotenuse $B C$, and side $D B$, or excess of the side $A B$ beyond a quadrant, is given, the perpendicular $C D$ will be found as before, which is the measure of the angle A required.

3. If the triangle be isosceles, and $A C = C F$; and the angle $A C F$ be required; bisect $A F$ in D , and through D and C draw the arc $D C$. Since $D C$ is perpendicular to $A F$, the angles A and F , and $A C D$ and $D C F$, are equal; from the hypotenuse $A C$, and leg $A D$, given in the right-angled triangle $A C D$, we find the angle $A C D$; the double of which is the angle required $A C F$: and from the same data may the angle A or F be found.

4. If the triangle be scalenous, and the angle A (*Plate III. fig. 5.*) be required; from C let fall the perpendicular $C D$, and seek the half-difference of the segments $A D$ and $D B$, by saying, as the tangent of half the base $A B$ is to the tangent of half the sum of the legs $A C$ and $C B$; so is the tangent of their half-difference to the tangent of the half-difference of the segments $A D$ and $D B$: add then the half-difference of the segments to the half-base, to find the greater segment; and subtract the same from the same for the less.

Thus having in the right-angled triangle *CAD*, the hypothenuse *AC*, and the side *AD*, the angle *A* is found thence. After the same manner is *B* found in the other *CDB*, from *CB* and *DB* given.

12. Given the three angles *A*, *B*, and *C*, to find any of the sides. Since in lieu of the given triangle, another may be assumed, whose sides are equal to the given angles, and the angles to the given sides: this problem is resolved after the same manner as the preceding one.

TRIGONUM, or *Triangular Harp*, an ancient musical instrument. (See *Plate of ancient Instruments*.) One of this kind was taken from an ancient painting in the museum of the king of Naples, in which it is placed on the shoulder of a little dancing Cupid, who supports the instrument with his left hand, and plays upon it with his right. The trigonum is mentioned by Athenæus, lib. iv. and by Julius Pollux, lib. iv. cap. 9. According to Athenæus, Sophocles calls it a Phrygian instrument; and one of his Deipnosophists tells us, that a certain musician of the name of Alexander Alexandrinus was so admirable a performer upon it, and had given such proofs of his abilities at Rome, that he made the inhabitants *μυσομανειν*, musically mad. It may not be unworthy of remark, that this little instrument resembles the Theban harp, in the circumstance of wanting one side to complete the triangle. The performer too, being a native of Alexandria, as his name implies, makes it probable it was an Egyptian instrument upon which he gained his reputation at Rome.

TRIGUERA, in *Botany*, was so called by the late abbé Cavanilles, in honour of his friend Don Candido Maria de Trigueros, who gathered this plant, then supposed entirely undescribed, in Andalusia. Another genus was originally thus designated, now *Lagunea lobata* of Willdenow, Sp. Pl. v. 3. 733. The present seems to be a good genus, though the plant on which it is founded proves to be the rare and little-known *Verbascum Osbeckii* of Linnæus, as the writer of the present article first discovered.—Cavan. Diff. 2. after page 106. Schreb. Gen. 114. Willd. Sp. Pl. v. 1. 839. Mart. Mill. Dict. v. 4.—Class and order, *Pentandria Monogynia*. Nat. Ord. *Luridæ*, Linn. *Solanææ*, Juss.

Gen. Ch. Perianth inferior, of one leaf, permanent, divided half way down, into five unequal acute segments. *Cor.* of one petal, bell-shaped; tube very short; limb inflated, plaited, five-cleft, longer than the calyx; the two upper segments reflexed. Nectary a short, membranous, five-toothed cup, surrounding the germen. *Stam.* Filaments five, very short, inserted into the teeth of the nectary at the outside; anthers arrow-shaped, converging. *Pist.* Germen superior, roundish, with two furrows; style thread-shaped, straight, rather longer than the stamens; stigma obtuse. *Peric.* Berry dry, nearly globular, of four cells. *Seeds* two in each cell, roundish, compressed, rough, one over the other.

Eff. Ch. Corolla bell-shaped, irregular. Nectary with five teeth, surrounding the germen, and bearing the stamens. Berry dry, of four cells, with two seeds in each.

Obf. Cavanilles observed one or two of the cells to be occasionally abortive.

1. *T. ambrosiaca*. Musky Triguera. Cavan. Diff. 2. t. A. Willd. n. 1. (*Verbascum Osbeckii*; Linn. Sp. Pl. 255. Willd. Sp. Pl. v. 1. 1006; excluding, from both, the reference to Tournefort, and the last-named place of growth. Obf. It. 52.)—Leaves decurrent, obovate, ferrated. Calyx villous.—Native of Spain, towards the coast, and of Salé in Barbary, flowering in the spring. *Root* annual. *Stems* simple, erect or decumbent, angular, leafy, a span high. *Leaves* alternate, two inches long, somewhat

hairy, coarsely ferrated, tapering at the base, and somewhat decurrent; the upper ones smaller. *Flower-stalks* axillary, in pairs, single-flowered, drooping. *Calyx* covered with woolly hairs. *Corolla* deep violet, an inch wide; nearly black in the throat. *Seeds* blackish, hard. The whole plant, called in Spanish *Abnizguena*, and *Moradilla*, has a pleasant musky scent. It is spoken of as possessing the emollient narcotic virtues of Deadly Nightshade, and Hemlock, being, like those plants, useful in cancers of the breast; so far at least as to allay the pain.

2. *T. inodora*. Scentless Triguera. Cavan. as above. Willd. n. 2.—Leaves sessile, ovato-lanceolate, entire. Calyx smooth.—Found in Andalusia with the foregoing, and vulgarly named *Moradilla blanquezina*. Differs from the first in the smoothness of every part. The flowers are handsome, drooping. *Throat* very pale violet, or yellowish-white, with five stripes; limb pale violet, or purple, with entire pointless lobes.

TRIGUEROS, in *Geography*, a town of Spain, in the province of Seville; 8 miles N.N.E. of Moguer.

TRIGYNIA, in *Botany, from *τρεεις*, three, and *γυνη*, a female, the name of an order in many classes of the Linnæan artificial system, distinguished by the flowers having three styles, pistils, or sessile stigmas. Of the latter, *Viburnum* and *Sambucus*, in the fifth class, are instances. The order in question occurs in the 1st, 2d, 3d, 5th, 6th, 8th, 9th, 10th, 11th, 12th, and 13th classes; in the 4th and 7th it is wanting. Indeed in the 13th class, this order is but uncertain, *Delphinium* and *Aconitum*, on which Linnæus founded it, being variable in the number of pistils. In the 12th class, *Icosandria*, it forms such unnatural and troublesome distinctions, as to be much better abolished. See **PENTAGYNIA**.*

TRIHILATÆ, so denominated from *tres*, *tria*, three, and *hilum*, the scar of a seed, because some of the principal genera are remarkable for the broad scars of their three seeds; the 23d natural order among the *fragmenta* of Linnæus, standing between his *Caryophyllei* and *Corydalis*, to the latter of which only it has any, even the slightest, affinity.

This is in itself but a heterogeneous assemblage, embracing several of Jussieu's orders, particularly the *Sapindi*, *Acera* and *Malpighiæ*, as also his *Meliæ*. It consists of three sections. In the first are *Melia*, *Trichilia*, *Guarea* and *Turraæ*; to which Linnæus was afterwards inclined to add *Cedrela* and *Swietenia*. The second section consists of *Malpighia*, *Banisteria*, *Hiræa*, *Triopteris*, *Acer* and *Æsculus*: and the third, of *Staphylea*, *Sapindus*, *Paullinia*, *Cardiospermum* and *Tropæolum*, to which Linnæus afterwards added *Hippocratea*, more certainly belonging to the second section.

Cavanilles, in his Dissertations on Monadelphous Plants, has added many new genera to the *Trihilatæ*; but he is extolled beyond measure by Giseke in his edition of the *Prælectiones* of Linnæus; where an account is given, not only of these genera, but of various others, considered by Cavanilles as monadelphous, though contrary to the general opinion. See **MONADELPHIA**.

TRIHING, **THRIHING**, or *Trithing*, from the Saxon, *dribinge*, an extent containing three or four hundreds, or the third part of a shire, or province. See **TITHING**.

Mr. Thoresby thinks the word ought to be written *thrithing*. See Thoresb. Ducatus Leodens. p. 85.

These trithings still subsist in the county of York, where by an easy corruption they are denominated *ridings*.

The word is also used for a court held within that circuit, which was the same with what we now call a *court-leet*, which is above a court-baron, and inferior to the county-court.

TRIKALA, in *Mythology*, is a name of the Hindoo deity Siva. One of his names is Kala, or Time, and the epithet Tri prefixed denotes his omniscience and omnipresence as to all times, past, present, and to come; a mystical triad or union of time. The honourable designation of Trikala is sometimes given to, or assumed by, individuals of supposed profundity of knowledge, especially if of an inspired or prophetic description. The consort of Siva in this form or character is Trikali, or Trikala-devi-kumari, meaning the divine triple maid, or triform divine maiden Kali. See TRISAKTI.

TRIKALA-DEVI. See the preceding article.

TRILATERAL, a term applied to all three-sided figures. See TRIANGLE.

TRILEUCUM PROMONTORIUM, or *Lapacia Cory*, in *Ancient Geography*, a promontory on the northern coast of Spain, N. of the country of the Callaici. According to Ptolemy, it lay between Flavium Brigantium and the mouth of the river Metarus or Mearus.

TRILIX, in *Botany*, a Latin word, used for a tissue of three threads, woven or twisted together; but how it applies to this plant, we are not informed. Mutis, its discoverer, called the genus *Jacquinia*. De Theis understands the above name as merely equivalent to triple, and alluding to the three calyx-leaves, and three petals, which perhaps is right.—Linn. Mant. 153. Schreb. 347. Willd. Sp. Pl. v. 2. 1129. Mart. Mill. Dict. v. 4. Juss. 435.—Class and order, *Polyandria Monogynia*. Nat. Ord. uncertain.

Gen. Ch. *Cal.* Perianth inferior, of three ovate, acute, spreading, flat, permanent leaves. *Cor.* Petals three, lanceolate, acute, smaller than the calyx. *Stam.* Filaments numerous, capillary, the length of the corolla; anthers roundish, minute, two-lobed. *Pist.* Germen superior, five-angled; style cylindrical; stigma simple. *Peric.* Berry obscurely five-angled, of five cells, covered by the calyx. *Seeds* numerous, roundish, minute.

Eff. Ch. Petals three. Calyx of three leaves. Berry of five cells, with many seeds.

1. *T. lutea*. Linn. Mant. 247. Willd. n. 1.—Gathered at Carthage, in South America, by Mutis, from whose description alone, contrary to his usual practice, Linnæus adopted this genus into his system. This, the only species, is a shrub two fathoms in height, with very numerous, round, roughish branches. *Leaves* alternate, stalked, somewhat petate, ovate, rather heart-shaped, pointed, serrated, veiny, downy. *Footstalks* round, smooth. *Flowers* yellow, not from the corolla, but the anthers, generally terminal, racemose, their partial stalks simple, round, downy.

TRILL, in *Music*, a plain shake upon a single note, formed by a beating in the throat on the vowel *o*, or by the shaking of the palate on the throat in one sound upon a note: this grace is usually made in closes or cadences, and when on a long note exclamation or passion is expressed, the trill is made in the latter part of such note; but most commonly on binding notes and such as precede the closing note. See TRILLO.

TRILL-Hooks, those used to hold the sides of a cart up to the horse.

TRILLETTO, in the *Italian Music*, a little short shake or quaver; it differs from trillo only in point of continuance, being its diminutive.

TRILLION, in *Arithmetic*, the number of a billion of billions.

After billions, we reckon by trillions, which makes a class of numeration, and is divided, like the other classes, into three places: thus we say, *trillions*, *tens of trillions*, *hundreds of trillions*, &c.

TRILLIUM, in *Botany*, a Linnæan name, left unexplained by its author, evidently alludes, like *Trilix*, to the triple number, not only of the calyx-leaves and petals, but of the stigmas, cells of the fruit, and even of the leaves, which prevails throughout this genus.—Linn. Gen. 180. Schreb. 240. Willd. Sp. Pl. v. 2. 271. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 2. 328. Pursh 244. Juss. 42. Lamarck Illustr. t. 267.—Class and order, *Hexandria Trigynia*. Nat. Ord. *Sarmentaceæ*, Linn. *Asparagi*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of three spreading, ovate, permanent leaves. *Cor.* Petals three, nearly ovate, rather larger than the calyx. *Stam.* Filaments six, awl-shaped, erect, shorter than the calyx; anthers terminal, oblong, the length of the filaments. *Pist.* Germen roundish, superior; styles three, thread-shaped, recurved; stigmas simple. *Peric.* Berry roundish, of three cells. *Seeds* several, roundish.

Eff. Ch. Calyx of three leaves. Petals three. Berry of three cells.

This genus is entirely confined, as far as botanists have hitherto observed, to North America. Linnæus has described three species, nor has Willdenow any more, in his Sp. Pl. Pursh has given by far the best account of the genus, greatly increasing the number of species. We shall therefore follow him in the greater part of their arrangement. All are perennial, herbaceous, smooth, with a simple, erect, round stem, bearing three simple entire leaves at the top, and a solitary flower, sessile or stalked, in the centre between them. Five of these plants are mentioned by Mr. Aiton, as cultivated in England, all hardy, flowering in April or May. In natural affinity, *Trillium* comes very near to PARIS. See that article.

1. *T. sessile*. Dark sessile *Trillium*. Linn. Sp. Pl. 484. Willd. n. 3. Pursh n. 1. Ait. n. 5. Curt. Mag. t. 40. Redout. Liliac. t. 133. (Paris foliis ternis, flore sessili erecto; Gron. Virg. ed. 1. 44. Solanum triphyllum, flore tripetalo atro-purpureo, in foliorum sinu absque pediculo, sessili; Pluk. Phyt. t. 111. f. 6. S. triphyllum, &c.; Catech. Carol. v. 1. t. 50.)—Flower sessile, erect. Petals lanceolate, erect, twice the length of the calyx. Leaves sessile, broadly elliptical, acute.—On the sides of fertile hills, in shady rocky ground, from Pennsylvania to Carolina, flowering in April and May. *Flower* dark chocolate-brown. *Berry* purple. I have seen a specimen with yellow flowers, brought from the Cherokee nation, which probably may be a distinct species. *Pursh*. Our plant has a thick, tuberous, horizontal root, with many simple fibres. *Stem* three or four inches high. *Leaves* spreading, rather deflexed, two inches long, spotted with light and dark-green, somewhat like *Erythronium Dens-canis*. *Calyx-leaves* an inch long, spreading, lanceolate, green with a purple tinge. *Petals* deep purple, nearly twice as long, converging, tapering at the base.

2. *T. petiolatum*. Plantain-leaved *Trillium*. Pursh n. 2.—“Flower sessile, erect. Petals linear-lanceolate, upright, rather longer than the calyx. Leaves elliptic-lanceolate, acute, on very long footstalks.”—About the waters of the Koooskoosky. *Gov. Lewis*. Flowering in June. This singular species, whose flowers resemble those of the foregoing, has leaves very much like *Plantago major*. *Pursh*.

3. *T. pifidum*. Purple-veined *Trillium*. Pursh n. 3. (*T. erythrocarpum*; Michaux Boreal. Amer. v. 1. 216. “*T. undulatum*; Willd. Hort. Berol. v. 1. 55.”)—“Flower-stalk nearly upright. Petals elliptic-lanceolate, acute, recurved, nearly twice as long as the linear-lanceolate calyx. Leaves ovate, pointed; rounded at the base; abruptly stalked.”

TRILLIUM.

stalked."—In sphagnous bogs, on the high mountains of Pennsylvania, Carolina, and Canada, flowering in May and June. *Flowers* white, with purple veins at the bottom. *Berry* scarlet. *Pursh*. We received from the late Rev. Dr. Muhlenberg, in 1799, a specimen answering precisely to this description, but not at all to Willdenow's name of *undulatum*. The *leaves* are an inch and half long, taper-pointed, on short stalks. *Flower-stalk* half that length. *Petals* an inch long, white, with slender parallel veins, which are of a fine purple at the base, even in the dried specimen. *Anthers* purple. *Germen* and *style* yellowish-white.

4. *T. ovatum*. Ovate Trillium. Pursh n. 4.—"Flower-stalk erect. *Petals* oblong, acute, spreading, rather longer than the linear calyx. *Leaves* ovate, tapering to a point, quite sessile."—On the rapids of Columbia river. *Gov. Lewis*. Flowering in April. *Flowers* pale purple. *Pursh*.

5. *T. pumilum*. Blunt-leaved Trillium. Pursh n. 5. (*T. pusillum*; Michaux Boreal.-Amer. v. 1. 215.)—Flower-stalk erect. *Petals* scarcely longer than the calyx. *Leaves* oval-oblong, obtuse, sessile.—Native of the pine-woods of Lower Carolina, flowering in May. *Petals* pale flesh-coloured. *Michaux*. Specimens in the Linnæan herbarium, which answer well to this description, were most unaccountably confounded by Linnæus with his *sessile*. They are inscribed "*Trillium, sive Tradescantie affinis, flore odorato unico tripetalo, radice tuberosâ.*"—*Clayton*. The *stem* is slender, five or six inches high. *Leaves* an inch and a quarter, or an inch and a half, broad, of a rather narrow elliptical shape. *Flower* on a very short stalk; in one specimen nearly sessile. *Calyx-leaves* exactly like the foliage, but only a quarter the size. *Petals* with fine, copious, inter-branching veins, becoming purplish as they advance in age.

6. *T. cernuum*. Drooping Trillium. Linn. Sp. Pl. 484. Willd. n. 1. Ait. n. 1. Pursh n. 6. Sm. Spicil. 3. t. 4. Curt. Mag. t. 954. (*Solanum triphyllum, flore hexapetalo carneo*; Catesb. Carol. v. 1. 45. t. 45, on the authority of the author's herbarium, though his figure gives no idea of the plant.)—Flower-stalk recurved. *Petals* lanceolate, the size and shape of the calyx-leaves, reflexed. *Leaves* rhomboid, abruptly pointed, on very short stalks.—In shady rocky situations, from Pennsylvania to Carolina, particularly on the banks of Schuylkill, near Philadelphia, flowering in May. *Petals* white. *Berries* purple. This may be called the largest of the genus, as I have often seen it near two feet high, with *leaves* measuring nine inches in diameter. *Pursh*. Our garden specimens are but one-third as large. The *flower* is perfectly reflexed. *Petals* white, with green ribs. *Anthers* and *styles* purple. *Germen* pale yellow, ovate, with six wings.

7. *T. erectum*. Upright-stalked Trillium. Linn. Sp. Pl. 484. Willd. n. 2. Ait. n. 2. Pursh n. 7. Curt. Mag. t. 470. (*T. rhomboideum*; Michaux Boreal.-Amer. v. 1. 215. Redout. Liliac. t. 134. *Solanum triphyllum canadense*; Cornut. Canad. 166. t. 167.)—Flower-stalk erect. *Flower* inclining. *Petals* elliptical, pointed, spreading, the length of the calyx. *Leaves* rhomboid, pointed, sessile.—On the mountains, in boggy soil, from Pennsylvania to Carolina, flowering in May. *Pursh*. The *leaves* are three or four inches long, and three broad at the obtuse lateral angles. *Flower-stalk* nearly three inches long, erect, except a little curve at the top, from the drooping of the *flower*, which is fetid, and larger than any of the foregoing species. *Calyx-leaves* an inch and quarter long, ovate, pointed, spreading, green. *Petals* the same length, but broader and

more elliptical, dark purplish-brown. *Germen* and *stamens* purple. *Berry*, according to Pursh, almost black. This is certainly *T. erectum* of Linnæus, though the specimen in his herbarium has no resemblance to it, having half a dozen *flower-stalks*, and not being an original specimen, nor of any authority. The specific name is not one of the best, there being several species equally erect, but *rhomboideum* is liable to the same objection. Had we found a better in any work of character, we might have been induced to swerve from our general rule of not changing established Linnæan names. We do not profess to be bound to keep any others, unless they are good.

8. *T. pendulum*. White Small-flowered Trillium.—"Willd. Hort. Berolin. t. 35." Ait. n. 3. Pursh n. 9? (*T. erectum* β ; Curt. Mag. t. 1027. Pursh n. 7.)—Flower-stalk erect. *Flower* inclining. *Petals* ovate, pointed, spreading, longer than the calyx. *Leaves* rhomboid, pointed, sessile.—Native of the mountains of Pennsylvania and Carolina. We received a specimen from Dr. Muhlenberg in 1805, the same year in which Mr. Masson sent plants to Kew. It flowers in April and May, and though nearly allied to the last, must surely be a distinct species. Every part is much smaller; the *leaves* more rhomboid; *flower* less strongly fetid than the *erectum*, with white *petals*, a reddish *germen*, and yellow *anthers* and *styles*. Mr. Pursh seems to have inserted this species twice; see his n. 7. and 9. We have not had an opportunity of consulting the *Hortus Berolinensis*, but we rely on Mr. Dryander in Hort. Kew.

9. *T. grandiflorum*. Large-flowered Trillium. Salisb. Parad. t. 1. Pursh n. 10. Ait. n. 4. (*T. erythrocarpum*; Curt. Mag. t. 855, excluding Michaux's synonym. *T. rhomboideum* γ ; Michaux Boreal.-Amer. v. 1. 216.)—Flower and its stalk drooping. *Petals* ovate; their claws converging into a tube; limb spreading thrice as broad as the calyx, and much longer. *Leaves* ovate, somewhat rhomboid, pointed.—On the mountains and rocky banks of rivers, in Virginia and Carolina, flowering in May. We received a specimen in 1797 from the honourable Mrs. Barrington's garden at Mongewell, the root having been sent perhaps a year or two before from North America. Mr. Masson is said to have sent the same to Kew in 1799. This is a large and handsome species. The *petals* are snow-white, veiny, two inches long; their bases convoluted into a sort of tube. *Anthers* yellow. *Calyx-leaves* ovato-lanceolate, an inch and half long, green.

10. *T. obovatum*. Obovate Trillium. Pursh n. 8.—"Flower-stalk erect. *Petals* obovate, bluntnish, flat, spreading, scarcely longer or broader than the calyx. *Leaves* ovate, rhomboid, pointed, perfectly sessile."—Found in Canada, near Montreal. *Flowers* dark rose-coloured, probably white when first opening. *Pursh*. This author mentions some specimens in the herbarium of A. B. Lambert, esq. agreeing in every respect herewith, which are the *T. camtschaticum* of Pallas. This perhaps is what Dr. Sims speaks of, under a similar name, in Curt. Mag. t. 855. We have not examined either.

TRILLIUM, in *Gardening*, furnishes plants of the low, tuberous-rooted, flowery, perennial kind, among which the species mostly cultivated are, the drooping trillium (*T. cernuum*); the upright trillium (*T. erectum*); and the sessile-flowered trillium (*T. sessile*).

Method of Culture.—These plants may be increased by seeds, which should be sown on a shady border as soon as they become ripe in the autumn; when they appear in the spring, the plants should be kept clean from weeds, and in the

the autumn following be planted out where they are to remain and flower.

They succeed best in light soils, where the situation is rather shaded.

They all afford variety in such places.

TRILLO, in *Geography*, a village of Spain, situated on a small river near its union with the Tagus, and once famous for its curious water-mills, for sawing of timber brought down by the stream, but no longer existing. It is now celebrated for its medicinal waters, efficacious in cutaneous complaints, both externally and internally applied. The baths are up the river, on the opposite side of the Tagus, about the distance of a mile. They are divided into "Los quatro Banos," called the king's bath, divided into four separate baths, all equally commodious and handsome, with their proper appurtenances. The countess's bath, so named after the lady of the count de Cifuentes, who is lord of the place, is close to the river, but judiciously built and remarkably solid, to resist every impulse of the stream. According to the analysis of Dr. Ortega, these waters participate of five substances, two volatile, and three fixed: *viz.* a phlogistic vapour, extremely anodyne, penetrating, and friendly to the nervous system; of a moderate quantity of gas, calcareous earth, common salt, selenitic salt; and that to sixteen ounces of water, one may calculate twenty-five grains and a half of fixed principle. Dr. Ortega observes, that the lightness of this water may enter into competition with that of distilled water, the purest we know of: therefore its effects may be more easily accounted for: that the heat of the water does not equal that of the blood, in a person in good health, and comes near to that tepid degree prescribed by the physicians in artificial baths.

TRILLO, Ital. a shake, in *Musical*. Tosi has devoted his third chapter (in Galliard's Translation, p. 41.) to the importance, use, and acquisition of a shake. He advises the vocal student, with the assistance of the master, to strive at attaining one that is "equal, distinctly marked, easy, and moderately quick, which are its most beautiful qualifications." The student will find the shake on the semitone or half-note much easier to acquire than that on the whole tone; which it will be necessary to practise first, and most frequently ever, as it includes the other. Tosi describes seven different kinds of shake, but none are worth the study but those on the tone and half-tone, which must at first be practised slow, and its rapidity increased by minute degrees.

The *beat*, or *trillo mordente*, differs little from the shake; in fact it is the shake reversed, ending upon the upper of two notes, instead of the lower. This grace was much used by singers in the former part of the last century, particularly in recitatives, and after the appoggiatura from the note below. Mingotti was the last great singer whom we remember to have frequently used the *trillo mordente*, or *beat*. Mancini, however, gave a chapter to it in 1774. But he was of the Bernacchi school, which would now be called *antica*.

TRILOBOUS LEAF, among *Botanists*. See LEAF.

TRILOCULAR CAPSULE. See CAPSULE.

TRILOKAN, in *Mythology*, a name of the Hindoo deity Siva. The name means with three eyes, that god being in some of his forms, and often in pictures and statues, so represented. Siva corresponds in many points with the many-named and multiform Jupiter of the Greeks. We are informed by Pausanias, that Triopthalmos was an epithet of Zeus, and that a statue of him with three eyes was found so early as the Trojan war. From these circumstances, combined with many others, sir W. Jones was led

to conclude that the identity of Jove and Siva, falls little short of being demonstrated. See SIVA

TRILOPUS, in *Botany*, a name given by Mitchell to the Linnæan genus *HAMAMELIS*. See that article.

TRIM, in *Carpentry*, is to fit one piece into another.

TRIM of a Ship, is her best posture, proportion of ballast, arrangement of her sails, and position of her masts for sailing.

Thus, the trim of the hold denotes the most convenient arrangement of the various materials contained in it, with relation to the ship's motion or stability at sea.

Trim, when applied to the sails, denotes the general arrangement which is best calculated to accelerate the ship's course, according to the direction of the wind.

Trim, when expressed of the masts, denotes their position with regard to the ship and to each other, so that they should not be too far forward or aft, nor too near nor too far apart: and, according to the situation or quality which communicates a greater velocity to the vessel, they should either be upright, or inclining aft or forward.

Hence, to find the best way of making a ship sail swiftly, is to find her trim.

TRIM a Boat, To, is to set the passengers so as to keep the boat even on both sides. See BOAT.

TRIM the Sails, To. See TACK.

TRIMMED, Sharp, in *Sea Language*, denotes the situation of a ship's sails in a scant wind.

TRIM, in *Geography*, the shire-town of the county of Meath, Ireland, situated on the river Bayne. Though the shire-town, it is a place of no importance, but it was formerly walled and defended by a strong castle, and it has some ruins of religious foundations. Before the Union, it was represented in parliament. It is 22½ miles N.W. by W. from Dublin.

TRIMACRUS, or TRIMACER, in the *Ancient Profody*, a foot in verse, consisting of three long syllables.

TRIMALORE, in *Geography*, a town of Hindoostan, in the Carnatic; 15 miles N. of Tanjore.

TRIMANETORE, a town of Hindoostan, in the Carnatic; 15 miles E. of Warriore.

TRIMAPORE, a town of Hindoostan, in Marawar; 9 miles N. of Trumian.

TRIMARKISIA, in the *Manege and War*, a body of horse among the ancient Gauls, so called because each soldier had three horses attending him, so that when one was either killed in battle, or overcome by fatigue, he might immediately mount another. The Tartars of the Krim retain the practice; for they never undertake an excursion, without allowing three horses to one rider; and many ancient nations, beside the Gauls, observed the same method.

TRIMBERG, or TRIMPERG, in *Geography*, a town of the duchy of Wurzburg; 20 miles E. of Schweinfurt.

TRIMBUCK, a town of Hindoostan, in Baglana; 18 miles W.N.W. of Naffuck.

TRIMELES, in the *Ancient Greek Music*, a nome or air for flutes.

TRIMELWADY, in *Geography*, a town of Hindoostan, in the Carnatic; 15 miles N.N.W. of Tanjore.

TRIMERES, in the *Ancient Greek Music*, a nome which was executed in three different modes successively: the Phrygian, the Dorian, and the Lydian. Some ascribe the invention of this compound nome to Saccadas the Argian, and others to Clonas of Thegea.

TRIMILCHI, a name by which the English Saxons called the month of May; because they always milked their cattle three times a day in that month.

TRIMITHUS, in *Ancient Geography*, a town in the eastern part of Cyprus, at some distance from the coasts, N. of Eucolla, and E. of the promontory Pedalium.

TRIMMANIUM, or TRIAMMION, a town of Lower Mœsia, on the Danube; marked in Anton. Itin. on the route from Viminacium to Nicomedia, between Scaidana and Exantaprilis.

TRIMMERS, in *Architecture*, pieces of timber framed at right angles to the joints, against the ways for chimneys, and well-holes for stairs.

TRIMODIA, among the Romans, a bag like an inverted cone, in which fowls carried their feed. It was suspended from their neck, and was so called from its containing three bushels.

TRIMONEER, a corruption of *timoneer*.

TRIMONTIUM, or TRIMANTIUM, in *Ancient Geography*, a town of Albion, belonging to the Selgovæ, according to Ptolemy; probably situated where Annan now stands.—Also, one of the names of Philippopolis in Thrace. Ptol.

TRIMPEN, in *Geography*, a town of Prussia, in Bartenland; 12 miles S. of Insterburg.

TRIMURTI, in the theological disquisitions of the Hindoos, is a word of mystical and varied import. Its most obvious meaning in the Sanscrit tongue is *three forms*; but as some sects of Eastern theologians profess to recognize the unity of the deity, the term is used singularly, and is equivalent to *triform*. In the Trimurti, the Hindoos fancy a union or reunion of the three great powers or attributes of the godhead, personified in Brahma, Vishnu, and Siva; or creation, preservation, and destruction. Many other triune conjunctions are found typified by this mysterious assemblage, of which some notice is taken under our articles O'M, SIVA, and TRISULA.

The Trimurti, or divine triad, is represented to the senses under the form of three heads joined. The well-known monstrous sculpture in the Elephanta cavern temple is of this subject. Of this triune bust, Niebuhr, Maurice, and others have given representations. (See ELEPHANTA and MAHAKALA.) One very like it was dug out of the ruins of an ancient temple on the island of Bombay, by the author of the Hindoo Pantheon, and an engraving is given of it in plate 81. of that work. A second Trimurti was found at the same time, but instead of being merely three heads, they are furnished with a body. This unusual form is also engraved for the work just mentioned; and the granite originals of both plates are deposited by the author in the museum at the East India House. The *miniature* bust of the gigantic sculpture in the Elephanta cave is so large as to weigh several tons. The Hindoos have other modes of representing the Trimurti; three heads and bodies on one leg, and other similar whimsicalities, not unlike the crude delineations of the early Trinitarians of the West.

The Hindoos are very prone to combinations of three in one, and fancy they see something very mysterious in such typifications. As well as that just noticed of the powers or attributes of the deity, they combine three letters in a monogram, and have such a reverence for it, that the sound which its articulation would convey is never uttered, or uttered most reverentially. These characters are equivalent to our A, U, M, and the sound would be like O'M.

The sun is a Trimurti, his properties of *creative* heat, *preserving* light, and *destructive* energy in an igneous form, comprehending the grand attributes of the deity, personified in Brahma, Vishnu, and Siva.

The Hindoos have a female Trimurti, composed of course of the consorts or Saktis, or energies of the great

powers. These are *Saraswati*, *Lakshmi*, and *Parvati*; which see.

Comparing the Hindoo triad with three of the gods of Greece, Cronus, Jupiter, and Mars, are those nearest in character and attributes to the Eastern polytheistic trinity. But the Greeks, largely as they seem to have borrowed from the mythology of the Hindoos, do not appear to have particularly adopted their male Trimurti. The female triad may be recognizable in the Parææ of the West, as noticed under SAKTI. The three goddesses give each a name to a sacred river, and a supposed junction of these waters is a fruitful subject to the Hindoo enthusiast or poet. See TRIVENT and SARASWATI.

Several other articles beginning with the Sanscrit word *tri*, contain something illustrative of the propensity of the Hindoos to triune combinations.

TRINACIA, or TRINACRIA, in *Ancient Geography*, a rich and powerful town of Sicily, and considered as the chief town of the island. Some writers have called it Tiracia.

TRINCA, in *Geography*, a town of South America, in the province of Tucuman; 66 miles N. of St. Miguel de Tucuman.

TRINCATTY, one of the Nicobar islands. N. lat. 8° 6'. E. long. 94° 5'.

TRINCAVELLI, VETTOR, in *Biography*, an eminent physician, was born at Venice about 1491. He studied at Bologna and Padua; and having graduated at the latter university, he settled at Venice, where he became professor of philosophy, and acquired distinction in the practice of medicine. In 1551 he was promoted to the chair of medical professor at Padua, with a very considerable stipend. He died at Venice in 1563, and was honoured with a public funeral. He was a good Greek scholar, and was the first professor at Padua who commented on the works of Hippocrates in the originals. He also translated many of Galen's treatises; and edited in the original Greek the works of Themistius, of Johannes Grammaticus, the Manual of Epictetus with Arrian's Commentary, Arrian's Alexander's Expedition, Stobæus, Hesiod, and other Greek writers. A collection of his works has been printed in 2 vols. fol. Haller. Gen. Biog.

TRINCIATELLA, in *Botany*, Ambros. Phyt. 543. Camer. Hort. Med. 173; See THURNCIA.

TRINCOLI, in *Geography*, a town of the island of Ceylon, near the E. coast; 84 miles E.S.E. of Candy. N. lat. 7° 10'. E. long. 82° 6'.

TRINCOMALEE, or TRINCOMALEY, a town and harbour of Ceylon, lying in N. lat. 8° 30'. E. long. 81° 24'. The town runs in a N.E. direction along one branch of the bay. The country around it is mountainous and woody; the soil uncultivated and barren; and the whole appearance wild. The woods, which are very thick, contain abundance of wild beasts of various descriptions; particularly wild hogs, buffaloes, and elephants. The latter often come down to the lakes in the neighbourhood of the fort to drink and bathe; and have been frequently shot within a mile of the town. Trincomalee, from its situation and construction, is naturally strong. It occupies more ground than Colombo, but contains a much smaller number of houses, and those inferior in size and appearance to any that are met with in several towns on the S.W. coast. The circumference of Trincomalee, within the walls, is about three miles; within this space is also included a hill, or rising point, immediately over the sea, and covered with a great quantity of thick jungle, in which wild deer and other game find shelter. This rising ground is very little inhabited,

most of the houses being close to the landing place, which lies in the lowest part. Even the lower parts of the fort were much incumbered with wood till within these few years. The fort is strong, and commands the principal bays, and particularly the entrance into the grand harbour, or inner bay, which affords in all seasons and in every variety of weather a secure shelter to ships of all descriptions, being land-locked on all sides, and sufficiently deep and capacious to receive the largest vessel, or any number of vessels. The whole navy of England might find accommodation in this harbour. Its situation is such, that in either monsoon, ships can arrive at or depart from it, and make their passage good from or to any part of the eastern world, and whole fleets may remain within it, at every season of the year, in perfect security. This harbour is overlooked by fort Ostenburg, a strong fort standing on a cliff, which projects into the sea; it was originally built by the Portuguese out of the ruins of some celebrated pagodas which once stood here. This fort cannot be attacked by sea, unless the fort of Trincomalee be first taken, and the entrance of the harbour forced. In the bay the shores are so bold, and the water so deep close up to them, that it is almost possible to step from the rocks into the vessels that moor alongside of them. At the extremity of the rock, on which the fort stands, a strong battery is erected, where the flag-staff of the fort is placed.

This harbour, from its nature and situation, is that which stamps Ceylon one of our most valuable acquisitions in the East Indies. As soon as the violent monsoons commence, every vessel which is caught by them in any other part of the bay of Bengal is obliged immediately to put to sea, to prevent inevitable destruction. At these seasons Trincomalee and Bombay alone, of all the ports on the different coasts of the peninsula of India, are capable of affording a safe retreat. The incalculable advantages to be derived from such a harbour are increased by its proximity and easy access to our settlements in the bay of Bengal. A vessel from Madras may arrive here in two days, and can at any time enter the harbour. These circumstances point out Trincomalee as an object of particular attention to our government, and of far more consequence to retain than the whole of the rest of the island. It will, however, require great encouragement and many improvements to render the town populous or anywise equal to Colombo. For the country around is not by any means so fertile as to tempt settlers to reside there; nor are the natural productions calculated to attract commerce. The climate has also been looked upon as the hottest and most unhealthy of the whole island. But the woods and marshes which rendered the climate insalubrious have been already in great measure cleared and drained, and the beneficial effects of these improvements were soon experienced. It is to be hoped that remedies may in the same manner be applied to the other defects under which Trincomalee at present labours: its trade is nothing, as there are no valuable natural productions to nourish it; but, from its situation, it is capable of becoming the richest emporium of the East. The want of commerce, and the uncultivated state of the surrounding country, are defects which flow mutually from each other; and the removal of one would soon, in a great measure, do away the other.

The Malivagonga (which see) falls into the magnificent bay of Trincomalee. (Percival's Ceylon.) This harbour, says Barrow (Travels in Southern Africa, vol. ii.), is to a maritime province a jewel of inestimable value; it holds the bay of Bengal at its mercy, and affords every facility of overawing and controuling the navigation of the straits of Sunda and Malacca. Our Asiatic possessions, commerce

and marine, would consequently lie open to the depredations of the masters of Ceylon. Trincomalee was taken by the British troops in 1795; 70 miles N.E. of Candy.

TRINDELEN, a rock in the Scaggerac, at about equal distances between the coast of North Jutland and the coast of Norway; 7 miles N.N.E. from the island of Leffoe. N. lat. $67^{\circ} 27'$. E. long. $11^{\circ} 1'$.

TRINE, DIMENSION, or *threefold dimension*, includes length, breadth, and thickness.

The trine dimension is peculiar to bodies or solids.

TRINE, in *Astrology*, is the aspect or situation of one star with regard to another, when they are distant 120 degrees.

It is also called *trigon*, and is usually signified by the character Δ .

TRINE, in *Rural Economy*, a term applied to the quantities of some sorts of articles, as the felines and spokes of wheels, which of the former is thirteen, and of the latter twenty-five.

TRINETRA, in *Mythology*, a name of the Hindoo god Siva. It means with three eyes, similar to *Trilokan*; which see.

TRING, in *Geography*, a small market-town in the hundred of Dacorum, and county of Hertford, England; is situated within a short distance of the Icknield way, 30 miles W. by N. from the county-town, and 31 N.W. by W. from London. The manor was granted by William the Conqueror to Robert, earl of Ewe, but it soon afterwards reverted to the crown; and in the year 1148 was given by king Stephen, with all its appurtenances, to the abbey of Feversham, which he had then founded. His grant was confirmed to the monks by succeeding sovereigns; and Edward II. gave them a charter for a weekly market, and two annual fairs to be held at Tring. After the dissolution, Henry VIII. granted the manor to the archbishop of Canterbury: it is now the property of sir Drummond Smith, bart. The parish church of Tring is a spacious, well-proportioned edifice, and consists of a nave, side aisles, and chancel, with a massive tower at the west end: the walls are supported by strong buttresses, and the whole is embattled. The nave is separated from the aisles by six pointed arches, rising from high clustered columns. The roof is of timber frame-work, with strong beams going across: the supporters on each side are terminated by carved figures. Most of the windows have obtuse pointed arches, and are divided into three compartments by mullions. In the interior are various monuments. Tring contains four meeting-houses for Dissenters of different denominations. A Sunday school for about eighty boys and girls has been established by subscription. The market-house is a mean edifice on wooden pillars, having a pillory and a cage beneath. The market is held on Fridays; principally for the sale of corn, meat, and straw-plat: the manufacture of the latter constitutes the employment of most of the females in this part of the country. Five fairs are now held annually. The population of Tring, as ascertained under the act of the year 1811, was 1847, occupying 352 houses.

Tring park, the seat of sir Drummond Smith, bart. consists of between three and four hundred acres, ranging on the S.E. side of the town. The mansion is large and convenient, and the principal apartments are spacious and neatly fitted up. The hall is ornamented with Corinthian pillars. On the floor above the hall, and running across the house, is a gallery or ball-room, with a circular dome in the centre. This house was erected about the time of Charles II. by Henry Guy, esq.

At a short distance N.E. from Tring, is Tring Grove, the

the residence of — Broadwood, esq. — Beauties of England and Wales, vol. vii. Hertfordshire, by E. W. Brayley.

TRINGA, SAND-PIPER, in *Ornithology*, the name of a distinct genus of birds, of the order of the Grallæ; the distinguishing characters of which are, that the beak is roundish, and of the length of the head; the nostrils linear; and that the feet have each four toes, the outmost being generally connected at bottom by a small membrane. The species are numerous, and as follow.

PUGNAX. With red bill and legs; three lateral tail-feathers unspotted, and face granulated with fleshy papillæ. See **RUFFE**.

VANELLUS. With red legs, dependent crest, and black breast. This is the lapwing or bastard plover of Ray, Willughby, Pennant, &c. See **LAPWING**.

GAMBETTA. With red bill and feet; body variegated with yellow and cinereous; beneath white. This is the totanus ruber of Brisson, the totanus alter of Willughby and Ray, and gambet of Pennant and Latham.

INTERPRES. With red legs; black body, varied with white and ferruginous; and white breast and abdomen. This is the arenaria of Brisson, the Hebridial sand-piper of Pennant, the turnstone or sea-dotterel of Ray, Willughby, Latham, &c. See **TURNSTONE**.

The *Morinella*, or tringa with red feet, blackish tail-feathers, white at the base, grey body, and black breast; or arenaria cinerea of Brisson, is a variety.

STRIATA. With base of bill and legs red; tail-feathers white with bands of brown, and many white tail-feathers. This is the totanus striatus of Brisson, and striated sand-piper of Pennant, &c. The totanus nazivus of Brisson is a variety.

BONONIENSIS. With ochraceous legs; long head and neck; body above black, and beneath white; throat and breast marked with ferruginous spots. The greater lapwing of Latham.

MACULARIS. With base of bill and legs incarnated; body spotted; eye-brows and double band of the wings white. This is the turdus aquaticus of Brisson, the spotted tringa of Edwards, and the spotted sand-piper of Pennant.

LOBATA. With subulate bill, bent at the apex; pinnated legs, and white undulated breast: the grey coot-footed tringa of Edwards, and grey phalarope of Pennant and Latham. Of this there is a variety, white beneath, black above, with yellowish longitudinal streaks; the band of the wings white; and legs lobated.

HYPERBOREA. With subulate bill, bent at the apex; pinnated legs; cinereous breast, and sides of the neck ferruginous: the cock coot-footed tringa of Edwards, the small cloven-footed gull of Willughby, and red phalarope of Pennant and Latham.

ERYTHROPUS. With red legs, front, rump and tail red and white; the body above and wings cinereous-brown; the abdomen ferruginous: the red-legged sand-piper of Latham.

ALPINA. Testaceous-brown, with blackish breast; tail-feathers cinereous, whitish; legs brownish.

HELVETICA. With black bill and legs; beneath black; white vent; tail-feathers white with black bands: the Swift sand-piper of Pennant.

OCHROPUS. With the apex of the bill pointed; legs greenish; back brown and green; abdomen and outermost tail-feathers white: the cinclus tertius of Aldr., Ray, and Will., the oerophus medius of Gesner, and green sand-piper of Pennant and Latham. Of this there is a variety, viz. *Littorea*, with smooth bill, cinereous legs, and brown

tail-feathers: the shore sand-piper of Pennant; and also another variety, with the back and wings cinereous, with obsolete whitish spots.

HYPOLEUCOS. With smooth bill; livid legs; body cinereous with black streaks; beneath white: the common sand-piper of Ray, Willughby, and Pennant.

CANUTUS. With smooth bill; cinereous legs; first tail-feathers ferrated; and the outer white unspotted. This is the knot of Pennant, &c. See **KNOT**.

ARENARIA. With black bill and legs; grey body; under and whole face white; collars grey.

FASCIATA. With bill, vertex, hind part of the head, spot near the eyes, and abdomen, black; front and rounded tail white; back cinereous; seven first tail-feathers white.

CINCLUS. With bill and legs black; collars white; tail and rump grey and brown. This is the least snipe of Ray and Sloane, the wagtail of Brown, the fanderling of Albinus, and the purre of Pennant. The cinclus with brown legs is a variety.

CALIDRIS. With bill and legs blackish; body beneath olivaceous; and rump variegated: the dusky sand-piper of Latham.

PUSILLA. With brown bill and legs; body beneath reddish; outer tail-feathers with a white shaft, and variegated rump: the little sand-piper of Pennant; found in St. Domingo, north of Europe, and rarely in England.

GLAREOLA. With smooth bill; greenish legs; body punctated brown and white; breast whitish: the wood sand-piper of Pennant and Latham; found in Sweden.

RUFICOLLIS. With black legs; head above and neck striated with ferruginous and black; and ferruginous throat: the red-necked purre of Latham.

SQUATAROLA. With black bill; greenish legs; grey body, beneath whitish: the grey plover of Ray, &c. and grey sand-piper of Pennant and Latham. Of this there is a variety, with black bill and legs; body brown, variegated with white; tail-feathers white with brown bands.

ISLANDICA. With brown bill and legs; body beneath ferruginous; secondary tail-feather with a white margin: the red sand-piper of Pennant.

CINEREA. Cinereous; beneath white; legs obscurely green; head with black spots; neck obscurely variegated: the ash-coloured sand-piper of Pennant and Latham.

ATRA. With black head and neck; back and wings brownish, mixed with black; breast and abdomen cinereous; rump cinereous, undulated with white and black.

NOVEBORACENSIS. Obscure, beneath white; breast spotted with brown; tail cinereous: New York sand-piper of Pennant and Latham.

VIRGATA. Obscure, beneath white; with yellowish legs; head and neck obscurely striated lengthwise with white: streaked sand-piper of Latham.

BOREALIS. With brown bill and legs; body above cinereous, beneath white; tail and tail-feathers obscure.

NOVE-TERRÆ. Above black, beneath ash-white; bill, spurious wings, tail-feathers, and tail, black; with cinereous legs: Newfoundland sand-piper of Latham.

VARIEGATA. Above varied with brown, black, and red; front and throat pale; neck and breast streaked with whitish and black longitudinally; abdomen white; bill and legs obscure: variegated sand-piper of Latham.

GLACIALIS. With pinnated yellowish legs; apex of black bill dilated; cheeks and throat testaceous; body above obscure, beneath white: plain phalarope of Pennant.

FUSCA. With bill, vertex, and legs pinnated and black; body above brownish and cinereous, beneath white; throat

cinereous, tinged with red: the coot-footed tringa of Edwards, and brown phalarope of Pennant and Latham.

CANCELLATUS. With upper feathers brown, white at the margin; lower white lined transversely obscurely; pinnated legs obscure.

EUCOPTERA. Black, beneath red, with cinereous bill, green legs, and yellow vent: the white-winged sand-piper of Latham.

MARITIMA. Above varied with grey and white; beneath white, with yellow legs; middle of the back violet; throat and tail obscure: the selvinger sand-piper of Latham.

UNDATA. Obscure, undulated with yellow and white; the rump, the tip of the secondary tail-feathers, and wing-coverts, white; tail cinereous, white at the apex: the waded sand-piper of Pennant and Latham.

UNIFORMIS. Wholly dilutely cinereous, with a short black bill: uniform sand-piper of Pennant and Latham.

AUSTRALIS. Above cinereous, spotted brown; beneath reddish; abdomen and rump whitish; tail and tail-feathers obscure; bill and legs black: southern sand-piper of Latham.

NEVIA. With obscure bill; legs greenish; body above cinereous, spotted with red and black; beneath reddish and white, spotted with obscure or bay: the freckled sand-piper of Pennant and Latham.

GRISEA. With black bill and legs; body above grey, beneath white; primary tail-feathers brown; tail grey and white at the margin; a band obscurely grey parallel to the margin: the grised sand-piper of Latham.

KEPTUSCHCA. With cinereous body; black vertex; abdomen blackish, terminating reddish.

TRINGAN, in *Geography*. See **TRANGANO**.

TRINGENSTEIN, a town of Germany, in the principality of Nassau Dillenburg; 6 miles E. of Dillenburg.

TRINGLE, in *Architecture*, a name common to several little square members, or ornaments; as reglets, listels, and platbands.

The word is French, where it signifies the same.

TRINGLE is more particularly used for a little member fixed exactly over every triglyph, under the plathand of the architrave; from whence hang down the guttæ, or pendant drops.

TRINIDAD, in *Geography*, a town of South America, in New Granada; 20 miles N.W. of Santa Fè.

TRINIDAD, an island near the coast of South America, about thirty leagues long, and from two to ten broad. This island was discovered by Columbus in his third voyage, who landed here in 1498, and was named by him after the Holy Trinity; because, says Herrera, having been in great danger in a violent storm, he made a vow to give that name to the first land he should find: soon after which a sailor, in the main-top, saw three points of land, by which the name was in every respect suitable to his vow. The original inhabitants were a colony of *Arrovauks*; which see. The climate is said by some to be unwholesome; the island being very often covered with thick fogs. The abbé Raynal says that it is excellent, being free from hurricanes. Heavy rains fall from the middle of May to the end of October. It is subject to slight earthquakes, and in the interior are four groups of mountains. The quality of its soil is variously reported; however, sir Walter Raleigh, who was there some time in the year 1593, and examined the island, gives an account, that the northern part of it is high land; but that its soil is good, proper for planting of sugar-canes, tobacco, &c. The southern coast is well adapted to the culture of coffee; and on the west is a large harbour, secure

in all seasons. Here are several sorts of animals, plenty of wild hogs, fish, fowl, and fruit. It also produces maize, cassava, and other roots, and in general all that is commonly found in America. The Spaniards owned to sir Walter, that they found gold in the rivers of this island, but nothing in comparison of what the main land produces. The natives called this island "Cairi;" but they themselves had different names, according to the different parts of the island where they dwelt. In 1797, it was taken by the British troops; and by the peace of Amiens, the island was ceded to Great Britain. The island of Tobago is separated from Trinidad by a channel called "Trinidad Channel." This island, situated at the eastern extremity of Terra Firma, from which it is only four leagues distant, is the natural magazine and resort where the contraband traders of Cumana, Barcelona, Margareta, and Guiana, make their purchases. The position of the island is singularly favourable to this commerce. The Spanish coasts, extensive, solitary, defenceless, and to leeward, offer both to the English and Spaniards the greatest facility for prosecuting it. The gulf of Paria, which washes the western part of Trinidad, receives the waters of the river Guarapiche, which penetrates the province of Cumana. By this river animals for labour and for the shambles are brought from Terra Firma to Trinidad; and through the same channel all the contraband articles consumed in this province can ascend with perfect convenience, or may be landed at several points without the least danger. In general, the cargoes which are destined for Barcelona proceed up this river; they are thence distributed to Caraccas and other cities. The mouths of the Oronoko, which cross the gulf of Paria from south and north, and which are compelled by Trinidad to discharge into the sea by the dragon mouths, open to this island the commerce of Guiana, whither the surplus goes by the river Apure to Barquisimeto, Truxillo, Varinas, Merida, &c. Dr. Anderson has given a particular account of a remarkable phenomenon in this island, which is a bituminous lake, or rather plain, denominated Tar-lake, and by the French La Brea, from its resemblance to ship-pitch, and from its answering a similar intention. It lies on the leeward side of the island, on a point of land extending into the sea about two miles, and opposite to the high mountains of Paria on the north side of the gulf. The headland, or cape, is about 50 feet above the level of the sea, and is the greatest elevation on this side of the island. From the sea it appears a mass of black vitrified rocks; but on closer examination, it is found to be a composition of bituminous scoriæ, vitrified sand, and earth, cemented together: in some parts, beds of cinders only are found. In approaching this cape, there is a strong sulphureous smell, sometimes disagreeable. This smell is prevalent in many parts of the ground to the distance of eight or ten miles from it. The point of land is about two miles, and falls with a declivity to the sea, the bituminous plain being on the highest part of it, and separated from the sea by a margin of wood which surrounds it. It appears at first like a lake of water; and in hot and dry weather its surface, about an inch deep, is liquid, whence it obtained the appellation of lake. Its form is circular, about three miles in circumference. Its more common consistence and appearance are those of pit-coal, the colour being rather greyer. No appearance of sulphur is discernible, though, in passing over it, a strong sulphureous smell was experienced. Dr. Anderson apprehended that this bituminous substance is the bitumen asphaltum of Linnæus. By a gentle heat it was rendered ductile; and mixed with grease or common pitch, it is much used for the bottoms of ships; and he conceives it to be a preservative against the insect called the borer, so destructive

destructive to ships in that part of the world. Every part of the country, he says, to the distance of 30 miles round, has the appearance of being formed by convulsions of nature from subterraneous fires; and the whole island, he thinks, is formed of an argillaceous earth, either in its primitive state, or under its different metamorphoses. This argillaceous earth is formed, as he conceives, from the sediment of the ocean, and its formation is easily accounted for from the situation of Trinidad. The great influx of currents into the gulf of Paria, from the coasts of Brasil and Andalusia, must bring down a vast quantity of light earthy particles from the mouths of the numerous large rivers which traverse those parts of the continent; but the currents being repelled by the sides of adjacent mountains, eddies and smooth water will be produced when they meet and oppose one another; and, therefore, the earthy particles would subside, and form banks of mud, and by the accession of fresh accumulations form dry land; and thus such a tract of country as Trinidad must be formed. The causes still operate, for the island is daily increasing on the leeward side, as is visible in the mud-beds that extend a great way into the gulf, and are there constantly augmented. But from the great influx from the ocean at the south end of the island, and its egress to the Atlantic again through the Bocas, a channel must ever exist between the continent and Trinidad. N. lat. $9^{\circ} 48'$ to $10^{\circ} 42'$. W. long. $60^{\circ} 6'$ to $61^{\circ} 36'$.

TRINIDAD, *La*, a town of South America, in the province of Moxes; 200 miles N.E. of La Plata. S. lat. $14^{\circ} 40'$. W. long. $65^{\circ} 50'$.

TRINIDAD, a sea-port town of the island of Cuba, situated in a bay on the south coast of the Havannah. N. lat. $51^{\circ} 56'$. W. long. $80^{\circ} 18'$.

TRINIDAD, *La*, or *Sonfonate*, a sea-port town of Mexico, in the province of Guatimala; 80 miles E.S.E. of Guatimala. N. lat. $14^{\circ} 3'$. W. long. $91^{\circ} 6'$.

TRINIDAD, *La*, a town of Mexico, in the province of Veragua, on a river which runs into the gulf of Mexico; 18 miles S.E. of La Conception.

TRINIDAD, *La*, a town of Mexico, in the province of Nicaragua, on the east coast of Nicaragua lake; 30 miles N.W. of St. Carlos.

TRINIDAD, a town of South America, in the province of Paraguay; 170 miles S.E. of Assumption.

TRINIDAD, a small island in the South Atlantic ocean, and one of those called "Martin Vas's Islands;" taken possession of by the Portuguese about the year 1783, who keep a small garrison here, but, according to M. Perouse, ill furnished. This island presents nothing to the eye but a rock, almost entirely sterile. A little verdure, and a few shrubs, are alone to be seen in the narrow passes between the mountains. It is in one of those vallies situated in the south-east quarter of the island, and about three hundred toises wide, that the Portuguese have formed their establishment. Nature certainly did not intend this rock to be inhabited: neither men nor animals being able to find a subsistence upon it; but the Portuguese were afraid lest some European nation should avail themselves of the vicinage, and carry on a contraband trade with the Brasils. S. lat. $20^{\circ} 31'$. W. long. of the fourth point $26^{\circ} 37'$.

TRINIDAD Bay, a small open bay or cove on the west coast of North America. N. lat. $41^{\circ} 3'$. E. long. $236^{\circ} 6'$.

TRINITARIANS, a term used very variously, and arbitrarily: frequently it stands as a common name for all persons who have sentiments on the mystery of the Trinity, different from those of the Catholic church.

Sometimes it is more immediately restrained to some one or other particular class of such persons.

It is now applied to the orthodox themselves, in contradistinction to the others who are then called *Antitrinitarians*, or *Unitarians*, who deny or impugn the doctrine of the Trinity.

Thus the Socinians and others called the Athanasians, *Trinitarians*.

The Trinitarians of the present age, and especially those who, in England, have written on the subject of the Trinity, are far from being agreed in their opinions, and, therefore, ought to be classed very differently from one another.

A late writer (Priestley's *Hist. Corrupt. of Christianity*, vol. i. p. 147.) thinks that they are all reducible to two classes, *viz.* that of those who believe that there is no proper divinity in Christ, besides that of the Father; and the class of Tritheists, who maintain that there are three equal and distinct Gods. Dr. Waterland and the rest of the Athanasians assert three proper distinct persons, entirely equal to and independent upon each other, yet making up one and the same being. Mr. Howe (*Works*, vol. ii. p. 560—568.) seems to suppose that there are three distinct eternal spirits, or distinct intelligent hypostases; each having his own distinct, singular, intelligent nature, united in such an inexplicable manner, as that upon account of their perfect harmony, consent, and affection, to which he adds their mutual self-consciousness, they may be called the one God, as properly as the different corporeal, sensitive, and intellectual natures united may be called one man. Bishop Pearson (on the Creed, p. 134, &c. 322, &c.), bishop Bull (*Serm.* vol. iv. p. 829.), and Dr. Owen (on the Heb. i. 3. p. 53, &c.), are of opinion, that though God the Father is the fountain of the Deity, the whole divine nature is communicated from the Father to the Son, and from both to the Spirit; yet so as that the Father and Son are not separate, or separable from the divinity, but do still exist in it, and are most intimately united to it. Dr. Thomas Burnet (*Script. Doctr.* p. 173.) maintains one self-existent and two dependent beings; but asserts, that the two latter are so united to and inhabited by the former, that by virtue of that union divine perfections may be ascribed and divine worship paid to them. In this opinion Dr. Doddridge is said to have concurred. Dr. Wallis (*Lett. on the Triu.*) thought, that the distinction between the three persons was only modal; which seems, says Dr. Doddridge, to have been the opinion of archbishop Tillotson. (*Tillotson. Serm.* vol. i. p. 492—494.) Dr. Watts (*Diff. N^o 7.*) maintained one supreme God dwelling in the human nature of Christ, which he supposes to have existed the first of all creatures; and speaks of the divine Logos, as the wisdom of God, and the Holy Spirit, as the divine power, or the influence and effect of it; which, he says, is a scriptural person, *i. e.* spoken of figuratively in scripture under personal characters. Doddridge's *Lectures*, p. 402, &c.

TRINITARIANS also denote an order of religious, instituted in honour of the Trinity, for the redeeming of Christian captives from the infidels; vulgarly called Mathurins, and brothers of the *redemption*.

They are clothed in white, and bear on the stomach a cross, partly red and partly blue; by which three colours, white, red, and blue, is supposed to be represented the mystery of the Trinity; but the habit of this order is different in different provinces.

The Trinitarians made it their business to go and ransom Christians held in slavery in the republics of Algiers, Tunis and Tripoli, and the states of Morocco. They have a rule peculiar to themselves; though several historians rank them among the observers of the rule of St. Augustine.

The order had its rise in 1198, under the pontificate of Innocent III. The founders were John de Matha and Felix de Valois; the first of Faucon in Provence; the second, not of the royal family of Valois, as some have imagined, but thus called, in all probability, as being a native of the country Valois.

Gauthier of Chatillon was the first who gave them a place in his lands to build a convent; and afterwards became the chief of the whole order: Honorius III. confirmed their rule; and Urban IV. appointed the bishop of Paris and others to reform them: they did it; and the reform was approved, in 1267, by Clement IV.

This order possesses about 250 convents, divided into thirteen provinces; of which six are in France, three in Spain, one in Italy, and one in Portugal. And formerly there was one in England, another in Scotland, and a third in Ireland.

Broughton, and some other writers, make a distinction between the order of the redemption of captives, and the fraternity of the Holy Trinity.

TRINITARIANS, *Barefooted*, are a reform of this order, made in Spain, in a general chapter held in 1594, where it was resolved, that each province should establish two or three houses, where the primitive rule should be observed, and where the religious should live up to a greater austerly, use coarser clothes, &c. and yet should have the liberty of returning to their ancient convent, when they thought fit.

Don Alvares Bafan, intending to found a monastery at Valdepegnas, and desiring to have it occupied by barefooted religious, it was agreed to add nudity of feet to the reform, that the Trinitarians might have the benefit of that establishment. The reform afterwards grew into three provinces, and was at length introduced into Poland and Russia, and thence into Germany and Italy.

There are also barefooted Trinitarians in France, established by F. Jerom Hallies, who, being sent to Rome to solicit the first reform mentioned above, not content with this, carried it farther, and obtained a permission of pope Gregory, to add a coarse habit and nudity of feet thereto. He began with the convent of St. Dionysius at Rome, and those of Aix in Provence.

In 1670, there were houses enough of this reform to make a province, and, accordingly, they held their first general chapter the same year.

There are also nuns of the Trinitarian order established in Spain by St. John de Matha himself, who built them a convent in 1201. Those who first took the habit were only oblata, and made no vows; but in 1201, the monastery was filled with real religious, under the direction of the *infanta Constantia*, daughter of Peter II. king of Aragon, who was the first religious, and the first superior of the order.

There are also barefooted nuns of this order, established at Madrid about the year 1612, by Frances de Romero, daughter of Julian de Romero, a lieutenant-general in the Spanish army.

Lastly, there is a third order of Trinitarians.

TRINITE', LA, in *Geography*, a town of France, in the department of the Stura; 4 miles S.W. of Bene.—Also, a name given to two islands and a rock in the South Atlantic ocean; uninhabited and little known. S. lat. 19° 30'. W. long. 40°.—Also, a town of France, in the department of the Morbihan; 15 miles E. of Pontivy.

TRINITY, TRINITAS, *Trias*, *Triad*, in *Theology*, the ineffable mystery of three persons in one God, Father, Son, and Holy Spirit.

It is an article in some systems of theology, that there

is one God, an unity in nature and essence, and a Trinity of persons. The term Trinity implies the unity of three, the unity of three divine persons really different, and the identity of an indivisible nature: the Trinity is a ternary of divine persons of the same essence, nature, and substance.

Person is defined an individual, reasonable, or intellectual substance; or an intellectual and incommunicable substance.

The hypostasis, or substance, is what constitutes the person. There are then in the Holy Trinity three persons, Father, Son, and Holy Spirit, which have all things in common, except their relations; whence that axiom in theology comes to have place, in the divine persons there is no distinction, where there is no opposition of relation.

The Father is the first person in the Holy Trinity, by reason the Father alone produces the Word, by the way of *understanding*; and with the Word produces the Holy Spirit, by way of *will*.

Here it is to be observed, that the Holy Spirit is not thus called from his spirituality, that being common and essential to all the three persons; but from the passive spiration (as some popish schoolmen express the manner in which the personality of the Holy Spirit is derived from the Father and Son), which is peculiar to him alone.

Add, that when one person in the Holy Trinity is called *first*, another *second*, and another *third*, it must not be understood of a priority of time, or of nature, which would imply some dependence; but of a priority of origin and emanation, which consists in this, that one person produces the other, in such manner, as that the person which produces cannot be, or be conceived, without that produced.

Those who maintain the doctrine of the Trinity allege, that the same titles, attributes, works, and worship, are ascribed by the sacred writers to the Father, Son, and Holy Spirit: nevertheless they contend, in different ways, for the proper unity of the divine nature. For the sentiments of some of the chief modern Trinitarians, see TRINITARIANS: and for the sentiments of others, who have rejected what has been usually denominated the orthodox doctrine of the Trinity, see ARIANS, MACEDONIANS, NOETIANS, SABELLIANS, SEMI-ARIANS, SOCINIANS, and UNITARIANS. See also TRITHEISM.

It is observed by Dr. Waterland and many other writers, that the term Trinity first occurs in the works of Theophilus, bishop of Antioch, about the year 180. Theoph. ad Autolyc. lib. ii. c. 14. p. 148. 150, ed. Wolfii.

But at this time the words, persons, and substances, were not in use; however, they were introduced on occasion of the disputes with Praxeas, Noetus, and Sabellius, either by Clement of Alexandria, or by Tertullian.

For the punishment inflicted by the English law on those who deny the Trinity, see HERESY.

Many of the heathens are said to have had a notion of a Trinity. Steuch. Eugub. de Peren. Philos. lib. i. c. 3. observes, that there is nothing in all theology more deeply grounded, or more generally allowed by them, than the mystery of the Trinity. The Chaldeans, Phœnicians, Greeks, and Romans, both in their writings, and their oracles, acknowledged that the Supreme Being had begot another Being from all eternity, which they sometimes called the *Son of God*, sometimes the *Word*, sometimes the *Mind*, and sometimes the *Wisdom of God*, and asserted it to be the creator of all things.

Among the sayings of the Magi, the descendants of Zoroaster, this is one, Παντα ἐξέτισσε πατηρ κωνη, παρεδωκε δευτερω: *the Father finished all things, and delivered them to the second Mind.*

Mind. The Egyptians called their Trinity, *Hemphba*, and represented it by a globe, a serpent, and a wing, disposed into one hieroglyphic symbol. Kircher, Gale, &c. suppose the Egyptians learned their doctrine of the Trinity from Joseph and the Hebrews.

The philosophers, says St. Cyril, owned three hypostases, or persons; they have extended their divinity to three persons, and even sometimes used the word *Trias*, *Trinity*: they wanted nothing but to admit the consubstantiality of the three hypostases, to signify the unity of the divine nature, in exclusion of all triplicity with regard to difference of nature; and not to hold it necessary to conceive any inferiority of hypostases.

We learn from Dr. Cudworth, that, besides the inferior gods, generally received by all the Pagans, (*viz.* animated itars, dæmons, and heroes,) the more refined of them, who accounted not the world the supreme deity, acknowledged a Trinity of divine hypostases superior to them all. This doctrine, according to Plotinus, is very ancient, and obscurely asserted even by Parmenides. Some have referred its origin to the Pythagoreans, and others to Orpheus, who adopted three principles, called Phanes, Uranus, and Cronus. Dr. Cudworth apprehends, that Pythagoras and Orpheus derived this doctrine from the theology of the Egyptian Hermes; and, as it is not probable that it should have been first discovered by human reason, he concurs with Proclus in affirming, that it was at first a theology of divine tradition, or revelation, imparted first to the Hebrews, and from them communicated to the Egyptians and other nations; among whom it was depraved and adulterated. Cudw. *Intell. System*, book i. c. 4.

Plato, and some of his followers, speak of a Trinity in such terms, that the primitive fathers have been accused of borrowing the very doctrine from the Platonic school; but M. Mourgues, who has examined the point, asserts, that nothing can be more absurd, than to suppose the Platonic Trinity brought into the church; and to have recourse to the Platonism of the fathers to discredit their authority with regard to this dogma.

TRINITY, *Friery* or *Fraternity of the Holy*, is a society instituted at Rome, by St. Philip Neri, in 1548, to take care of pilgrims coming from all parts of the world to that capital, to visit the tombs of St. Peter and St. Paul.

In 1558, pope Paul IV. gave the fraternity the church of St. Benedict, to which they gave the title of the Holy Trinity. Since that time, they have built close by it a very ample hospital for pilgrims, and persons on the recovery.

The fraternity has since become very considerable, and most of the noblesse of Rome, of either sex, have done it the honour to be members of it.

TRINITY, *Congregation of the Holy*, is a congregation of twelve priests established in the hospital of the fraternity just mentioned, to take care of pilgrims, and others entertained therein.

TRINITY, *Order of the Holy*. See *TRINITARIANS*.

TRINITY-Sunday, is the next Sunday after Whit Sunday, thus called, because on that day was anciently held a festival (as it still continues to be in the Romish church) in honour of the Holy Trinity. The observance of this festival was first enjoined by the sixth canon of the council of Arles, in 1260; and John XXII. who distinguished himself so much by his opinion concerning the beatific vision, is said to have fixed the office for this festival in 1334.

TRINITY-Herb, in *Botany*. See *VIOLET*.

TRINITY-House, is a kind of college at Deptford, belonging to a society of seafaring persons, founded for the

regulation of seamen, and security and convenience of ships and mariners on our coasts.

This society was incorporated by Henry VIII. in 1515, who confirmed to them not only all the ancient rights and privileges of the mariners of England, but also their several possessions: which, together with various grants of queen Elizabeth and king Charles II. were confirmed by letters patent of the 1st of James II. in 1685; under the name of the master, wardens, and assistants of the guild or fraternity of the most glorious and undivided Trinity, and of St. Clement, in the parish of Deptford Strand, in the county of Kent.

This corporation is governed by a master, four wardens, eight assistants, and eighteen elder brethren: the inferior members of the fraternity, denominated younger brethren, and chosen among the masters and mates expert in navigation, are of an unlimited number, and serve for supplying vacancies among the thirty-one elder brethren. The master, &c. of this corporation, are invested by charter with a power to examine the mathematical children of Christ's Hospital; to examine the masters of his majesty's ships; to appoint pilots for conducting ships in and out of the river Thames; and to amerce such as shall act as masters or pilots without their approbation in a fine of 20*l.*; to settle the several rates of pilotage, and erect light-houses, and other sea-marks, on the several coasts of the kingdom, for the security of navigation; to prevent aliens from serving on board English ships, without their licence, under penalty of 5*l.* for each offence; to punish seamen for desertion or mutiny in the merchant service; to hear and determine the complaints of officers and seamen in this service, under an appeal to the court of admiralty; and to grant licences to poor seamen (non-freemen) to row on the river Thames.

To this company belongs the ballast-office, for cleaning and deepening the river Thames, by taking from it a sufficient quantity of ballast for the supply of all ships that fail out of the river; in which service sixty barges, of the burden of thirty tons, and two men each, are constantly employed: all ships taking in ballast pay to them 12*d.* a ton.

This corporation is empowered by charter to purchase lands, &c. to the amount of 500*l.* per annum, and also to receive charitable benefactions to the like amount. They have also light-houses, to which all ships pay a halfpenny per ton.

Out of the income of this corporation, about three thousand poor seamen, their widows and orphans, are annually relieved, at the expence of about 6000*l.*

The house in which the brethren of this corporation usually meet for the dispatch of business, is on Tower-Hill. (See *LONDON*.) They have three hospitals, two at Deptford, and one at Mile-End, which last is designed for decayed sea-officers, masters of vessels, pilots, and their widows.

TRINITY Term. See *TERM*.

TRINITY, or *La Trinité*, in *Geography*, a sea-port town of the island of Martinico; the harbour is formed on the south-east side by the point Caravelle, which is two leagues in length; and on the other side by a very high hill, about 350 or 400 paces in length, which only joins to the main land by an isthmus not above 200 feet broad. The east side, opposite to the bottom of this bay, is flopped up by a chain of rocks, which appear level with the water when the ebb tide is spent. The town here is a very thriving place, being the residence of several merchants, as well as of the lieutenant-governor of the Cabes-terre; and much frequented by shipping, especially from Nantes; the cargoes of which are sure here to meet with a quick sale, the people, who

who are very numerous in the adjacent parts, choosing rather to buy what they want near at hand, than to fend for it from the Basseterre. Besides, during the hurricane season, ships have a safe station in this port: another advantage they have here is, that when they set out for Europe, they are to the windward of all the islands, and save about 300 leagues in their passage, which they would find by the way of St. Domingo, or Porto Rico. N. lat. $14^{\circ} 53'$. W. long. $61^{\circ} 8'$.

TRINITY Bay, a large but not a very deep bay of the South Pacific ocean, on the north-east coast of New Holland, between Cape Grafton and Cape Tribulation.—Also, a large bay on the east coast of Newfoundland. N. lat. 48° . W. long. $53^{\circ} 10'$.

TRINITY Harbour, a cove on the north-west end of Trinity bay, on the east coast of Newfoundland. N. lat. 48° . W. long. $53^{\circ} 10'$.

TRINITY Inlet, a bay of the North Pacific ocean, on the west coast of North America; 30 miles S. of Queen Charlotte's Sound.

TRINITY Island, an island in the North Pacific ocean, discovered by captain Cook. Captain Vancouver passed this coast in the year 1794, and says it appeared to be divided into two islands, with several others of inferior size lying to the north, between them and the land about Cape Trinity. The east point of the easternmost is, according to his observations, situated in N. lat. $56^{\circ} 33'$. E. long. $206^{\circ} 47'$.

TRINIUMGELD, or **THRINIUMGILD**, a compensation used among our Saxon ancestors for great crimes, which were not absolved but by paying a fine thrice nine times. See **GELD**.

TRINK, in our *Statutes*, is used for a fishing-net. 2 Hen. VI. cap. 15. Blount.

TRINO, in *Geography*, a town of France, in the department of the Sesia, lately belonging to the duchy of Montferrat, situated in a marshy soil: the country near produces great quantities of corn, rice, and cheese, by some supposed equal to those of Piacenza or Parma. The fortifications are for the most part demolished. It has one collegiate and several parish churches, and religious houses; 10 miles S.S.W. of Vercelli. N. lat. $45^{\circ} 17'$. E. long. $8^{\circ} 16'$.

TRINOBANTES, **TRINOANTES**, or **TRINOVANTES**, in *Ancient Geography*, were inhabitants of Britain, situated next to the Cantii northward, and occupied, according to Camden and Baxter, that country which now composes the counties of Essex and Middlesex, and some part of Surrey. But if Ptolemy be not mistaken, their territories were not so extensive in his time, as London did not then belong to them. The name of this British nation seems to be derived from the three following British words; *Tri*, *Now*, *Hant*, which signify the inhabitants of the new city. This name was perhaps given them by their neighbours, on account of their having newly come from the continent into Britain, and having there founded a city called Tri-Now, or the New City, the most ancient name of the renowned metropolis of Britain. The Trinobantes had come so lately from Belgium, that they seem hardly to have been firmly established in Britain, at the time of the first Roman invasion. For their new city, which soon after became so famous, was then so inconsiderable, that it is not mentioned by Cæsar, though he must have been within sight of the place where it was situated. They were then at war with their neighbours, the Cattivellauni, whose king, Cassibelanus, commanded the confederated Britons against the Romans; and, on this account, the Trinobantes were amongst the first of the British states who deserted that confederacy and submitted to Cæsar. They submitted again to the Romans, on their next invasion

in the reign of Claudius, with the same facility, and almost for the same reason. For, in the interval between the invasion of Julius and that of Claudius, the Cattivellauni had reduced them under their obedience; and, in order to emancipate themselves from this subjection to their neighbours, they put themselves under the protection of the Romans. But the Trinobantes soon became weary of their obedience to their new masters. For the Roman colony at Camulodunum, which was within their territories, depriving some of them of their estates, and oppressing them several other ways, they joined in the great revolt of the Britons under Boadicea, and shared very deeply in the miseries of that revolt. From that time the Trinobantes remained in peaceable subjection to the Romans, as long as they continued in Britain. The country of the Trinobantes was greatly valued and much frequented by the Romans, on account of the excellence of its soil and climate, and the many advantages of its situation. That sagacious people soon fixed their eyes on the new town of the Trinobantes; and observing its admirable situation for health, for pleasure, and for trade, great numbers of them settled in it, and giving it the name of Londinium from its situation, and of Augusta from its grandeur, it became in a little time the largest and most opulent city in this island. In the reign of Nero, as Tacitus informs us, London was become a city highly famous for the great conflux of merchants, her extensive commerce, and plenty of all things. No fewer than seven of the fourteen journeys of Antoninus begin or end at London; a plain proof, among many others, that this city was the capital of Britain in the Roman times, as it is at present the great and flourishing metropolis of the British empire. Camulodunum, now Malden in Essex, was the seat of the first Roman colony in Britain, and a place of great beauty and magnificence in these times; though at present few or no vestiges of its ancient grandeur remain. Cæsaromagus, from its pompous name, was probably a place of some note in the Roman times; but it is now so entirely ruined, that it is difficult to discover the ground where it once stood; some of our antiquaries placing it at Chelmsford, and others at Dunmow. The Colonia of Antoninus was probably Colchester, and Durolitum, as some think, Leiton, but, according to others, Waltham. But though the county of Essex was certainly very much frequented by the Romans, who erected many noble works in it, yet time, cultivation, and various accidents, have made so great a change in the face of that country, that very few vestiges of these works are now remaining. The territories of the Trinobantes were included in that Roman province which was called Britannia Prima. See **CAMULODUNUM**.

TRINODA NECESSITAS, in our *Ancient Customs*, a threefold necessary tax, to which all lands are liable; *viz.* *expeditio*, & *reparatio pontis*, & *arcis*; going to the wars, and repairing of bridges and of castles.

These were the three exceptions anciently inserted in the king's grants of land to the church, after the words that freed them from all secular service.

TRINODA, or *Trinodia Terra*, in some *Ancient Writers*, denotes a quantity of land containing three perches.

TRINOMALY, in *Geography*, a town of Hindoostan, in the Carnatic, near which the troops of Hyder Ally were defeated by the British, under colonel Smith in the year 1768, with the loss of the greatest part of their artillery; 45 miles S.S.W. of Arcot. N. lat. $12^{\circ} 13'$. E. long. $79^{\circ} 10'$.

TRINOMIAL or **TRINOMINAL Root**, in *Mathematics*, is a root consisting of three parts, or monomes, connected together by the signs + or -.

Such is $x + y + z$, or $a + b - c$. See INVOLUTION.

TRIO, in Italian *Terzetto*, a vocal composition in three principal parts, exclusive of the accompaniments. In chamber duets and trios, such as those of Steffani and Clari, in which each part repeats the same words, the great merit was pure harmony, and ingenious subjects of fugue and imitation. But in the dramatic duets and trios of modern times, the several parts have different words and different passions to express. In an opera trio, the several characters are dialogued, and seldom sing together; and in each solo part a beautiful, interesting, and characteristic melody is required. But in moments of passion, where the three parts are united, and expressing with energy and passion their several complaints and accusations, it is that, united with the orchestra, an interest will be produced at once by combinations of poetry, harmony, and stage effects.

There is nothing more difficult, perhaps, for the poet to write, or the composer to set, than a dramatic trio.

TRIOCTILE, in *Astrology*, an aspect, or situation, of two planets with regard to the earth, when they are three octants, or eight parts of a circle, *i. e.* 135 degrees, distant from each other.

This aspect, which some call the *sesquiquadrans*, is one of the new aspects superadded to the old ones by Kepler.

TRIODIA, in *Botany*, from *τρις*, *τρις*, *three*, and *οδον*, *a tooth*, alluding to the three, nearly equal, teeth, of the outer valve of the corolla.—Brown Prodr. Nov. Holl. v. 1. 182. Kunth Nov. Gen. et Sp. v. 1. 126.—Clas and order, *Triandria Digynia*. Nat. Ord. *Gramina*.

Ess. Ch. Calyx many-flowered, of two nearly equal valves. Outer valve of the corolla with three, nearly equal, teeth; the middle one straight. Nectary of two scales.

A genus of perennial, rather rigid grasses, with paniced flowers, and the habit of a *Poa* or *Festuca*. Mr. Brown suspects *Festuca decumbens* of Linnæus, which is *Poa decumbens* of Sm. Fl. Brit., *Danthonia decumbens* of Decandolle, ought to be removed hither. Our learned friend also has hinted to us, that the two South American species of Humboldt and Bonpland, here subjoined to his own New Holland ones, though they answer to the generic character, are considerably different in appearance from the rest.

1. *T. pungens*. Br. n. 1.—“Panicle rather close, erect; with alternate, mostly simple, branches. Spikelets lanceolate, of about six flowers. Outer valve of the corolla woolly at the edges and keel, in its lower half. Leaves spreading, involute, pungent; sheaths of the lower ones viscid.”—Found by Mr. Brown, in the tropical part of New Holland.

2. *T. procera*. Br. n. 2.—“Panicle loose; its branches undivided, spiked. Spikelets somewhat stalked, of three or four flowers. Calyx roughish. Outer valve of the corolla very smooth at the keel, and nearly so at the edges. Leaves involute, rather lax; their sheath with a silky beard.”—From the same country.

3. *T. parviflora*. Br. n. 3.—“Panicle loose, elongated; its branches undivided, spiked. Spikelets linear, of about six flowers. Outer valve of the corolla naked at the keel; rather downy at the edges. Leaves involute, rather lax. Stipula torn.”—From the same country.

4. *T. microstachya*. Br. n. 4.—“Panicle elongated, rather close; its branches undivided, spiked. Spikelets about three-flowered. Glumes rough. Outer valve of the corolla blunt, with three very short teeth; its keel and edges smooth. Leaves involute; their sheath bearded.”—From the same country as the three foregoing.

5. *T. irritans*. Br. n. 5.—“Panicle close. Spikelets lanceolate, imbricated. Outer valve of the corolla villous

at the base. Leaves involute, spreading, rigid, pungent.”—Native of the southern coast of New Holland.

6. *T. ambigua*. Br. n. 6.—“Panicle lax; its branches half-whorled, undivided, spiked. Spikelets nearly sessile, linear, of eight or ten flowers. Outer valve of the corolla silky at the edges; inner fringed. Leaves involute. Stipula torn.”—Found in the tropical part of New Holland, by Mr. Brown, who doubts whether this be a genuine species of *Triodia*. Its aspect is perfectly that of a *Poa*.

7. *T. pulchella*. Kunth as above, n. 1. t. 47.—Panicle leafy, of about three flowers. Spikelets about seven-flowered. Corolla hairy at the base; its inner valve toothed. Scyons trailing. Leaves rough.—Native of cool dry exposed situations in Mexico, flowering in September. Root fibrous, with trailing runners, taking root as they go, and sending up stems two or three inches high, solitary or aggregate, whose simple panicle is accompanied by many awl-shaped leaves, resembling the radical foliage.

8. *T. avenacea*. Kunth n. 2. t. 48.—Panicle close. Spikelets about six-flowered. Corolla hairy in its lower half; inner valve entire. Scyons trailing. Leaves slightly hairy.—Native of vallies in Mexico, flowering in April. This increases by runners, like the last. But the stems are twice as tall; the panicle leafless, rather compound, resembling a *Festuca*; the leaves flat, bluntish, not unlike *Poa annua*.

TRIODION, the title of an ecclesiastical book in the Greek church, which comprehends the office of a particular part of the year. This book is called Triodion, because it contains the hymns or odes of three strophes. The hymn of two strophes is called “Diodion;” and that of four, “Tetrodion.” Leo Allatius.

TRIOLA, in *Geography*, a town of the Ligurian republic; 18 miles N.E. of Vintimiglia.

TRIOND, a town of European Turkey, in Albania; 12 miles W.N.W. of Alessio.

TRIONDA, a small island in the gulf of Satalia, near the coast of Natolia. N. lat. 36° 36'. E. long. 30° 26'.

TRIONES, in *Astronomy*, a sort of constellation, or assemblage of seven stars in the Urta Major, popularly called *Charles's Wain*.

From the *Septem Triones*, the north pole takes the denomination *Septentrio*.

TRIONTO, in *Geography*, a river of Naples, which runs into the gulf of Tarento; 10 miles E. of Rossano.—Also, a cape of Italy, on the coast of Calabria Citra, in the gulf of Tarento, at the mouth of the Trionto. N. lat. 39° 46'. E. long. 16° 54'.

TRIONUM, in *Botany*. (See *HIBISCUS*.) There is a *τρινον* in Theophrastus, said to be one of the Mallow tribe; like the *Hibiscus* in question, whose leaves, having three lobes, are supposed to sanction the present application of this name.

TRIOPTHALMUS, formed of *τρις*, *three*, and *οφθαλμος*, *eye*, a name given by authors to such pieces of agate, or other semi-pellucid stones, as happen to have three small circular spots, resembling eyes, upon them: these are of the nature of the common agate, &c. The spots are mere accidental varieties in the dispositions of the veins, and do not make a distinct species of stone.

TRIOPIUM, in *Ancient Geography*, a country or town, or, as others say, a promontory of Caria, near the sea, and belonging to the Cnidians. On this promontory was a temple of Apollo, where the Dorians celebrated games in honour of this god. At this temple was held an assembly of the Dorians of Asia, similar to the assemblies of the European Greeks at Thermopylæ. See *Cape Crio*.

TRIOPTERIS, in *Botany*, from τρις, *three*, and πτερον, *a wing*, very expressive of the three prominent membranous wings of each capsule, at least in the original species.—Linn. Gen. 228. Schreb. 307. Willd. Sp. Pl. v. 2. 743. Mart. Mill. Dict. v. 4. Juss. 253. Cavan. Diff. 431. Lamarek Illustr. t. 382. Gært. t. 116.—Class and order, *Decandria Trigynia*. Nat. Ord. *Tribilata*, Linn. *Malpighie*, Juss.

Gen. Ch. *Cal.* Perianth inferior, minute, permanent, in five deep segments. *Cor.* Petals five, roundish, with long claws. *Stam.* Filaments ten, capillary, slightly connected at the base, five rather shorter than the intermediate ones; anthers simple, roundish. *Pist.* Germen superior, three-cleft; styles three, erect; stigmas obtuse. *Peric.* Capsules three, oval, not bursting, each with one, three, or four, flat, membranous, divaricated wings. *Seeds* solitary.

Eff. Ch. Calyx in five deep segments. Petals five, roundish, with slender claws. Filaments combined at the base. Capsules three, single-seeded, each with one, three, or four, membranous wings.

1. *T. jamaicensis*. Jamaica Triple-wing. Linn. Sp. Pl. 612. Willd. n. 1. Swartz Obf. 183. (Banisteria n. 3; Browne Jam. 231.)—Leaves oblong, pointed, veiny, polished. Clusters terminal, lax. Capsules with three equal wings.—Native of Jamaica and Hispaniola. *Stem* shrubby, twining. *Leaves* stalked, opposite, entire. *Flowers* numerous, small, blue, in compound terminal clusters.

2. *T. indica*. East Indian Triple-wing. Willd. n. 2. Roxb. Coromand. v. 2. 32. t. 160.—Leaves ovate, acute, polished, smooth. Clusters compound, axillary. Wing foliary, undivided, oblong, surrounding the capsule.—Native of forests among the mountains of Hindoostan. *Roxburgh*. A twining shrub, with small whitish flowers. *Fruit* with three vertical parallel wings, each capsule being fixed in the centre of each.

3. *T. ovata*. Ovate Triple-wing. Cavan. Diff. n. 591. t. 259. Willd. n. 3. Lamarek t. 382, copied from Cavanilles.—Leaves ovate, bluntish, somewhat heart-shaped, smooth, with two glands on the footstalk. Clusters compound, terminal. Capsules with three equal wings.—Native of Hispaniola. *Flowers* yellowish.

4. *T. rigida*. Rigid Triple-wing. Swartz Ind. Occ. 859. Willd. n. 4.—Leaves roundish, acute, bordered, striated, coriaceous. Clusters axillary, compound. Capsules with three nearly equal wings.—Native of mountainous thickets in Hispaniola, flowering in May. Nearly akin to the first species, but differing essentially in its rounder, very rigid, striated leaves. *Flowers* blue. *Swartz*.

5. *T. acutifolia*. Sharp-leaved Triple-wing. Willd. n. 5. (Tetrapteris acutifolia; Cavan. Diff. n. 595. t. 261.)—Leaves ovato-lanceolate, acute, smooth. Panicle terminal. Capsules with four equal wings.—Found in Cayenne by M. Stoupy. *Flowers* yellow. *Cavanilles*.

6. *T. acuminata*. Pointed-leaved Triple-wing. Willd. n. 6. (Tetrapteris mucronata; Cavan. Diff. n. 596. t. 262. f. 2.)—Leaves elliptic-oblong, pointed, smooth. Umbels panicled, terminal. Capsules with four wings; the two lowermost smallest.—Found in Cayenne by M. Stoupy.

7. *T. buxifolia*. Box-leaved Triple-wing. Willd. n. 7. (Tetrapteris buxifolia; Cavan. Diff. n. 597. t. 262. f. 1. Banisteria microphylla; Jacq. Obs. fasc. 3. 7. t. 56.)—Leaves elliptic-oblong, bluntish, smooth. Umbels solitary, terminal. Capsules with four nearly equal wings.—Native of the Antilles. The leaves are much smaller than any of the foregoing, being hardly above an inch long, and nearly sessile.

8. *T. citrifolia*. Orange-leaved Triple-wing. Swartz Ind. Occ. 857. Willd. n. 8. (Tetrapteris inæqualis; Cavan. Diff. n. 594. t. 260. Acer scandens tricoccus, foliis citri, flore luteo minore; Plum. Ic. 9. t. 16.)—Leaves ovate, acute, smooth. Umbels axillary, stalked. Capsules with four wings; the two lowermost smallest.—Native of woods on the mountains of Jamaica. The shrubby stem climbs to a great height, with very long, round, flexible, smooth branches. Leaves stalked, three or four inches long, flexible, with several lateral ribs. Flowers small, yellow, in axillary and terminal panicled umbels.

Dr. Swartz very justly observes, that the *Tetrapteris* of Cavanilles is no distinct genus from *Triopteris*. Our second species, having but three wings to the whole aggregate fruit, or a simple circumambient wing to each capsule, may be thought to answer ill to the idea of this genus.

TRIOPTERIS, in *Gardening*, furnishes a plant of the climbing woody exotic stove kind from the West Indies, of which the species cultivated is the Jamaica triopteris (*T. jamaicensis*).

It is a tender exotic plant, which constantly requires the protection and warmth of a greenhouse or stove in this climate.

Method of Culture.—This plant is propagated and increased by seeds, cuttings of the branches, and layers. In striking roots, the cuttings will be greatly assisted by the use of a hot-bed of tanners' bark. The plants, after they are raised, are always to be kept in pots, which are to be placed amongst those of the greenhouse or stove kinds. They should have occasional waterings during hot weather.

They afford a desirable variety in collections of the above kinds of plants.

TRIORCHIS, a word used by some to express a man who has three testicles.

It is also used as the name of a buzzard; and of a plant, called ladies' traces.

TRIORES, or TRIERS, in *Law*, such as are chosen by the court to examine whether a challenge made to the panel of jurors, or any of them, be just or not.

The triors, in case the first man called be challenged, are two indifferent persons named by the court; and if they try one man and find him indifferent, he shall be sworn; and then he and the two triors shall try the next; and when another is found indifferent and sworn, the two triors shall be superseceded, and the two first sworn on the jury shall try the rest.

TRIOSTEUM, in *Botany*, from τρις, *three*, and στεον, *a bone*, because of the three hard seeds.—Linn. Gen. 94. Schreb. 128. Willd. Sp. Pl. v. 1. 990. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 1. 381. Pursh 162. Juss. 211. Lamarek Illustr. t. 150. Gært. t. 26.—Class and order, *Pentandria Monogynia*. Nat. Ord. *Aggregate*, Linn. *Caprifolia*, Juss.

Gen. Ch. *Cal.* Perianth superior, in five deep, spreading, lanceolate, permanent segments, the length of the corolla. *Cor.* of one petal, tubular; limb shorter than the tube, in five deep, erect, rounded lobes, the lower ones smallest. *Stam.* Filaments five, thread-shaped, the length of the corolla, and inserted into its tube; anthers oblong. *Pist.* Germen inferior, roundish; style cylindrical, the length of the stamens; stigma thickish. *Peric.* Berry obovate, bluntly triangular, of three cells. *Seeds* solitary, bony, bluntly triangular, obtuse, furrowed.

Eff. Ch. Corolla of one petal, scarcely longer than the calyx, nearly regular. Calyx in five deep segments. Berry inferior, of three cells, with solitary seeds.

1. *T. perfoliatum*. Perfoliate Fever-root. Linn. Sp. Pl.

Pl. 250. Willd. n. 1. Ait. n. 1. Pursh n. 1. (Triof-teopernum latiore folio, flore rutilo; Dill. Elth. 394. t. 293.)—Leaves oblong, combined. Flowers sessile, whorled.—In rich rocky grounds, principally on a limestone soil, from New England to Carolina, but rare. Perennial, flowering from June to August. *Flowers* and *berries* dark purple. *Pursh*. A hardy perennial, sometimes seen in our more curious botanic gardens. The *stem* is two feet high, erect, round, hairy or downy, like the rest of the herbage, and bearing several pairs of connate, oblong, acute, entire *leaves*, three or four inches long, spreading widely, and crossing each other. *Flowers* downy, many in each whorl.

2. *T. angustifolium*. Narrow-leaved Fever-root. Linn. Sp. Pl. 250. Willd. n. 2. Ait. n. 2. Pursh n. 2. (Petriclymenum herbaceum rectum virginianum; Pluk. Phyt. t. 104. f. 2.)—Leaves elliptic-lanceolate, slightly combined. Flowers axillary, solitary.—On the borders of woods, in a sandy soil, in Virginia and Carolina. Perennial, flowering in June and July. *Flowers* and *berries* yellow.

3. *T. triflorum*. Three-flowered Fever-root. Vahl Symb. v. 3. 37. Willd. n. 3.—Leaves stalked. Flower-stalks opposite, three-flowered.—Supposed to be a native of Madagascar. A dried specimen, as it appears, was given to Vahl by Thouin. The *stem* is simple, finely downy, eighteen inches high. *Leaves* two or three inches long; smooth above; downy beneath; but half the breadth of the first species.

TRIP, a sea-term; a ship is said to bear her topmasts *a-trip*, when she carries them twisted up to the highest.

TRIP is also a cant-term, denoting an outward-bound voyage, particularly in the coasting navigation. It also denotes a single board in plying to windward.

TRIP, among *Sheep-Farmers*, is a term which, when applied to collections of these animals, signifies a small flock or stock of them.

TRIPALL, or TRIPPALL, in *Geography*, a river of England, in the county of Northumberland, which runs into the South Tyne, 7 miles W. of Hexham.

TRIPALORE, a town of Hindoostan, in the Carnatic; 24 miles S. of Madras.

TRIPARITY, a town of Hindoostan, in the circar of Cuddapa, with a celebrated pagoda; 28 miles N. of Comban.

TRIPARTITE, TRIPARTITUS, something divided into three parts, or made by three parties; as an indenture tripartite, &c.

TRIPARTITION is a division by three, or the taking of the third part of any number or quantity.

TRIPATORE, in *Geography*, a town of Hindoostan, in Marawar; 20 miles N.E. of Madura. N. lat. 10° 8'. E. long. 79° 39'.—Also, a town of Hindoostan, in Mysore; 40 miles W.N.W. of Pondicherry. N. lat. 12° 21'. E. long. 78° 45'.

TRIPAWANUM, a town of Hindoostan; 10 miles E.S.E. of Madura.

TRIPELA. See TRIPOLI.

TRIPENTAHEDRA, derived from *τρίς*, *thrice*, *πένη*, *five*, and *ἔδρα*, *a side*, in *Natural History*, the name of a genus of spars.

The bodies of this genus are spars, composed of thrice five planes; being made of a pentangular column, terminated at each end by a pentangular pyramid. Of this genus we only know one species; this has a moderately long column, and very short and broad pyramids; it is found in Derbyshire, Yorkshire, and Cornwall, and is very frequent about Gosselaer in Saxony. Hill.

TRIPETALOIDEÆ, in *Botany*, the 5th order among the *Fragmenta* of Linnæus, consists of *Juncus*, *Aphyllanthus*, *Triglochin*, *Scheuchzeria*, *Elegia* and *Reslio* in one section; then *Flagellaria*, *Calamus*, *Butomus*, *Alifina* and *Sagittaria*. Linnæus has hinted, in a manuscript note, that the three last ought probably to be removed to an order near akin to the *Palma*, or a subdivision thereof. The name alludes to the three petals, for so we must call them, though Linnæus, like the French botanists, has spoken of them, sometimes, as petal-like leaves of the calyx.

TRIPETALOUS FLOWERS, in *Botany*, such which consist of three leaves, which are called petals, to distinguish them from the leaves of plants.

TRIPETTY, in *Geography*, a town of Hindoostan, in the Carnatic, where was a celebrated pagoda, resorted to by vast crowds of pilgrims from all parts of Hindoostan; 49 miles S.S.W. of Nellore. N. lat. 13° 45'. E. long. 79° 30'.

TRIPHACA, in *Botany*, was so named by Loureiro, from *τρίς*, *three*, and *φακν*, *a lentil*, or, as he takes the liberty of saying, *a legume*, in allusion to the three leguminous seed-vessels.—Loureir. Cochinch. 577.—Class and order, *Monoclea Polyandria*.

This is a large tree, found on the eastern coast of Africa. Mr. Brown has suggested to us that it is undoubtedly a *STERCULIA*; see that article. In species it seems to come near *S. Balanphas* and its allies. The number of the foli-oles doubtless varies.

TRIPHARMACUM, an ointment in the late London Dispensatory, so called from its being composed of three ingredients: the prescription is this: Take common plaster four ounces; oil olive two ounces; vinegar one ounce; set them over a gentle fire, and stir them continually till they become an ointment.

TRIPHASIA, in *Botany*, so named by Loureiro, Cochinch. 152, (omitted in his index,) from *τρίφασια*, *three-fold*, because of the three leaflets, petals, and calyx-teeth, proves, by his specimens at Sir Joseph Banks's, to be no other than *Limonia trifoliata* of Linnæus.

TRIPHOLINUS MOXS, in *Ancient Geography*, a mountain of Italy, in Campania. Pliny speaks of the vines which grew upon the mountain, and calls the territory which produced them *Tripholinus* ager. These vines are also mentioned by Martial, lib. 13. epigr. 14.

TRIPHOTHONGUE, in *Grammar*, an assemblage, or concurrence, of three vowels in the same syllable; as in *quæ*.

Quintilian, lib. i. cap. 6. denies the existence of triphthongues; and asserts, that there never was any syllable of three vowels, but that one of them was always turned into a consonant: Scioppius asserts the contrary. However this may be in the Latin and Greek, which were the only languages Quintilian understood, it is certain there are several languages in Europe where triphthongues are in use.

TRIPHYLIA, in *Ancient Geography*, a country of the Peloponnesus, in the Elide. Strabo mentions its maritime town Samicum.

TRIPOLI, in *Geography*, a town of Sicily, in the valley of Demona; 8 miles S. of Pati. N. lat. 38° 10'. E. long. 15° 15'.

TRIPINNA, in *Botany*, so denominated from the triply-pinnate leaves.—Loureir. Cochinch. 391.—Class and order, *Didynamia Angiospermia*.

This appears to be a very handsome and large tree, with paniced orange-coloured flowers, a berry of one cell, with few seeds, and smooth, ovate, pointed leaflets. It may be referred to Jussieu's order of *Vitices*, but whether to any described genus, we want materials to determine. This

tree is a native of mountainous woods in Cochinchina. The name is liable to much objection.

TRIPLARIS, from *triplex*, threefold, because of the prevalence of the number 3, in all the parts of fructification.—Linn. Gen. 41. Schreb. 57, 814. Willd. Sp. Pl. v. 4. 812. Mart. Mill. Dict. v. 4. Juss. 83. Lamarck Illustr. t. 825.—Class and order, *Triandria Trigynia*, Linn. *Dioecia Dodecandria*, Schreb. *Dioecia Enneandria*, Willd. Nat. Ord. *Polygonæ*, Juss.

Gen. Ch. Male, *Cal.* Perianth of one leaf, turbinate, in six ovate, acute, concave segments, externally hairy. *Cor.* none. *Stam.* Filaments nine to twelve, thread-shaped, inserted into the calyx below its divisions, which they exceed in length, behind a crown of very short hairs; anthers heart-shaped, erect.

Female, *Cal.* Perianth of one leaf, inferior, large, permanent; tube ovate, swelling; limb erect, in three deep, lanceolate, membranous, veiny, obtuse segments. *Cor.* Petals three, linear, obtuse, veiny, permanent, closely pressed to the germen. *Stam.* Filaments about twelve, very short, awl-shaped, erect, inserted as in the male, but destitute of anthers, and often altogether wanting. *Pistl.* Germen superior, large, triangular; styles three, very short; stigmas awl-shaped, keeled, hairy. *Peric.* none, except the permanent calyx. *Seed.* Nut triangular, pointed, invested with the tube of the calyx.

Ess. Ch. Male, Calyx in three deep segments. Corolla none. Stamens nine or twelve.

Female, Calyx inferior, in three deep segments. Petals three. Styles three. Nut triangular, clothed with the calyx.

1. *T. americana.* Terminal-flowered Triplaris. Linn. Sp. Pl. 130. Læfl. It. 256. Willd. n. 1. Aubl. Guian. 910. t. 347. Vahl Symb. v. 2. 100. (*T. pyramidalis*; Jacq. Amer. 13. t. 173. f. 5.)—Clusters terminal as well as axillary, oppositely branched.—Native of woods in South America, flowering in November. A tree, whose trunk is forty feet high; its summit pyramidal and dense; its branches hollow, usually full of small red ants. Leaves elliptic-oblong, alternate, acute, entire, smooth, on short stalks. *Stipula* annular, intrafoliateous, membranous, short. Spikes hairy; the male flowers green, fragrant; female ones forty-coloured.

2. *T. ramiflora.* Lateral-flowered Triplaris. Jacq. Amer. 14. Vahl Symb. v. 2. 100. Willd. n. 2.—Clusters lateral, simple, mostly solitary.—Native of Carthagenæ.

TRIPLE, *Threefold.* See RATIO and SUB-TRIPLE.

TRIPLE, in *Music*, is one of the species of measure, or time.

Triple time consists of many different species, of which there are in general four, each of which has its varieties. The common name of triple is taken hence, that the whole, or half measure, is divisible into three equal parts, and is beaten accordingly.

The first species is called the *simple* triple, in which the measure is equal to three semi-breves, three minims, three crotchets, three quavers, or three semi-quavers, which are marked thus, $\frac{3}{2}$, or $\frac{3}{4}$, $\frac{3}{8}$, $\frac{3}{16}$, $\frac{3}{32}$; but the last is not much used, except in church music.

In all these the measure is divided into three equal parts, or times, called thence *triple* times, or the measure of three times; of which two are beat down, and the third up.

The second species is the *mixt* triple; its measure is equal to six crotchets, or six quavers, or six semi-quavers, and accordingly it is marked $\frac{6}{4}$, or $\frac{6}{8}$, or $\frac{6}{16}$; but the last is seldom used.

Some authors add other two; viz. six semi-breves and six minims, marked $\frac{6}{2}$, or $\frac{6}{4}$; but these are not in use.

The measure here is usually divided into two equal parts, or times, of which one is beat down and one up: but it may also be divided into six times; of which the first two are beat down, and the third up; then the next two down, and the last up; i. e. each half of the measure is beat like the simple triple (on which account it may be called *compound* triple), and because it may be thus divided either into two or six times (i. e. two triples), it is called *mixed*; and, by some, the *measure of six times*.

The third species is the *compound* triple, consisting of nine crotchets, or quavers, or semi-quavers, and marked $\frac{9}{4}$, $\frac{9}{8}$, $\frac{9}{16}$: the first and last are little used; and also add $\frac{9}{2}$, $\frac{9}{4}$, which are never used.

This measure is divided into three equal parts, or times, of which two are beat down, and one up; or each third part may be divided into three times, and beat like the simple triple; on which account it is called the *measure of nine times*.

The fourth species is a compound of the second species, containing twelve crotchets or quavers, or semi-quavers, marked $\frac{12}{4}$, $\frac{12}{8}$, $\frac{12}{16}$; to which some add $\frac{12}{2}$, and $\frac{12}{4}$, which are never used; nor are the first and third much used, especially the latter.

The measure here may be divided into two times, and beat one down, and one up; or each half may be divided and beat as the second species, either by two or three; in which case it will make in all twelve times, and hence is called the *measure of twelve times*.

The French and Italian authors make a great many more species and divisions of triple time, unknown, or at least unregarded by our English musicians, and therefore not so necessary to be dwelt upon here.

While the modes or moods were in use, triple time was the most difficult part of a musician's study; and, indeed, seems not to have been well understood by the masters themselves, as no two writers of elementary tracts on the subject seem to agree. But at present, by the use of bars and points, with the Italian technical terms for the degrees of quick and slow, triple time is so simplified, that young students find it easier, and feel it sooner than common time. (See *Plate Time-Table*, and the article NOTATION.) When every gentleman's child learned to dance a minuet, young musicians found it easier to beat and to keep triple time, though it seems to limp, than common, which is the most simple, natural, and equitable of all measures and motions. See MINUET.

TRIPLE *Progression*, in *Harmonics*, supposed to have been the invention, or rather to have been first applied to musical ratios by Pythagoras. To speak practically of this division of the monochord, or general system of music, it was the guide not only of Pythagoras, but Euclid, and all the Greek and Roman writers on harmonics, except Aristoxenus. It precluded all idea of temperament, by a series of perfect 5ths; nor was a temperament thought of by any of the ancients, except Didymus and Ptolemy; but they seem never to have been implicitly followed.

Nothing but mere melody being in question, and the major 3d being so harsh as to be ranked among discords, temperament was not much wanted till counterpoint had made some progress; and then it was as much opposed by the adherents to the practice of the ancients, as the Copernican system was by the adherents to the Ptolemean. These prejudices, however, had been nearly annihilated, and the temperament of keyed and wind instruments became so habitual, that the triple progression had had no champion for a long time, till the abbé Rouffier, a Pythagorean *enragé*,

enragé, arose, and treated all musicians as ignorant and absurd, who had not opposed temperament, and regarded all music as dissonance which had been composed for tempered scales. But we have heard nothing of the learned abbé since the Revolution; and there seems to be no more true believers left in Pythagoras's doctrine of the triple progression, in Europe at least, than in that of the transmigration of souls.

TRIPLE Quartan Fever. See FEVER.

TRIPLE Incision. See ENGRAFTING.

TRIPPLICATE RATIO, is the ratio which cubes bear to each other.

This ratio is to be distinguished from triple ratio, and may be thus conceived. In the geometrical proportionals 2, 4, 8, 16, 32, as the ratio of the first term (2) is to the third (8) duplicate of that of the first to the second, or of the second to the third: so the ratio of the first to the fourth is said to be triplicate of the ratio of the first to the second, or of that of the second to the third, or that of the third to the fourth, as being compounded of three equal ratios.

TRIPPLICATIO, TRIPPLICATION, in *Civil Law*, is the same with sur-rejoinder in common law.

TRIPPLICITY, or **TRIGON**, among *Astrologers*, is a division of the signs, according to the number of the elements; each division consisting of three signs.

Triplicity is frequently confounded with *trine aspect*; though, strictly speaking, the two are very different things: triplicity is only used with regard to the signs, and trine, on the contrary, with regard to the planets.

The signs of triplicity are those which are of the same nature, and not those which are in trine aspect. Thus Leo, Sagittario, and Aries, are signs of triplicity, because those signs are, by these writers, all supposed fiery.

TRIPLO HEATH, in *Geography*, a common of England, remarkable for being the spot where the army formed the council of agitators, and chose Oliver Cromwell for their commander, in 1648; 8 miles S. of Cambridge.

TRIPLOIDES, a surgeon's instrument, with a three-fold basis, used in the restoring of great depressions of the skull. Blanc.

TRIPOD, TRIPOS, in *Antiquity*, a famed sacred seat or stool, supported by three feet, on which the priest and sibyls were placed to render oracles.

It was on the tripods that the gods inspired the Pythians with that divine fury and enthusiasm with which they were seized at the delivering of their predictions.

M. Spanheim observes, that, on Roman medals, the tripod expresses some priesthood, or sacerdotal dignity. A tripod, with a raven and a dolphin, is also the symbol of the duumvir, deputed for keeping of the sibylline oracles, and for consulting them on occasion.

Athenæus admits only two sorts of tripods, that are reduced to great and small tripods. But Banier distinguishes three kinds. Under the first he includes those used by the Pythia, when she delivered the oracles of Apollo in the temple of Delphos. The second kind comprehends whatever stood upon three feet, such as vases, tables, &c. of which there was a great number. Under the third class are included the votive tripods, which princes or private persons dedicated in the temples of Apollo. Herodotus (lib. ix.) speaks of a golden tripod, which the Greeks, upon their victory over the Persians, sent to Delphos. Most of the tripods found in the cabinets of the curious, are of brass or of bronze.

TRIPOD of Jason. See TRITON.

TRIPODIUM. In the laws of Henry I. occurs this

passage—"In quibus vero causis triplicem ladam haberet, ferat judicium tripodii," *i. e.* 60 solid. The meaning of which, according to some, is, that, as for a small offence the composition was twenty shillings; so for a great offence, which was to be purged *triplici lada*, the composition was three times twenty shillings, and this was called *tripodium*.

TRIPOLDA, in *Geography*, a town of Naples, in Principato Ultra; 16 miles S. of Benevento.

TRIPOLI, a country of Africa, which, though tributary to the grand signior, is called a kingdom or regency; bounded on the N. by the Mediterranean; on the E. by Barca, or, considering Barca as a province of Tripoli, by Egypt; on the S. by the Atlas mountain; and on the W. by Tunis and Biledulgerid; about 600 miles from E. to W. The breadth, from N. to S., is various, from 120 to 250. It has formerly been divided into seven provinces, or with Barca, eight; but it is generally distinguished into Maritime and Inland: the inhabitants of the former generally live upon commerce and piracy; the latter for the most part on plunder and robbery. Each division hath some cities and towns, besides a number of villages, which lie scattered chiefly through the latter; most of them very poor and thinly inhabited; the country being almost every where sandy and barren: as for cities and towns, there are few of consequence, the greater part being either wholly depopulated and gone to ruins, or only inhabited by a few fishermen, lime-burners, potash-makers, and here and there some few labourers: the chief part reduced to the lowest degree of misery and wretchedness, through the cruel exactions of the government, or the frequent depredations of the Arabs. The government, religion, laws, and customs of this kingdom are in a great measure the same with those of Algiers and Tunis. Only with respect to the first of these articles, it will not be amiss to observe, that the beys of Tripoli are not mere titular vassals to the Porte, but really under subjection and tribute. This joined to the other exigencies of the regency, the avarice of the Turkish bashaws sent thither from Constantinople, and the general decay of commerce, obliges them to load the subjects with such heavy taxes and extortions, as hath reduced the greatest part of the kingdom to the lowest degree of indigence and misery. The revenues arise chiefly from their corsairs, which are nevertheless but few, seldom exceeding seven or eight, and of these only one can properly be styled a ship, the rest are small galleys, poorly manned and equipped. The next is the duty on imports and exports; the tax on the Jews, who are here very numerous; on the natives, who, though ever so poor, must yet pay part of the product of their ground, or manufactures; and lastly on the country Moors and Arabs, among whom the bey sends his flying camp of janizaries to levy it; for these last, as well as the Moors, are kept so poor by those heavy taxes, that nothing but force, and sometimes exemplary severity, can extort it from them. The bey, by means of his protection from the Porte, makes shift to keep up a kind of despotic power, as he is besides generalissimo of all the forces. As for their commerce, it chiefly consists in slaves, either such as are taken by their corsairs, or such as they traffic for with their neighbours: the greatest part of both they send into Turkey, where they can dispose of them to the best advantage. The next branch is that of ashes, which they buy from the Arabians, and sell to the Europeans, to make glass and soap: the rest of their traffic is not worth mentioning. One circumstance in the conduct of this regency deserves notice: they are more scrupulous observers of their treaties with other nations than any of their neighbours: which punctuality, whether it proceeds from real probity, or a consciousness of their own

own weakness, is nevertheless of no small advantage to navigation and commerce. This state, as well as the rest of Barbary, after being freed from the Roman yoke, passed successively under the Vandals, Saracens, and the kings of Morocco, Fez, and Tunis; till, weary of their slavery and oppression, they resolved to have a monarch of their own, whom they chose from among themselves; and the new monarch governed them at first with great equity and moderation; but he no sooner saw himself out of danger, than he began to play the tyrant in his turn to such a degree, that the citizens conspired against him, and he was murdered by his own brother-in-law. They chose in his room another, named Abubacer, who had been formerly an officer under him, but had since retired, and turned marabout or hermit; but he had not reigned many months, before Ferdinand, king of Castile and Aragon, sent thither Peter, count of Navarre, with a powerful fleet and army, which laid siege to the capital. Abubacer, finding himself unequal to so powerful an enemy, surrendered on honourable terms, and was sent with his wife, two sons, and an uncle, to the emperor Charles V. then at Palermo, who soon after restored him to his former dignity, on condition that he should become his vassal and tributary. Abubacer rebuilt and re-peopled the city, which he held in the emperor's name, till the knights of Rhodes were driven out of that island, and forced to retire into Syracuse, when Charles was pleased to bestow the island of Malta upon them, together with the city and castle of Tripoli. They sent accordingly, and took possession of both, made one of their order governor, and put a garrison into it of their own troops. They were scarcely settled in this new acquisition, before Barbarossa made himself master of it, but it was soon after retaken by the emperor, and restored to them, who continued in possession of it till the reign of Soliman, who, under pretence that it had been retaken during the truce, sent thither a naval armament, consisting of about 110 royal galleys, and 30 other vessels, under the command of Sinan bashaw, who had under him the famed Salha Rais, surnamed Devil-driver, and the no less famous Dragut; and notwithstanding every means of defence, it was obliged to surrender, and delivered up to the Turks, after it had continued in the possession of the Christians a little above forty years, from the time of its being taken by the count of Navarre. Sinan committed the government of it to the aga Morat, upon condition that he should hold it under the grand signior, and resign it whenever he should appoint another governor. It was not long, however, before the famed corsair Dragut got possession of this place. He fortified both city and castle with strong walls, and two forts near the sea-side, well supplied with artillery and ammunition; by which means it became one of the strongest cities in Africa, and the common retreat of most of the corsairs that roved under Turkish colours, from whence they infested the coasts of Italy, Sicily, Naples and Spain, and a fruitless attempt was made by the Christians to retake it. After the death of Dragut, the Porte continued sending either a sangiac or bashaw to Tripoli, the castle being garrisoned with Turks, and the city inhabited by Moors, and the kingdom still paying tribute to the grand signior. The piratic trade went on with success; the renegades met with the usual encouragement from the Turks, and were promoted to the command of the corsairs, and even of their own fleets, and sometimes to the bashawship; these recommending themselves to the regency, not only by their desperate behaviour, but much more by their peculiar barbarity to the Christian prisoners, which often provoked reprisals, that were carried on both sides to such excess as can

hardly be particularized without horror. In this condition the kingdom continued till the Turkish government, becoming more and more intolerable, by the avarice and tyranny of those bashaws, a certain marabout named Sid Hajah, about the close of the sixteenth century, found means to raise a general revolt both in the city and country. Unfortunately for him, he did not take care to secure a foreign assistance, before he broke out into open rebellion; so that Hascen bashaw, the Turkish admiral, came suddenly upon him, at the head of sixty galleys, and a number of other ships and forces, which he had procured from Tunis and Algiers, and defeated him so often, that he was at length abandoned by his troops, and assassinated by his own partizans. Hascen sent the marabout's head to Constantinople, and had hardly settled the government on the old footing, when a new governor, sent thither from the Porte, found a much more effectual way to free them from this tyranny. This man was a renegade Greek, of the ancient family of the Justiniani, known by the name of Mahmet Beygh, who, by his intrigues and bribes, had obtained a banner or government from the grand signior. He sailed directly to Tripoli, and having got possession of the castle, refused to acknowledge or receive any bashaw from Constantinople. He took the reins of government wholly upon himself, not indeed as independent, but as vassal and tributary to the Porte, to whom he obliged himself to pay a tribute and homage, as an acknowledgment of his subjection and dependence.

TRIPOLI, a city and sea-port of Africa, and capital of the country so called, situated on the coast of the Mediterranean. It was formerly divided into two parts, the Old and New; the former, which was the native country of the emperor Severus, is supposed to have been built by the Romans, was since conquered by the Vandals, and at last destroyed by the Mahometans, under their caliph Omar II. since which time it hath never recovered its importance, and is now almost gone to ruin; the latter, which stands at a small distance from it, though of no great extent, is populous, and in a flourishing condition. It stands on a foundation of rock, by the sea-side, surrounded with high walls and stout ramparts, flanked with pyramidal towers, but not kept in good repair. The sea washes the town on three sides; and on the fourth a sandy plain, called the Messa, joins it to the rest of the country. On the E. it is divided from Egypt by the dreary deserts of Barca, where none reside but occasionally the wandering Arab. It hath but two gates, one towards the inland on the S., and the other to the sea on the N., where it expands itself in form of a crescent, near a spacious and commodious haven. On entering the harbour, the town manifests the dilapidations of time, large heaps of rubbish appearing in various parts of it. The castle, or royal palace, where the bashaw resides, is at the E. end of the town within the walls, with a dock-yard adjoining, where the bey (the bashaw's eldest son) builds his cruisers. The castle is very ancient, and is inclosed by a strong wall, that appears impregnable; but within, it is totally destitute of symmetry.

New Tripoli is supposed to have been built by the natives, who gave it the name of *Tarabilis*, or *Trebiles*, whence the Latins call it *Tripolis*. Some authors pretend that it was once a place of vast trade, on account of its neighbourhood to Numidia and Tunis, resorted to by vessels from Malta, Venice, Sicily, Marseilles, and other parts; there being hardly such another commodious sea-port along this whole coast, except Alexandria; by which means it became so opulent, that it was filled with rich merchants, abounded with fine mosques, hospitals, and other public buildings,

TRIPOLI.

and excelled Tunis in beauty and wealth. It retains now but few traces of its ancient splendour. The baths form clusters of cupolas, very large, to the number of nine or ten, crowded together in different parts of the town. The mosques have generally a small plantation of Indian figs and dates close to them, which give to the town a novel and pleasing aspect. The houses are low and mean, the streets narrow, dirty, and irregular: there are in it nevertheless some monuments still standing, which evince its former magnificence; particularly a triumphal arch, one half of which now lies buried in the sand, and some remains of Roman pavement. We need not wonder at this extraordinary decay, if we consider the two great inconveniencies which this city labours under: first, the want of sweet water, here being neither rivers, springs, nor wells, nor any other means of supplying it with that useful element but cisterns and reservoirs of rain-water; secondly, the great scarcity of corn, and the other products of the ground, occasioned by the dry sandy soil that surrounds it on the land side for several miles. It produces, however, palm-trees in great plenty, that yield the most delightful dates, which constitute a considerable part of their food: besides these, they have the lotus or lotus, a tree whose fruit is reckoned still finer than the dates, and makes a most excellent wine. That plant serves them for meat and drink, for which reason they have been stiled by the ancients *Lotophagi*. But upon the whole, were it not for the continual supply of provisions brought in by their corsairs, and other trading vessels, Tripoli could never subsist by the products of its own territories; and hence we may infer the cause of its present decay. Adjacent to the walls of the city is a famous burying-ground, in which are found coffins, urns, medals, and other curious relics of antiquity. The Franciscan friars have here a very handsome church, convent, and hospital, the last of which is the more necessary, as the city is so often and so severely visited by the plague. Other orders of monks were here settled, who have been since obliged to abandon it, probably on account of its decay. The country around is adorned with a multiplicity of handsome villas, cultivated chiefly by Christian slaves, and much like those about Algiers and Tunis. The people here carry on a considerable trade in linen cloths, great quantities of which are wrought by the inhabitants; but their chief dependence is on their own corsairs, and those of other nations, which resort to their harbour. Its shops are little better than booths, though they contain pearls, gold, gems, and precious drugs. Here are two covered bazars, one very large, composed of four aisles meeting in a cross, furnished on each side with shops, which contain every kind of merchandize: the other is much smaller, without shops, and destined to the sale of black men and women. (See the preceding article.) A late traveller says, the date-trees, which spread themselves like a forest behind the town, and the hills beyond them, which bound the prospect on the south, are interesting objects; but the town itself is built in too low a situation to compose a part of the general scene: for it is scarcely visible at the distance of a mile. Its scanty limits, though scarcely four miles in circumference, are too great for its present population; and its ancient castle, though once the pride and still the residence of the reigning family, is now a mouldering ruin; 300 miles S.E. of Tunis. N. lat. $32^{\circ} 54'$. E. long. $13^{\circ} 18'$.

TRIPOLI, or *Tarabolos*, a town of Syria, and capital of a pachalic, and residence of the pacha, situated near the mouth of a small river, called *Kadisha*, at the foot of Mount Lebanon, which overlooks and surrounds it with its branches to the E. the S. and even a little to the N.W.

The Greek name Tripoli, denoting three cities, is derived from its having been built by three colonies, from Tyre, Sidon, and Arfidus, each of which formed settlements so near each other that they were soon united into one. It is separated from the sea by a small triangular plain, half a league in breadth, at the point of which is the village where the vessels land their goods. The Franks call this village La Marine, the general name given by them to these places in the Levant. There is no harbour, but a simple road, which extends from the shore to shoals, called the Rabbit and Pigeon Islands. The bottom is rocky, and mariners are not fond of remaining here, as the cables are soon worn out, and the vessels exposed to the N.W. winds, which are frequent and violent on all this coast. In the time of the crusades, this road was defended by towers, seven of which are still subsisting from the mouth of the river to the village. They are strong built, but now serve only as a place of resort for birds of prey. All the environs of Tripoli are laid out in orchards, where the nopal grows spontaneously, and the white mulberry is cultivated for the silk-worm; and the pomegranate, the orange, and the lemon-tree, for their fruit, which is of the greatest beauty. The grounds belonging to it extend as far as Mount Lebanon, and abound in vineyards. Each hill produces a different wine; but the golden wine is most admired. But these places, though delightful to the eye, are unhealthy. Every year, from July to September, epidemic fevers, like those of Alexandretta and Cyprus, rage here: these are owing to the artificial inundations with which the mulberry-trees are watered, in order that they may throw out their second leaves. Besides, as the city is open only to the west, the air does not circulate, and the spirits are in a constant state of oppression, which makes health at best but a kind of convalescence. At La Marine the air is more salubrious, its circulation being less impeded. The commerce of Tripoli consists almost wholly in indifferent coarse silks, which are made use of for laces, and is in the hands of the French alone. But they are losing their quality, which is owing to the decay of the mulberry-trees. They have a consul here, and three commercial houses. They export silks, and sponges fished up in the road; these they exchange for cloths, cochineal, sugar, and West India coffee; but this factory, both with respect to imports and exports, is inferior to *Latakia*; which see.

The pachalic of Tripoli comprehends the country which stretches along the Mediterranean from Latakia to the *Narh-el-Kelb*, and is bounded on the W. by that torrent, and the chain of mountains which overlook the Orontes. The principal part of this government is hilly, the sea-coast alone between Tripoli and Latakia being a level country. The numerous rivulets which water it contribute greatly to its fertility; but notwithstanding this advantage, this plain is much less cultivated than the mountains, without even excepting Lebanon, with its numerous rocks and pine-trees. Its chief productions are corn, barley, and cotton. In the territory of Latakia, tobacco and olives are principally cultivated; but in Lebanon and the *Kefraouan*, white mulberry-trees and vineyards. This pachalic contains several tribes and religions. From Lebanon to above Latakia, the mountains are peopled by the *Anfarians*, a particular sect of religious, which first rose in the latter end of the ninth century; Lebanon and the *Kefraouan* are inhabited entirely by the *Maronites*; and the sea-coast and cities, by schismatic Greeks, and Latins, Turks, and descendants of the Arabs. The pacha of Tripoli enjoys all the privileges of his place. The military and finances are in his hands; he holds the government in quality of a farm from the Porte, on a lease of one year only, at the annual rent of 750 purses (39,000*l.*)
In

In 1101, this town was taken by the Christians, and held by Bertrand, son of Raymond, count of Touloufe, as a county, in which situation it remained till the year 1288, when it was taken by Melec Messor, sultan of Egypt, who ordered it to be razed to its foundation; 75 miles N.N.W. of Damascus. N. lat. 34° 28'. E. long. 35° 36'. Volney's Travels in Egypt, &c. vol. ii.

TRIPOLI, in *Mineralogy*, a mineral originally brought from Tripoli for the polishing of stones and metals, whence it derives its name. It has a dull argillaceous appearance, but is not compact; it has a fine but hard grain, and does not soften by water, or mix with it. The colours are grey, inclining to red or yellow. From analysis, it proves to be principally composed of siliceous flint. Tripoli appears to be of two formations; the one by fire, which has hardened flates or sand-stones, and converted them into this substance; the other by water, decomposing beds containing siliceous flint, clay, and iron. The tripoli from Derbyshire, called rotten-stone, may be referred to the latter formation; it occurs in the upper part of the great shale stratum which covers the mountain lime-stone of that district: it is dug near the surface, and is sold for 60s. per ton. Farey's Derbyshire, vol. i. p. 231.

The tripoli of Poligné, near Rennes, in Brittany, is fusible. It is of a red colour of different shades. Trunks of trees are found changed into tripoli in the middle of the beds, which are covered by beds of sand-stone in an inclined position.

The tripoli of Venice is the most esteemed; it comes from the island of Corfu. It is schistose, and has a yellowish-red colour. Saussure has remarked in this tripoli, and in the preceding, a multitude of small cylindrical pores.

Tripoli is found at Menal, near Riom, in the department of Puy-de-Dome. It occurs in beds which appear to have been formerly schists changed by the action of volcanic fire. This substance is found in the quarries of chalcedony of Volterra in Tuscany, and is said to be so situated as to appear evidently the result of the decomposition of the chalcedony. It occurs in coal strata at Postchappel, in Saxony. The tripoli from Billin, in Bohemia, occurs in thin beds, which pass insensibly into pitch-stone. Acids produce no effervescence with it, nor is it melted by the most violent heat, though it is somewhat hardened.

In fact, we sometimes find tripoli in volcanic mountains, or in strata which contain beds of coal in a state of combustion; and sometimes in beds formed evidently by deposition from water. It should appear that certain strata, composed principally of siliceous flint in a state of extremely minute division, and combined with iron and clay, are decomposed by the agency of water, and the latter materials being in a great part removed, the siliceous flint is left porous and friable, and coloured by iron: it then forms tripoli; and beds of this mineral may have been so formed, and afterwards covered by streams of lava, where they occur in volcanic mountains. Where siliceous flint is intermixed with a portion of alumine and iron, as in schists, the alumine by exposure to a great heat may be hardened and contracted, and leave the stone in a porous or friable state. The specific gravity of tripoli is stated by Bucholz at 2.202, and its constituent parts

Siliceous flint	. . .	81
Alumine	. . .	1.50
Oxyd of iron	. . .	8
Sulphuric acid	. . .	3.43
Water	. . .	4.55

The sulphuric acid and water are considered as accidental.

For the method of imitating gems by means of tripoli, see GEMS.

TRIPOLIS, in *Ancient Geography*, a country of the Peloponnesus, in Arcadia, so called on account of its three towns, according to Pausanias.—Also, a town of Phœnicia, situated about half a league from the sea, and 18 miles from Orthofia. Diodorus and Strabo derive its name from three towns of which it originally consisted, about a stadium from one another.

Alexander the Great subdued this city, which, after his death, passed to Ptolemy Soter, whose successors retained possession of it till the reign of Antiochus the Great, king of Syria, who made himself master of this town and the whole of Phœnicia, towards the year 219 B. C. After its subjugation by Pompey, it passed under the dominion of the Romans, but was allowed the privilege of being a free city, and of being governed by its own laws. Under the empire of Vespasian, Tripoli assumed the epithet of Flavian. The territory of Tripoli was watered by many rivers and streams, which descended from Libanus. About two leagues E. of Tripoli was a tomb formed in a rock, which the Syrian Christians held to be the sepulchre of Canaan, the father of the Phœnicians.

TRIPOLIS, a town or country of the Peloponnesus, in Arcadia, which afforded an ample supply both of men and cattle, according to Pausanias.—Also, a country of Thessaly, in which were the towns of Pythium, Azorum, and Dolicha, according to Livy.—Also, a town of Asia, on the Meander, and capital of Caria.—Also, a town of Asia, on the banks of the Euxine sea, W. of Trebisond.

TRIPOLITANA REGIO, or *Tripoli*, a country of Africa, bounded N. by the Mediterranean sea, E. by the river Cinyphus or Cinyphus; situated in the midst of Libya Interior, and W. of the river Triton. Procopius says, that Sergius was appointed governor of this province by Justinian, at whose instigation the inhabitants embraced the Christian religion. They were called the "allies of the Romans," because they faithfully maintained peace with them. Some have confounded Pentapolis with Tripolis. See TRIPOLI, in *Geography*.

TRIPOLIZZA, in *Geography*, a town of European Turkey, in the Morea, the capital of a pacha, having about 12,000 inhabitants. In 1770, this town was besieged by the Russians and revolted Greeks, but a numerous detachment of Albanian cavalry coming up, the Greeks fled and left the Russians to the contest alone, of whom hardly one escaped. The Albanians afterwards, under a pretence that the inhabitants had held a correspondence with the enemy, put three thousand of them to the sword in less than two hours, and then plundered and set fire to the town; 18 miles W. of Napoli di Romania.

TRIPONTIO, or TRIPONZO, a town of the Popedom, in the duchy of Spoleto, on the Nera; 12 miles N.W. of Norcia.

TRIPONTIUM, in *Ancient Geography*, a place of Italy, in Latium, on the Appian way; which appears by the military column to be at the 39th mile: it was repaired by the emperor Trajan. The Goths constructed a tower in this place.

TRIPONTIUM, a town of Great Britain, in the sixth Iter of Antonine, supposed to be Rugby. Drs. Gale and Stukeley place it at Dowbridge, and the last of these authors derives its name from *tre*, a town, and *pont*, a little valley, in which Dowbridge is situated. Camden and Baxter fix Tripontium at Towcester, and Camden derives its name from the British words *Tair-ponti*, signifying three

three bridges. But Mr. Horsley supposes it to have been situated where the town of Rugby now stands.

TRIPOOR, in *Geography*, a town of Hindoostan, in Mysore; 25 miles N.E. of Coimbetore.

TRIPPING, in *Heraldry*, denotes the quick motion of all sorts of deer, and of some other creatures, represented with one foot up, as it were, on a trot.

In speaking of lions, they say *passant*, instead of *tripping*.

TRIPPING, in *Sea Language*, denotes the movement by which an anchor is loosened from the bottom by its cable or buoy-ropes. See *ATRIP*.

TRIPSACUM, in *Botany*, was so named by Linnæus, from τριψα, a rubbing, or grinding; but whether in allusion to the grain being useful for making flour, or, as we are rather inclined to suspect, to the smooth polished aspect of the glumes, is not explained.—Linn. Gen. 481. Schreb. 622. Willd. Sp. Pl. v. 4. 201. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 5. 236. Pursh 88. Juss. 30. Lamarck Illustr. t. 750. Gærtn. t. 1.—Class and order, *Monocotyledon Triandria*. Nat. Ord. *Gramina*.

Gen. Ch. corrected by Schreber. Male flowers in pairs, unilateral, alternate, mostly in the upper part of the spike. *Cal.* Glume two-flowered; the outer floret male; inner neuter; each of two valves: outer valve lanceolate, flattish, obtuse, awnless, cartilaginous, thinner at the edges; embracing the inner valve, which is oblong, triangular, keeled, acute, about the same length. *Cor.* in each floret of two nearly equal valves, membranous, very thin, awnless, smaller than the calyx; the outer valve ovate, boat-like, bluntish; inner lanceolate, cloven at the end. Nectary of two minute, triangular, fleshy, convex, abrupt valves, pointed at each end, thinnest at the upper margin, notched in the middle. *Stam.* in the outer floret, Filaments three, capillary, longer than the calyx; anthers parallelepipedal: in the inner, Filaments three, very slender, somewhat combined; anthers none.

Female flowers in the lower part of the same spike, alternately sunk in the common stalk, at each side. *Cal.* Involucrum ovate, cartilaginous, very thick, tumid below, polished; obscurely bordered at each side externally; blunt and somewhat emarginate at the end; embracing the inner glumes with its thinner margin. Glume of two valves; the outermost oblong, tumid, taper-pointed, thickish, doubled; inner similar, but rather blunt. *Cor.* of two valves, smaller and thinner than the calyx; the outer valve largest, tumid, bluntly three-toothed; inner rather smaller, flat at the back, emarginate. Abortive glume of one valve, oblong, folded in at each margin, furnished with two teeth, and situated at the fore-side of the fertile floret, to which it is much inferior in size. Nectary minute, of two linear, membranous, very thin scales, acutely notched at the summit. *Stam.* Filaments three, minute, at the base of the germen, capillary, dilated below; anthers linear, minute, imperfect. *Pist.* Germen superior, oblong; style one, compressed, longer than the calyx; stigmas two, very long, villous, twisted. *Peric.* none. *Seed* solitary, ovate, a little compressed, pointed with the permanent style.

Obs. At the base of the involucrum, at each side, is an opening, lined internally, on one side, with bristly hairs.

Ess. Ch. Male, Calyx a glume of two flowers, the innermost neuter. Corolla of two membranous valves.

Female, Calyx a single-flowered glume, enclosed in a single-leaved involucrum, pierced at each side. Corolla of two valves. Stigmas two. Seed one.

1. *T. dactyloides*. Rough-seeded Tripfacum. Linn. Sp. Pl. 1378. Willd. n. 1. Ait. n. 1. Pursh n. 1. Mill. Illustr. t. 78. (Coix feminibus angulatis; Linn.

Hort. Cliff. 438. Gramen dactylon maximum americanum; Pluk. Phyt. t. 190. f. 2. *G. dactylon indicum* esculentum, spicâ articulata; Ambrosin. Phyt. 546, 547, rude, but expressive. Sefamo perenne indiano, pianta frumentacea; Zanon. Ist. 181. t. 69, not 68).—Spikes aggregate, about three together, male in the upper part, female at the base.—On the banks of rivers, and along the sea-shore, in Virginia, Carolina, and the country of the Illinois, flowering in August. *Pursh.* Root perennial, thick and woody, with many strong zigzag fibres. *Stems* numerous, erect, reedy, four or five feet high, round, smooth, as thick as a goose-quill, knotty; leafy below. *Leaves* long, linear, taper-pointed, an inch broad, smooth. *Spikes* a span long, smooth, usually three together, often more or fewer; the male flowers very numerous.

T. monostachyon, Willd. n. 2. Hort. Berolin. t. 1, found in salt meadows and ditches, from New York to Carolina, seems, as Pursh remarks, to be but a single-spiked variety of the former; probably such as is represented by Miller above cited.

2. *T. cylindricum*. Cylindrical Tripfacum. Michaux Boreal.-Amer. v. 1. 60. Willd. n. 3. Pursh n. 3.—“Spike solitary, hermaphrodite, cylindrical. Spikelets contiguous, separating by joints.”—Found in sandy fields in Florida. *Michaux.*

3. *T. hermaphroditum*. United-flowered Tripfacum. Linn. Sp. Pl. 1379. Willd. n. 4. Ait. n. 2. Linn. fil. Dec. 17. t. 9. (Cenchrus n. 2; Browne Jam. 367).—Spike solitary, tapering, with a wavy stalk, and rather distant spikelets.—Native of grassy pastures in Jamaica, where it is fed on by all sorts of cattle. The root is annual, fibrous. *Stem* from eighteen to twenty-four inches high, leafy, smooth. *Leaves* pointed, somewhat rough-edged. *Spike* tapering, pale, smooth. *Sinus* at each side of the involucrum destitute of internal hairs, but accompanied by a sort of blunt short spur.

TRIPTERELLA, a diminutive from τριψα, three, and πτερον, a wing, used by Michaux to express the character of the three little narrow wings, projecting from the angles of the calyx, or rather corolla; not, as De Theis says, of the capsule.—Michaux Boreal.-Amer. v. 1. 19. Vahl Enum. v. 2. 42. Pursh 28.—Class and order, *Triandria Monogynia*. Nat. Ord. akin to *Burmannia*, and perhaps *Hypoxis*; genera whose place in Jussieu's system is not well settled.

Gen. Ch. *Cal.* none, unless the corolla be taken for such. *Cor.* of one petal, permanent, superior; tube swelling at the base, contracted in the middle, angular, with three slight wings, at the summit; limb shorter than the tube, in six deep segments, the three intermediate ones minute. *Stam.* Filaments three, very short, inserted into the tube below the three smaller segments of the limb; anthers within the tube, of two widely separated lobes. *Pist.* Germen inferior; style the length of the stamens, triangular; stigma in three short, thickish, blunt segments. *Peric.* Capsule membranous, triangular, of three cells, crowned with the withered corolla. *Seeds* numerous, minute, oblong, cylindrical, striated.

Ess. Ch. Calyx none. Corolla superior, of one petal; its tube angular, swelling at the base; limb in six segments, the three intermediate ones minute. Capsule of three cells, with many seeds.

1. *T. capitata*. Capitate Tripterella. Michaux t. 3. Vahl n. 1. Pursh n. 1. (Anonymos capitata; Walt. Carol. 69. Vogelia capitata; Gmel. Syst. Nat. v. 2. 107.)—In wet places, borders of ponds, &c. in Lower Carolina, flowering from May to July. *Pursh.* Found by Richard in Cayenne. *Vahl.* Root small, fibrous, annual.

Stem from nine to eighteen inches high, solitary, simple, erect, slender, smooth, nearly naked. *Leaves* very few and small, scattered, awl-shaped; sheathing at the base. *Flowers* white, several together, in a solitary terminal head the size of a large pea, interspersed with small, awl-shaped, scaly bractees, shorter than the corolla. The wings which proceed from the angles of the latter appear to be very slight.

TRIPHTHONG. See TRIPHTHONGUE.

TRIPTILIUM, in *Botany*, so named in the Flora Peruviana, from τρις, three, and πτελον, a soft plume, or feather, which is very descriptive of the five dense, white, stalked tufts, crowning the seed.—Fl. Peruv. Prodr. 102. t. 22. Willd. Sp. Pl. v. 3, 1626. De Caudolle Ann. du Mus. d'Hist. Nat. v. 19. 67. t. 3. f. 3.—Class and order, *Syn-genesia Polygamia-aqualis*. Nat. Ord. *Compositae semistilosculose*, Linn. *Gnarocephali*, Juss.

Gen. Ch. *Common Calyx* imbricated, nearly cylindrical, of several lanceolate, keeled, spinous-pointed, nearly equal, scales, containing four or five flowers, in a simple series. *Cor.* compound, uniform, radiant; florets all uniform, perfect, fertile, monopetalous, tubular, two-lipped; the lower lip spreading, ovate, three-toothed; upper much smaller, erect, oblong, entire. *Stam.* Filaments five, capillary; anthers united into a tube, shorter than the corolla, swelling in the middle. *Pist.* Germen solitary under each floret, obovate; style thread-shaped, longer than the stamens; stigmas two, oblong, spreading. *Peric.* none, except the permanent calyx. *Seeds* solitary, oblong, angular; down of five equal, linear, channelled scales, the length of the calyx, each terminating in a dense, oblong, pointed, spreading plume, about half as long as the scale. *Recept.* small, clothed with soft shaggy hairs.

Eff. Ch. *Receptacle* villous. *Calyx* imbricated, spinous, about five-flowered. *Florets* two-lipped. Down of five channelled scales, feathered at the summit.

1. *T. laciniatum*. Blue and White Triptilium. Willd. n. 1. (*T. spinosum*; Cavan. MSS.)—Native of Peru and Chili. We received a specimen from the late abbé Cavanilles in 1804. Few plants constitute a more distinct genus, or make a more elegant appearance, even after being so many years dried. The root is said to be annual. *Herbage* hard and rigid, besprinkled with fine, long, loose, rather copious, hairs. *Stem* round, slender, branched, corymbose, brown, very leafy. *Leaves* scattered, nearly or quite sessile, spreading, about an inch long, pinnatifid, with three or five spinous-pointed, convex segments; paler, and most hairy, beneath; accompanied by short, axillary, leafy shoots, whose leaves are linear and undivided. *Flowers* numerous, in a dense, compound, level-topped, corymbose, leafy panicle. *Calyx* about one-third of an inch long; its scales slightly hairy, with membranous edges. Lower lip of each floret of a bright permanent blue; upper whitish. The feathery tips of the seed-down, nearly the length of the florets, are snow-white, and, contrasted with their fine blue, make a singularly elegant appearance. We have not heard of this plant in any European garden.

TRIPTIS, in *Geography*, a town of Saxony, in the circle of Neustadt; 4 miles E. of Neustadt. N. lat. 50° 25'. E. long. 11° 50'.

TRIPTOLEMUS, in *Mythology*. See CERES.

TRIPOTOTES, compounded of τρις, three, and ὥσις, case, in *Grammar*, defective nouns, which have only three cases; such is *fors*, *fortis*, *forte*; or *dica*, *dicam*, *dicas*.

TRIPUDIUM, in *Antiquity*, a species of divination, in which omens were drawn from the rebounding of corn thrown to chickens.

TRIPUNETAIRE, in *Geography*, a town of Hindoostan; 35 miles E.N.E. of Cochin.

TRIPURA, a city often mentioned in the mythological relations of the Hindoos, as having been destroyed, together with its wicked sovereign Tareka, by their god Siva, who is hence called Tripuranteka, or the destroyer of Tripura. See SURA and TAREKA.

TRIPURANTEKA, in *Mythology*, a name of the Hindoo god Siva, so called from a mythological relation of his having destroyed a city and tyrant named Tripura.

TRIPYRAMIDES, derived from τρις, thrice, and πυραμεις, a pyramid, in *Natural History*, the name of a genus of spars.

The bodies of this genus are spars composed of single pyramids, each of three sides, standing on no column, but affixed by their bases to some solid body.

Of this genus there are only two known species: 1. A short and thick one, found on the sides of the stacks of stone in Northamptonshire, and elsewhere; but this is not common, and is usually small. 2. A long one with a narrow base: this is not found in England, but is common in the German mines. Hill.

TRIQUETRA OSSA, in *Anatomy*, the small irregular bones occasionally found between the regular bones of the cranium. See CRANIUM.

TRIQUETRUM FOLIUM, among *Botanists*. See LEAF.

TRIRAPHIS, in *Botany*, from τρις, three, and ῥαφεις, a needle, or awl, because of the three straight awns.—Brown Prodr. Nov. Holl. v. 1. 185.—Class and order, *Triandria Digynia*. Nat. Ord. *Gramina*.

Ess. Ch. *Calyx* many-flowered, of two equal, awnless valves. *Spikelet* two-ranked; two, or more, of the lowest florets perfect, the rest male, or neuter. *Outer valve* of the corolla with three terminal straight awns; inner awnless. *Nectary* of two scales. *Stigmas* villous.

A genus of grasses found within the tropics, akin to the TRIODIA and PAPPOPHORUM of Mr. Brown, (see those articles); and therefore to his *Earofia*, and the *Chloris* of Swartz, which are said to be very little different from each other. The flowers are paucicel. Two New Holland species, gathered by the learned author in the tropical part of that country, are all that occur in his *Prodromus*; nor does this genus find a place in Mr. Kunth's South American work. Probably however there may be East Indian species, unknown to us.

1. *T. pungens*.—"Panicle loose. *Outer valve* of the corolla coriaceous, minutely downy. *Awns* equal; the middle one simple. *Leaves* involute, spreading, straight."

2. *T. mollis*.—"Panicle close. *Outer valve* of the corolla bearded with spreading hairs. *Middle awn* furnished at each side with a bristle-like appendage."

TRIREME, or TRIREMIS, in *Antiquity*, a galley with three ranks of oars on a side. See ENNERIS.

TRISACRAMENTARIANS, or TRISSACRAMENTARIANS, an appellation given to a sect in religion, who admit of three sacraments, and no more.

There have been several Trisacramentarians who allowed of baptism, the eucharist, and absolution for sacraments.

The English are often misrepresented by foreigners as Trisacramentarians, from an opinion that they allow ordination to be a sacrament.

TRISACTIS, in *Natural History*, the name of a genus of star-fish, composed of a body and three rays, the more usual number being five.

TRISAGA, in *Geography*, a town of Italy, in the Cadurin; 14 miles N.N.E. of Cadora.

TRISAGION, or TRISAGIUM, τρισάγιον, compounded of τρεις, *three*, and ἅγιος, *sanctus, holy*, in *Church History*, a hymn, in which the word *holy* is repeated three times.

The proper Trisagion is those words, *Holy, holy, holy, Lord God of Sabaoth*, which we read in *Isaiah*, vi. 3. and in the *Apocalypse*. From these words the church formed another trisagion, which is rehearsed in Latin and Greek, in the respective churches, to this effect, *Holy God, Holy Mighty, Holy Immortal! have mercy upon us*. Petrus Fullensis to this trisagion added, ο σαουθαδης δι ημας, *Thou who wast crucified for us—have mercy*, &c. thus attributing the passion, not to the Son alone, but to all the three persons of the Trinity; and he pronounced anathema to all such as would not say the same. See THEOPASCHITE.

The use of the second trisagion (exclusive of the addition of Fullensis) began in the church of Constantinople, from whence it passed into the other churches of the East, and afterwards into those of the West: and still subsists in its primitive purity, both in Latin, Greek, Ethiopic, and Mozarabic offices.

TRISAKTI, or TRISAKTI-DEVI, in *Hindoo Mythology*, is a name of the goddess Parvati, consort of Siva. It means of triple energy; both god and goddess having various triform characters and potencies, and many names indicative of three-fold properties. Parvati is found to have many attributes and appellations corresponding with those of the Grecian Juno or Diana: among them several derived from their three-fold character. Trivia, for instance; and by the way, the meeting or junction of roads was mysteriously sacred to both. See JUNCTION.

Tritonea, Tergemania, &c. are appellations of the Triple Hecate. See Potter's *Archæol. Græc.* ch. xix.

TRISANTHUS, in *Botany*, from τρεις, *three*, and ἄνθος, *a flower*, because there are three flowers in one common calyx.—Loureir. *Cochinch.* 175.—Class and order, *Pentandria Digynia*. Nat. Ord. *Umbelliferae*.

Gen. Ch. *Cal.* Umbel simple, of three flowers. Involucrum of two lanceolate, permanent leaves. Perianth superior, of five minute deciduous teeth. *Cor.* none. *Stam.* Filaments five, awl-shaped, very short; anthers roundish, of two cells. *Pist.* Germen lenticular, coloured, rather abrupt, crowned by the perianth; styles none, (or very short); stigmas two, oblong, reflexed. *Peric.* none. *Seeds* two, kidney-shaped, easily separable.

Eff. Ch. Umbel simple, of three flowers. Involucrum of two leaves. Calyx of five teeth. Petals none. Fruit compressed.

1. *T. cochinchinensis*. *Rau má* of the *Cochinchinaese*. The only described species, frequent about hedges in *Cochinchina*, where, though an esculent herb, it is not cultivated. The author thought he had also met with this plant in *China*, as well as other parts of the *East Indies*; and he cites the *Pis equinus* of *Rumphius*, book 9. chap. 69. t. 169. f. 1, which is no other than *Hydrocotyle asiatica* of *Linnaeus*. They may be one and the same, as *Loureiro* was most inclined to believe. He describes his *Trisanthus* with a long, trailing, slender, thread-shaped stem, taking root at nearly regular intervals. *Leaves* from the same points as the roots, roundish, concave, rugose, smooth, crenate, divided half way down, on long, erect footstalks. *Germen* purple, which *Loureiro* takes for a perianth investing the seed, and becoming a pericarp. The *flower-stalks* are radical, crowded, rather long.

The whole plant is said to be vulnerary, cleansing, diuretic, and nephritic. *Loureiro* knew a man who, having deprived himself, at a stroke, of parts which most people wish to preserve, healed the wound readily by the applica-

tion of this herb, mixed with a small quantity of powdered lime. A notable cure no doubt! but which few persons will be anxious to verify by experiment, and which still fewer, probably, would try with perfect satisfaction or success.

TRISCAEDECACTIS, in *Natural History*, a name given by *Linkius*, and some other authors, to a kind of branched star-fish, or astrophyte, whose rays are thirteen in number, where they first leave the body, and each divides into many more.

TRIS-DIAPASON, TRIPLE-DIAPASON, in *Music*, what is otherwise called a *triple eighth*.

TRISE, at *Sea*, the seamen's word for haling up of any thing with a dead-rope, or one that doth not run in a block, but is pulled by hand or by main strength: thus if any cask, chest, or other goods, hath only a rope fastened to it, and so without a tackle be pulled up into a ship by hand, they say it is *trised up*.

TRISECTION, or TRISSECTIION, the dividing of a thing into three.

The term is chiefly used in *Geometry*, for the division of an angle into three equal parts.

The *trisection of an angle* geometrically, is one of those great problems whose solution has been so much sought by mathematicians for two thousand years; being, in this respect, on a footing with the quadrature of the circle, and the duplicature of the cube angle.

Several late authors have written of the trisection of the angle, and pretend to have found out the demonstration of it; but they have all committed paralogisms.

TRISSETÆ, the *three-haired flies*, a term used by the writers in *Natural History*, to express a certain genus of the *seticaudæ*, or bristle-tailed flies, which are distinguished from the rest, by having three hairs or bristles growing from the tail; there are several kinds of these flies, found frequently among our hedges.

TRISSETUM, in *Botany*, apparently so called because the corolla was supposed to have three awns, is a genus of grasses, adopted by *Pursh*, *Fl. Amer. Sept.* 26 and 76, for which he cites *Persoon's Enchiridion*, v. 1. 97, and gives the following essential character.

Calyx two or three-flowered, pointed, keeled. Corolla with two terminal awns, and a solitary dorsal one, which is straight, not twisted. Florets smooth.

The only species mentioned by *Mr. Pursh*, is called *T. pratense*, and is said to be *Avena flavescens* of former authors. If it be the European plant, so well known under that name, we can most indubitably aver that it does not answer to the above character, the corolla having two taper points, like many other grasses; but nothing like awns except the large solitary dorsal one, which is as certainly twisted as that of all other *Avena*.

TRISEUS, in *Febichyology*, a name given by *Salvian*, *Benedictus Jovius*, and others, to that species of the gadi which we call the *celpout*, and authors in general the *myræta fluviatilis*. See *GADUS Iota*.

TRISIRAS, in *Hindoo Mythology*, is the name of a dog appertaining to their god *Yama*, the regent of hell.

This reminds us at once of the *Cerberus* of the Grecian *Pluto*, the more particularly as the *Hindoo* dog is represented to be *three-headed*, which indeed is the literal translation of *Trisiras*.

TRISMEGISTUS, formed from τρεις, *three*, and μεγιστος, *greatest*, an epithet, or surname, given to one of the two *Hermeses*, or *Mercuries*, kings of *Thebes*, in *Egypt*, who was contemporary with *Moses*.

Mercury, or *Hermes Trismegistus*, is the latter of the

two *Hermeses*; the former having reigned about the time of the Deluge. They are both of them represented as authors of many of the arts and institutions of the Egyptians. See *HERMES*.

TRISMIS, or *TROSMIS*, in *Ancient Geography*, a town of Lower *Mæsia*, near the Danube. *Ptol.* This place is marked in *Ant. Itin.* on the route from *Viminacium* to *Nicomedia*, between *Biroen* and *Arrubium*.

TRISMOS, τρισμος, or τριγμος, a convulsion of the muscles of the temples, causing the teeth to gnash.

TRISOLYMPIONICA, τρισολυμπιονικη, compounded of τρεις, *three*, Ολυμπια, *Olympic games*, and νικη, *victory*, among the *Ancients*, a person who had thrice borne away the prize at the *Olympic games*.

The *trifolympioniceæ*, or *trifolympionics*, had great privileges and honours allowed them. Statues were erected to them, of the kind called *iconica*, which were modelled to the size and form of their persons.

They were also exempted from all taxes and incumbrances, and could never be marked with infamy.

TRISPAST, *TRISPASTON*, compounded of τρεις, *three*, and σπασ, *I draw*, in *Mechanics*, a machine with three pulleys, or an assemblage of three pulleys, for raising great weights.

The *trispaston* is a species of *polyspaston*.

TRISPERMUM, in *Pharmacy*, the name of a cataplasm, or poultice, consisting of three ingredients; these are cummin and opium seed, and bay-berries.

TRISSA, in *Ichthyology*, a name used by some authors for the fish more commonly known by the name of *alausa*, and called in English *shad*, or the mother of herrings.

TRISSACRAMENTARIANS. See *TRISSACRAMENTARIANS*.

TRISSANTON BAY, in *Geography*. See *SOUTHAMPTON*.

TRISSARRI, a town of France, in the department of the Lower *Pyrenées*; 9 miles S.W. of *St. Palais*.

TRISSILD, a town of Norway, in the diocese of *Aggerhus*; 65 miles N. of *Kongswinger*.

TRISSINO, *GIANGIORGIO*, in *Biography*, an Italian poet, was descended from a noble lineage, and born in 1478 at *Vicenza*. In his youthful studies he was industrious and ardent. Besides the Latin and Greek languages, the latter of which he acquired under *Demetrius Chalcondylas*, he became a proficient in mathematics, physics, architecture, and other fine arts. He was employed in posts of trust and honour by the popes *Leo X.* and *Clement VII.*, and he also received many tokens of distinction from the Venetian republic and his native city. He was twice married; and with both his wives he lived happily at *Vicenza*. But a law-suit, in which he engaged with the son of his first wife, obliged him to retire to *Murano*, near *Venice*, and having lost his cause and a great part of his property, he went to *Rome*, where he died in 1550. Ambitious of being a poet, he cultivated an imitation of the ancients; and his tragedy of "*Sophonisba*," formed after the laws and manners of their drama, and the first in which verse without rhyme was employed, has been considered as the first Italian work of that class. This tragedy, framed by the author in 1515, was not printed till the year 1524. His next production was a comedy, intitled "*Similimi*," which was well received. But his great work, in which he was engaged for twenty years, was his epic poem, intitled "*Italia Liberata de' Goti*," the subject of which was the deliverance of Italy from the Goths in the reign of the emperor *Justinian*. His model in the composition of this work was *Homer*, whom he servilely imitated, insomuch that, according to *Voltaire*, "he took every thing from him but his genius." The success

of this poem by no means corresponded to his expectations. Of his other works, and his whimsical but ineffectual project of introducing certain Greek letters into the Italian alphabet, we need take no notice. *Gen. Biog.*

TRISTAN d'Acunha, in *Geography*, the largest of three islands in the South Atlantic ocean, about 1500 miles from any land either to the west or north, very lofty, and about 15 miles in circumference. A part of the island, fir *Erasmus Gower* observes, (quoting the author of the *Authentic Account of the Embassy to China*,) towards the north rises perpendicularly from the sea to a height apparently of 1000 feet, or more. A level then commences, forming what among seamen is termed *table land*, and extending towards the centre of the island; from whence a conical mountain rises, not unlike in appearance to the *Peak of Teneriffe*, as seen from the bay of *Santa Cruz*. Boats were sent to sound and examine the shore for a convenient place to land and water. In consequence of their report the *Lion* stood in, and came to anchor in the evening on the north side, in 30 fathoms water, one mile from the shore; the bottom black sand with slime; a small rock of the west point bearing south-west by south, just open with the western extremity of the island; a cascade or fall of water emptying itself upon the beach south by east. All the shore from the southern point to the eastern extremity appears to be clear of danger, and steep, except the west point, where there are breakers about two cables' length, or near 500 yards, from the shore. The ship, when anchored, was overshadowed by the dark mass of that portion of the island, whose sides seem to rise like a moss-grown wall immediately from the ocean. On the right the elevation was less rapid, and between the rising part and the sea was a flat of some extent, covered with sedge-grass, interspersed with small shrubs, which being perfectly green, looked from the ship like a pleasant meadow, watered by a stream that fell afterwards from its banks upon the beach. The officers who went ashore reported, that the casks might be filled with fresh water by means of a long hose, without moving them from the boats. The landing-place thereabouts was also described as being safe and superior to any other that had been examined. From the plain the land rose gradually towards the central mountain, in ridges covered with trees of a moderate size and height. The coast abounded with sea-lions and seals, penguins and albatrosses: one of the latter was brought on board, his wings measured ten feet from tip to tip; but others are said to have been found much larger. The coast was covered with a broad seaweed several fathoms long, and deservedly by naturalists termed *gigantic fucus*. Some good fish was caught with the hook and line. The accident of a sudden gulf, by which the anchor was in a few hours driven from its hold, and the ship forced out to sea, prevented the island from being explored as was intended. It is probable, that if the *Lion* had anchored in twenty instead of thirty fathoms water, the anchor would have held firmly. Some advantage was obtained, however, from coming to this place. The just position of those islands in respect to their longitude was ascertained, by the means of several time-pieces, to be about two degrees more eastwardly than generally laid down in charts. These islands are certainly worthy of a more particular enquiry; for they are not fifty leagues from the general track of vessels bound to *China*, and to the coast of *Coromandel* by the outer passage. In war-time, an excellent rendezvous might be settled there for ships that wanted no other supply than that of water. When circumstances require particular dispatch, it is practicable to come from *England* to *Tristan d'Acunha* without stopping
in

in the way, and afterwards to the end of the voyage to India or China. These islands are separated by a space of about 1500 miles from any land to the westward or northward of them. They are situated in that part of the southern hemisphere, in the neighbourhood of which a continent, to balance the quantity of land in the northern hemisphere, was once expected to be found; but where it has since been discovered that there is none. The spot where the Lion anchored was determined by good meridional observations, and by accurate time-pieces, to be in S. lat. 37°. W. long. 15° 40'.

TRISTANIA, in *Botany*, from τρεῖς, *three*, and ἰστάναι, or ἰστάναι, *to stand*; in allusion, as we presume, to the ternate disposition of the flowers and their stalks; the three-forked inflorescence of this, doubtless very distinct, genus, being strikingly different from all to which it is nearest allied in the parts of fructification.—Brown in Ait. Hort. Kew. v. 4. 417.—Class and order, *Polyadelphia Icosandria*. Nat. Ord. *Hesperideæ*, Linn. *Myrti*, Juss.

Gen. Ch. *Cal.* Perianth superior, of one leaf, turbinate, in five deep, triangular, nearly equal segments. *Cor.* Petals five, roundish, inserted into the rim of the calyx between its segments. *Stam.* Filaments numerous, in five sets, opposite to the petals, and about the same length, mostly palmate; anthers roundish, incumbent. *Pist.* Germen inferior, turbinate, somewhat angular; style thread-shaped, about the length of the stamens; stigma obtuse. *Peric.* Capsule roundish, more or less completely coated, of three cells and three valves, the partitions from the centre of each valve. *Seeds* numerous, minute, angular.

Eff. Ch. Calyx superior, in five deep segments. Petals five. Stamens numerous, in five palmate parcels, opposite to the petals, and scarcely longer. Style one. Capsule of three cells.

This genus is selected from *MELALEUCA*, (see that article,) whose character however may stand as it does, distinguished by the great length of its stamens. Our 4th, 5th, and 18th species belong to *Tristania*, with one more already published, and probably several others, known as yet to Mr. Brown alone, destined for the sequel of his *Prodromus*. All the true *Melaleuca* have perfectly sessile, generally crowded, flowers. Having already described the above three species, we shall here merely enumerate them, with the appropriate specific characters of Mr. Brown, as far as he has given any.

1. *T. nerioifolia*. Oleander-leaved *Tristania*. Ait. n. 1. (*Melaleuca nerioifolia*; Sims in Curt. Mag. t. 1058. *M. folicifolia*; Andr. Repof. t. 485.)—Leaves opposite, lanceolate. Stamens from three to five in each set.—Observed by Mr. Brown, in New South Wales, from whence its seeds were sent to England, about the year 1804, according to Mr. Aiton, who marks it as a greenhouse shrub, flowering from July to September. The stamens are much fewer than in any other species which has come to our knowledge, and their connexion at the base is but slight. The flavour of the plant is said to be bitterish and astringent, scarcely aromatic, in which it differs from the *Melaleuca*.

2. *T. suaveolens*. Sweet-scented *Tristania*. (*M. suaveolens*; Gartn. v. 1. 173. t. 35.)—Leaves alternate, elliptical. Calyx and stalks downy. Capsule entirely inferior.—Native of New Holland, near Endeavour river. *Sir J. Banks*. Not as yet introduced into our gardens.

3. *T. laurina*. Laurel-leaved *Tristania*. Ait. n. 2. (*Melaleuca laurina*; Sm. Tr. of Linn. Soc. v. 3. 275. Willd. Sp. Pl. v. 3. 1429.)—Leaves alternate, obovato-lanceolate; tapering at the base. Calyx, stalks, and branches downy.

Capsule half superior.—Gathered by admiral Phillip in New South Wales, and introduced, from seed, at Kew in 1798, by sir Joseph Banks. It is a greenhouse shrub, but has not yet flowered. *Aiton*.

4. *T. conferta*. Pittosporum-leaved *Tristania*. Brown MSS. Ait. n. 3.—“Leaves alternate, elliptical, or somewhat lanceolate, acute; the terminal ones crowded. Segments of the calyx acute, leafy.”—Found by Mr. Brown in New South Wales, and introduced at Kew in 1805. A greenhouse shrub, flowering from July to September.—We have seen no specimen of this last species, nor have we any account of the colour of its flowers, which are probably white, like those of the two immediately preceding.

TRISTE, in *Geography*, an island near the coast of America, on the south side of the bay of Campeachy, situated on the west of Port Royal island, from which it is separated only by a narrow channel, about 18 miles in circumference. N. lat. 18° 20'.

TRISTE, a name given by the Spaniards to the gulf of *Paria*; which see. This gulf, according to Depons, is twenty-five leagues from E. to W., and fifteen from N. to S., and has anchorage in that whole extent, but its depth varies from eight to thirty fathoms. Upon the coast of *Paria* its soundings are much less. This gulf is, in fact, a real port, which for excellence and extent vies with the handomest in the world. It has a muddy bottom, except near the coast of *Terra Firma*, where are shoals and banks of sand. Its waters are as salt as those of the sea, though some have erroneously represented them as fresh. This gulf is difficult of entrance; and the wind must be from the S.E. to enter it with any prospect of safety. The tide is formidable, and has a violence inconceivable by those who are not well acquainted with the great ebbings and flowings of the sea.

TRISTEMMA, in *Botany, from τρεῖς, *three*, and στέμμα, *a crown*, “because the fruit is surmounted by a triple permanent crown;” a genus mentioned by De Theis, but without reference to any author, nor have we met with any indication of it elsewhere.*

TRISTEN, in *Geography*, a town of Germany, in the county of Feldkirch; 11 miles S.S.W. of Feldkirch.

TRISTO, a word used by Paracelsus, to express what he calls the material fire, lodged in the matter of all the four elements, and exerting upon occasion its influence, under the form of the proper effects of each element.

TRISTONBOROUGH, in *Geography*, a town of Strafford county, in the state of New Hampshire, containing 709 inhabitants.

TRISTRA, **TRUSTRA**, or *Trifla*, in our old *Laws-Books*, an immunity, by which a man is excused from attending on the lord of the forest, when he is disposed to chace within the forest; so that he cannot be compelled to hold a dog, follow the chace, nor stand at the place appointed, which otherwise he might be, under pain of amercement.

“Sint quieti, &c. de chevagio, hondepenny, buckstel, et tristis, et de omnibus misericordiis, &c.” Privileg. de Semplingham.

TRISULA, in *Hindoo Mythology*, the name of one of the commonest attributes of the Hindoo deity Siva. In pictures of him, it is represented as a tridentated implement, similar to that seen in the hands of the Neptune of the West. The sect of Hindoos who are Saivas, that is, exclusive worshippers of Siva as the deity, maintain that the Trifula is symbolical of his triad of powers: meaning that he comprehends those of creation, preservation, and destruction. Others explain

explain the Trifula as allusive to Siva's supremacy over the three worlds; or earth, heaven, and hell; a mysterious triad, awefully indicated by the compound triverbal phrase *Bhur-bhuwafwat*, of which see under the article O'M.

The word Trifula means, in the Sanscrit tongue, three-pointed. In the west of India, it is sometimes called *triphala*; and hence, connected with other coincidences, Mr. Wilford (*As. Res.* vol. iii.) considers "the Jupiter *Triphylus* of the Panchæan islands to be no other than Siva holding a triphala; he being also represented with three eyes, to denote a triple energy; as Vishnu and Prithvi are severally typified by an equilateral triangle, and conjointly, when their powers are supposed to be combined, by two such triangles intersecting each other." The mysterious properties of the triangle, or cone, with its apex upward or downward, and of two intersecting triangles, are noticed in our articles LINGA, O'M, PARVATI, PAVAKA, SIVA, VISHNU, and others thence referred to. The intersected equilateral triangles, mentioned by Mr. Wilford as typical of Vishnu and Prithvi, have an allusion in natural philosophy to the influence of humidity on the earth; Vishnu representing the *aqueous* principle of nature, and Prithvi the *material*, or the earth. (See PRITHU and VISHNU.) Of the resemblance of Jupiter Triphylus, or Triophthalmos, with the three-eyed Siva, see under his name of TRILOKAN, which means with three eyes. Trinetra has also a similar meaning.

TRISULI, a name of the Hindoo deity Siva. He is so called from bearing the symbol Trifula, or trident. See TRISULA.

TRISYLLABLE, TRISSYLLABLE, in *Grammar*, a word consisting of three syllables.

TRITÆA, in *Ancient Geography*, a town of Achaia, in the southern part, on the river Melas; said to be founded by Menalippus, son of Trittia, a priestess of Minerva, in consequence of her amours with the god Mars. The principal temple of this city was that of the greater gods, who were annually honoured by feasts similar to those of Bacchus. The statue of Minerva, which was reckoned beautiful, was transported from hence to Rome. This town was one of those which Augustus put into a state of dependence upon Patras.

TRITÆOPHYES, a word used by the medical writers of the ancients, to express a kind of fever, much of the nature of the tertian, and taking its rise from it.

TRITANY, in *Geography*, a town of Hindoostan, in the Carnatic; 18 miles S. of Bomrauzepollam.

TRITCHINGODE, a town of Hindoostan, in Mysore; 6 miles S. of Sankeridurgam.

TRITCHINOPOLY, a town of Hindoostan, in the Carnatic. It is surrounded with two walls, flanked with towers, and encompassed with a ditch. It was taken by the British under major-general Lawrence and captain (afterwards lord) Clive, in 1751, and since that time it has been made the capital of Madura; 67 miles W. of Tranquebar. N. lat. 10° 48'. E. long. 78° 45'.

TRITE, τριτες, in *Music*, the third musical chord in the system of the ancients.

There are three strings under this denomination in the ancient diagramma, *viz.* the *trite hyperbolæon*, *trite diezeugmenon*, and *trite synemmenon*.

This chord of the ancient tetrachord was so named from its being the third from the nete; and hence we might call it the anti-penultimate. It was otherwise, in some tetrachords, called parypate. See DIAGRAM and INTERVAL.

TRITE *Diezeugmenon*, in the *Greek Music*, was the anti-

penultimate note of the diezeugmenon tetrachord, and answers to Guido's *c*, *sol*, *fa*, *ut*.

TRITE *Hyperbolæon*, was the anti-penultimate note of the hyperbolæon tetrachord, and answers to Guido's *f*, *fa*, *ut*.

TRITE *Synemmenon*, was the anti-penultimate note of the synemmenon tetrachord, and answers to Guido's *b*, *fa*. Wallis's *Appen.* Ptolem. *Harm.* p. 257. See DIAGRAM.

TRITEA, or TRITIA, in *Ancient Geography*, a town of Asia, in the Troade.

TRITHEISM, the opinion of the Tritheists, or the heresy of believing three Gods.

Tritheism consists in admitting not only of three persons in the Godhead; but of three substances, three essences or hypostases, and indeed three Gods.

Several people, out of fear of giving into Tritheism, have become Sabellians; and several others, to avoid Sabellianism, have commenced Tritheists; so delicate and subtle is the distinction.

In the famous controversy between Dr. South and Dr. Sherlock, the first is judged to have run into Sabellianism, by a too rigorous assertion of the unity of a Godhead; and the latter into Tritheism, by a too absolute maintaining of the Trinity.

John the Grammarian, surnamed Philoponus, lover of labour, is held the author of the sect of the Tritheists, under the emperor Phocas; at least it appears that he was a zealous advocate of it.

The chief of this sect, according to Mosheim, *Eccl. Hist.* vol. i. was John Afcufnage, a Syrian philosopher, and a Monophysite. He imagined in the Deity three natures or substances, absolutely equal in all respects, and joined together by no common essence.

TRITHEITÆ, TRITHEISTS, in *Church History*, a name given to such heretics, as admit not only of three persons, but of three distinct substances and natures, in the Holy Trinity. See TRINITY and TRITHEISM.

TRITHEMIUS, JOHN, *Abbot*, in *Biography*, was born in the year 1442, at the village of Tritenheim, near Treves, whence he took his name. Having finished his course of education in the universities of Treves and Heidelberg, he was chosen abbot of the Benedictine monastery of Spanheim in 1483, which he superintended for twenty-two years, and when he withdrew from it in consequence of a faction of the monks, he was placed by the bishop of Wurtzburg at the head of a monastery in that city, where he died in 1518, at the age of seventy-six. "Trithemius," says one of his biographers, "was a person of vast erudition, a philosopher, mathematician, chemist, poet, historian, and divine, and conversant in the Hebrew, Greek, and Latin languages." His works, written in Latin, are numerous, but those in biography and history are held in the highest estimation. His writings on piety and morality chiefly relate to the monastic and sacerdotal life, miracles of saints, and such topics. His philosophy bore the mystic character of the age in which he lived. His "Steganography, or the Art of writing in Cyphers," containing some singular characters ignorantly taken for talismans, subjected him very unjustly to the charge of magic. Upon the whole, "he appears to have been a person whose great learning was considerably tainted with credulity, and whose industry was superior to his judgment." Dupin. *Gen. Biog.*

TRITHING. See TRIHING.

TRITICUM, in *Botany*, an old Latin name, very satisfactorily derived, by Varro himself, from *tritum*, ground or rubbed, because of the manner in which its grain is prepared for the food of mankind. Wheat, or Wheat-grass.—Linn. *Gen.*

Gen. 40. Schreb. 55. Willd. Sp. Pl. v. 1. 476. Mart. Mill. Dict. v. 4. Sm. Fl. Brit. 157. Prodr. Fl. Græc. Sibth. v. 1. 74. Ait. Hort. Kew. v. 1. 180. Brown Prodr. Nov. Holl. v. 1. 178. Schrad. Germ. v. 1. 389. Pursh 90. Juss. 32. Tourn. t. 292, 293. Lamarck Illustr. t. 49. Gært. t. 81. Kunth Nov. Gen. et Spec. v. 1. 179.—Class and order, *Triandria Digynia*. Nat. Ord. *Gramina*.

Gen. Ch. *Cal.* Common receptacle zigzag, toothed, elongated into a spike. Glume transverse, containing about three or more flowers, and consisting of two ovate, bluntish, concave valves. *Cor.* of two nearly equal valves, the size of the calyx; the outermost tumid, obtuse with a point, or awn; the inner flat. Nectary of two acute scales, gibbous at the base. *Stam.* Filaments three, capillary; anthers pendulous, oblong, cloven at each end. *Pist.* Germen superior, turbinate; styles two, capillary, reflexed; stigmas feathery. *Peric.* none, the corolla embracing the seed till it is full-grown and ripe, then letting it go. *Seed* solitary, ovate-oblong, blunt at each end, convex at the outer side, marked with a longitudinal furrow on the inner.

Eff. Ch. Calyx of two valves, solitary, transverse, many-flowered, on a zigzag, toothed receptacle.

We have already adverted to the difficulty of distinguishing this genus from *SECALE*; see that article. They both agree in the transverse, or lateral, position of their bivalve calyx, by which position the side of each spikelet is parallel to the common receptacle, not, as in *Lolium*, contrary. The greater number of *florets* in *Triticum*, which are only two in *Secale*, is the only technical distinction. The outer valve of the *corolla* of the present genus is often terminated by a long awn; but this appendage varies, even in the same species.

Section 1. *Root annual.*

1. *T. aestivum*. Summer Wheat. Linn. Sp. Pl. 126. Willd. n. 1. Ait. n. 1. Bauh. Pin. 21. ("T. aristatum; Blackw. Herb. t. 40. f. 4, 5."—"T. locustis quadrifloris, basi subhirsutis, glumis exterioribus floralibus aristatis; Hall. in Com. Nov. Goett. v. 5. t. 1. f. 1.")—Calyx four-flowered, tumid, smooth, imbricated, awned.—Supposed to be a native of Siberia. It is sown in the spring, and produces a speedy but uncertain crop. We have never seen an authentic specimen, nor are we at all certain that what has generally been taken for this species is any thing more than a variety of the following.

2. *T. hybernum*. Winter, or Lammas, Wheat. Common Cultivated Wheat. Linn. Sp. Pl. 126. Willd. n. 2. Ait. n. 2. Ehrh. Pl. Off. n. 151. Gært. f. 1. (*T. vulgare*; Hoff Gram. Austr. v. 3. 18. t. 26. *T. hybernum*, aristis carens; Tourn. Inst. 512. t. 292. *T. spicâ muticâ*; Ger. Em. 65. Siligo spicâ muticâ; Lob. Ic. 25.)—Calyx four-flowered, tumid, even, imbricated, abrupt, with a short compressed point.—Native country unknown. Cultivated in various parts of the world; being sown in autumn, it stands the winter, and ripens seed in the following summer, so that it may be reckoned biennial. The root consists of downy fibres. *Stems* one or more, erect, straight, from three to five feet high, round, jointed, smooth, leafy. *Leaves* linear, pointed, flat, many-ribbed, rough, entire, rather glaucous. *Stipula* jagged, bearded. *Spike* solitary, two or three inches long, dense, two-ranked, smooth, joints of the common stalk bearded. *Glumes* smooth. *Calyx* in the upper part of the spike with a more elongated point. *Corolla* of the upper spikelets frequently more or less awned.

Under this most important and familiar species are comprehended a great number of varieties, the knowledge and history of which are more peculiarly the province of the

agriculturist, and will be treated of under the article WHEAT. By the botanist they have not been sufficiently investigated, either as varieties or species. Some of them appear entitled to the latter denomination; particularly the White Wheat, *T. album*, Gært. f. 2, whose less obtuse calyx, and the long awn of its corolla, seem to indicate a specific difference. This last character indeed occurs in many of them; see Tourn. t. 293. Some of the reputed species of Linnæus are less decisively marked. The determination of these points, with the respective qualities of each species or variety, might very advantageously occupy the attention of some accurate rustic botanist, continually on the spot, by whose labours the question might be set for ever at rest, and probably a most important service rendered to scientific agriculture. Not to embroil the subject, we shall not, with insufficient materials, enter upon it.

3. *T. compositum*. Many-spiked Wheat. Linn. Suppl. 115. Willd. n. 3. (*T. spicâ multiplici*; Bauh. Pin. 21. Ger. Em. 66. Morif. sect. 8. t. 1. f. 7.)—Spike compound; spikelets crowded. Corolla awned.—Native of Egypt; cultivated at Naples. The glumes are smooth. Awns three or four inches long. This is probably a variety of the last, rather than, as Linnæus says, of *T. aestivum*.

4. *T. turgidum*. Turgid, or Cone, Wheat. Linn. Sp. Pl. 126. Willd. n. 4. Ait. n. 3. Ehrh. Pl. Select. n. 23. Hoff Gram. Austr. v. 3. 19. t. 28. (*T. spicâ villosâ quadratâ, longiore et brevior*; Morif. v. 3. 176. sect. 8. t. 1. f. 13, 14.)—Calyx four-flowered, tumid, villous, imbricated, obtuse, with a short point.—Native country unknown. The corolla varies with or without long awns. The silky, or villous, glumes alone distinguish this from various awned or awnless varieties of *T. hybernum*.

5. *T. polonicum*. Polish Wheat. Linn. Sp. Pl. 127. Willd. n. 5. Ait. n. 4. Hoff Gram. Austr. v. 3. 21. t. 31. Pluk. Phyt. t. 231. f. 6. Morif. sect. 8. t. 1. f. 8.)—Calyx three or four-flowered, pointed, naked, lanceolate like the corolla, which is compressed, with a long awn.—The native country of this likewise is unknown. It was cultivated here in the latter part of the seventeenth century, for curiosity at least, and is still seen in botanic gardens, though not much regarded by the farmer, being easily laid by rain. That this is a distinct species there can be no doubt. The strength of the whole plant, its large ears, and long, narrow, scarcely tumid glumes, readily distinguish it at first sight. Linnæus defines this *Triticum* as having a two-flowered calyx, the character of *Secale*; but Haller asserts the presence of one, if not two, imperfect florets.

6. *T. spelta*. Spelt Wheat. Linn. Sp. Pl. 127. Willd. n. 6. Ait. n. 5. Ehrh. Pl. Off. 431. Hoff Gram. Austr. v. 3. 21. t. 30. (*Zea dicoccos five major*; Bauh. Theatr. 412. t. 413. *Z. spicâ muticâ dicoccos, vel major*; Morif. sect. 8. t. 6. f. 1.)—Calyx imperfectly four-flowered, elliptical, obliquely pointed, shorter than the long-awned corolla.—The origin of this species is likewise unknown, nor is its specific character satisfactory. The glumes are very glaucous. It is chiefly cultivated in the south of Europe, and is given to horses in Spain, when barley is scarce. The bread it makes is of a dry quality, but no kind of flour is better for pastry.

7. *T. monococcum*. Single-grained Wheat, or St. Peter's Corn. Linn. Sp. Pl. 127. Willd. n. 7. Ait. n. 6. Ehrh. Pl. Select. n. 33. Hoff Gram. Austr. v. 3. 22. t. 32. (*Zea spica barbata, &c.*; Morif. sect. 8. t. 6. f. 2. *Briza monococcos*; Ger. Em. 73.)—Calyx angular, strongly toothed, about three-flowered. First floret awned; intermediate one imperfect.—Native country unknown. This species is cultivated in the most mountainous parts of Switzerland.

Switzerland. The neat quadrangular form of the ripe ear, as if carved out of ivory, is remarkable. The *straw* is hard and firm, excellent for thatching. Flower rather better than that of the preceding, making good, though not white, bread, and chiefly esteemed for gruel.

8. *T. prostratum*. Trailing Wheat-grafs. Linn. Suppl. 114. Willd. n. 9. Ait. n. 7. (*T. pumilum*; Linn. Suppl. 115. Willd. n. 10. *Secale prostratum*; Pallas It. v. 1. 485. Jacq. Hort. Vind. v. 3. 25. t. 44.)—Spike ovate, compressed, two-ranked. Glumes of the calyx and corolla strongly keeled, longer than their awns.—Found by Pallas in the most barren sandy deserts near the Caspian sea. M. Thonin, in 1780, sent seeds to Kew garden. A hardy annual, flowering in June. The *spikes* sometimes fall off entire, and vegetate in the sand, producing a tuft of decumbent slender plants, from three to six inches long, with narrow, slightly downy, *leaves*. *Spikes* solitary, terminal, from half to three-quarters of an inch long, smooth, elegantly two-ranked, with ten or twelve closely imbricated, furrowed, incurved *spikelets*. Awns of the *calyx* awl-shaped, nearly as long as those of the *corolla*, being about a quarter the length of the glumes. *T. pumilum* of Linnæus is the very same species, described twice over.

9. *T. tenellum*. Dwarf Wheat-grafs. Linn. Sp. Pl. 127. Willd. n. 15. Ait. n. 11. (*T. n. 1430*; Hall. Hist. v. 2. 212, most certainly according to Mr. Davall. *Gramen loliaceum minus, spicâ simplici*; Bauh. Pin. 9. Prodr. 19.)—Spike simple, linear. *Spikelets* alternate, elliptic-lanceolate, awnless. Calyx furrowed. Corolla even, emarginate. Leaves bristle-shaped.—Native of Switzerland, and the south of France. *Root* annual, of a few woolly fibres. *Stems* one or more, erect, straight, from four to eighteen inches high, scarcely branched, leafy, with several dark-brown joints. *Leaves* short, slender, erect. *Spike* terminal, solitary, erect, very slender. *Spikelets* more or less distant, erect, close-pressed, rather turgid, smooth. *Florets* from four to eight or ten, polished, somewhat cylindrical, pale and blunt at the tip, with slight indications of lateral ribs. We can meet with no certain figure of this very distinct species, under which, as Schrader remarks in Fl. Germ. v. 1. 346, Linnæus has confounded several different things. *Gramen pusillum unicaule, paniculâ loliacâ*; Bocc. Mus. 69. t. 57, quoted by him for the following, is most like *T. tenellum*, and may perhaps be intended for it.

10. *T. unilaterale*. Unilateral Wheat-grafs. Linn. Mant. 35, excluding certainly the first two synonyms, and probably the third; see the preceding species. Willd. n. 18. (*G. loliaceum minus, spicis tenuissimis*; Morif. sect. 8. t. 2. f. 3.)—Spike simple, linear. *Spikelets* alternate, close, turned to one side. Calyx unequal, taper-pointed. Corolla short-awned, smooth. Native of Italy, Syria, and the south of France. *Root* annual, of many capillary fibres, partly downy. *Stems* numerous, a span high, scarcely branched, smooth, leafy. *Leaves* narrow, channelled, ribbed; their sheaths long, furrowed, sometimes clothed with very short, soft, deflexed hairs. *Spikes* solitary, long, slender, a little curved, of numerous, rather close *spikelets*, half the size of the foregoing, and less tumid. *Florets* three or four, awl-shaped, with bristly awns of various lengths, but scarcely above half so long as the glumes.

11. *T. hispanicum*. Little Spanish Wheat-grafs. Reichard Syst. Plant. v. 1. 240. Willd. n. 8. (*T. maritimum*; Linn. Mant. 2. 325. *Festuca maritima*; Linn. Sp. Pl. 110. Loeff. It. 44.)—Spike simple, linear. *Spikelets* alternate, close, turned to one side. Glumes all downy. Calyx unequal, taper-pointed. Corolla with an awn exceeding its own length.—Gathered in Spain by Loefling.

This appears to us a mere variety of the last, with downy *glumes*, and longer awns to the *florets*. Loefling's specimens are of humbler growth than those of the preceding that have in general fallen under our inspection, but there is no specific difference between them.

12. *T. maritimum*. Sea Wheat-grafs. Linn. Sp. Pl. 128. Willd. n. 14. Vahl Symb. v. 2. 26. (*Gramen loliacâ paniculâ ramosâ, maritimum*; Bauh. Theatr. 130. Scheuchz. Agroft. 274. t. 6. f. 5.)—*Spikes* panicled. *Spikelets* many-flowered, compressed. *Florets* linear-lanceolate, ribbed, pointed, awnless. Stem branched.—Native of the sea-coasts of the south of France, Greece, and Egypt. *Root* annual, of many woolly fibres. *Stems* branched from the base, leafy, a foot high, more or less bent at the joints, and partly decumbent; often purplish, as well as the sheaths of the leaves, and branches of the panicle. *Leaves* longish and tapering, narrow, striated, smooth. *Sheaths* broader than the leaves, but much shorter. *Stipula* membranous, torn, decurrent. *Panicle* about three inches long, forked, with many spreading, spiked, triangular, smooth branches. *Spikelets* alternate, slightly stalked, half an inch long, smooth, of about eight crowded *florets*, each strongly keeled, and acutely pointed, smooth, with a strong marginal rib at each side. *Calyx-valves* furrowed, nearly equal. Some synonyms referred to this, belong to the following. That of Boccone, t. 95, is at least doubtful.

13. *T. loliaceum*. Dwarf Sea Wheat-grafs. Fl. Brit. n. 4. Engl. Bot. t. 221. Willd. n. 17. Knapp. t. 114. *Gramen pumilum, loliaceo simile*; Raii Syn. 295. *G. loliaceum exile durius*; Sm. Rel. Rudb. 13. *G. exile duriusculum maritimum, foliolis circumvolutis, veluti junceis, brevibus*; Pluk. Phyt. t. 32. f. 7. *G. parvum marinum, spicâ loliacâ*; Morif. sect. 8. t. 2. f. 6.)—Spike mostly simple, unilateral. *Spikelets* many-flowered, compressed. *Florets* elliptical, obtuse, awnless, with marginal ribs. Stem branched.—Native of the sandy sea-beach, on the east and south coasts of England, as well as in Italy. We have it from a Piedmontese botanist, under the name of *T. unilaterale*. *Root* annual. *Stems* rigid, spreading, smooth, from three to five inches high. *Leaves* tapering; involute when dry. *Spike* erect, mostly simple, linear, rigid, of from nine to twelve alternate, slightly stalked, two-ranked *spikelets*, turned most to one side; in very luxuriant, or cultivated, specimens the lower part of the spike is branched. This plant is very nearly allied to *Poa rigida*, nor is the position of their *spikelets* dissimilar. It serves however to connect our last species of *Triticum* with the following one.

14. *T. unioides*. Elegant Wheat-grafs. Ait. n. 12. Willd. n. 16. Vahl Symb. v. 2. 26. (*Poa ficula*; Jacq. Ic. Rar. t. 303. *Briza cynosuroides*; Scop. Infubr. v. 2. 21. t. 11. *Cynofurus ficulus*; Jacq. Obs. fasc. 2. 22. t. 43. *Gramen filiceum, paniculis integris*; Bocc. Sic. 62. t. 33. f. 2. Morif. sect. 8. t. 6. f. 53.)—Spike simple, close. *Spikelets* many-flowered, ovate, compressed. *Florets* closely imbricated, ovate, acute, keeled, awnless, with central lateral ribs. *Stems* mostly simple.—Found on the sea-coasts of Italy, Sicily, and Barbary. Annual. A most elegant grass, remarkable for its large, flat, closely imbricated, sharp-edged *spikelets*, which resemble those of an *Uniola*, or of *Poa Eragrostis*. The *stems* are a span high, sometimes purple. *Leaves* lanceolate, taper-pointed, flat.

Section 2. *Root perennial*.

15. *T. junceum*. Sea Rushy Wheat-grafs. Linn. Sp. Pl. 128. Willd. n. 11. Fl. Brit. n. 1. Engl. Bot. t. 814. Sm. Fl. Græc. Sibth. t. 99. Knapp t. 113. Fl. Dan. t. 916. (*Gramen maritimum, spicâ loliacâ, foliis*

luis pungentibus, nostras; Pluk. Phyt. t. 33. f. 4. G. angustifolium, spicâ tritici, muticæ finuli; Bauh. Prodr. 17. Morif. sect. 8. t. 1. f. 5.)—Calyx abrupt, five-flowered. Leaves involute, sharp-pointed. Root creeping.—Found abundantly on the loose sands of the sea-coast, throughout Europe, flowering in July. The long stringy tough roots, fixed by woolly fibres, co-operate with *Carex arenaria*, *Elymus arenarius*, &c. in fixing the sand, and forming a barrier against the encroachments of the ocean. The whole plant is very glaucous, hard and rigid, with spinous-pointed leaves, strongly furrowed on their upper side. The stems are two feet high, often tinged with violet in the lower part, and very smooth. Spikes solitary, simple, compressed, stiff, of several alternate, flat spikelets, quite smooth and awnless. Calyx many-ribbed. *T. rigidum*, Schrad. Germ. v. 1. 392, is very near indeed to *junceum*.

16. *T. distichum*. Two-ranked Cape Wheat-grafs. Thunb. Prodr. 23. Willd. n. 12.—“Calyx four-flowered, smooth, awnless. Flowers two-ranked. Leaves thread-shaped.”—Found at the Cape of Good Hope, by Thunberg, whose short specific character is all we know of this species.

17. *T. repens*. Creeping Wheat-grafs. Couch-grafs. Linn. Sp. Pl. 128. Willd. n. 13. Fl. Brit. n. 2. Engl. Bot. t. 909. Leers 45. t. 12. f. 3. Knapp t. 111. Mart. Rust. t. 124. Fl. Dan. t. 748. Schreb. Gram. part 2. 24. t. 26. (Gramen caninum vulgatum; Morif. sect. 8. t. 1. f. 8.)—Calyx awl-shaped, many-ribbed, five-flowered. Florets pointed. Leaves flat. Root creeping.—But too common throughout Europe, in all kinds of cultivated ground, flowering in summer and autumn. The long and deeply creeping roots are of all things most difficult to extirpate. Yet when collected in sufficient quantity, they afford wholesome nourishment for cattle, and in some countries have been made into bread in times of scarcity. The stems are two feet high, slender. Herbage green, except in a maritime variety, the γ of *Fl. Brit.*, *T. junceum* of Relhan, *T. intermedium* of Host Gram. Austr. v. 2. 23, which is glaucous, with pungent leaves, and possibly deserves to rank as a separate species. The leaves of our common kind spread horizontally, often all to one side, by which this species becomes conspicuous among bushes or hedges in autumn. Spikes two or three inches long, much smaller in every part than those of *T. junceum*. Florets from five to eight, either simply pointed, or furnished with awns, which vary in length, but are scarcely ever equal to the glumes.

18. *T. caninum*. Fibrous, or Bearded, Wheat-grafs. Hudf. 58. Fl. Brit. n. 3. Engl. Bot. t. 1372. Knapp t. 112. Schrad. Germ. v. 1. 389. Host Gram. Austr. v. 2. 20. t. 25. Ehrh. Phytoph. n. 72. (Elymus caninus; Linn. Sp. Pl. 124. Willd. Sp. Pl. v. 1. 469. Gramen caninum aristatum, radice non repente; Morif. sect. 8. t. 1. f. 2.)—Calyx pointed, about five-ribbed, four-flowered. Florets awned. Leaves flat. Root fibrous.—Native of bushy places in various parts of Europe. In England it prefers a calcareous soil, flowering in July. The root is fibrous, downy, not at all creeping. Herbage light green, not glaucous. Stem two feet high, erect, straight, finely striated, leafy. Leaves rather broad, rough on both sides, sometimes hairy, with a scarcely discernible stipula. Spikes solitary, pale, from two to four inches long, a little drooping when ripe. Awns straight, usually longer than their glumes.

19. *T. cristatum*. Crested Wheat-grafs. Schreb. Gram. tasc. 2. 12. t. 23. f. 2. Sm. Compend. ed. 2. 22. Engl. Bot. t. 2267. (Bromus cristatus; Linn. Sp. Pl. 115. Willd. Sp. Pl. v. 1. 439. Festuca culmo spicato, spiculis

multifloris; Gmel. Sib. v. 1. 115. t. 23. Gramen triticeum, spicâ latiore compactâ; Buxb. Cent. 1. 32. t. 50. f. 3.)—Calyx elliptical, awned, keeled, obscurely ribbed. Florets awned. Spikelets closely imbricated, two-ranked, depressed, straight. Stems simple.—Common in Siberia and Tartary. The late Mr. George Don discovered it on steep banks and rocks, by the sea-side in Scotland, between Arbroath and Montrose, flowering very sparingly. The roots are perennial, with very long, strong, woolly fibres, destined to grow in sand. Stems twelve or eighteen inches high, ascending, slender, rigid, leafy; hairy at the top. Leaves linear, shortish, sometimes hairy; their sheaths long and tight. Spike elliptic-oblong, very close, pale, most resembling *T. prostratum*, n. 8, but longer, and differing essentially in the lateral ribs of the calyx-glumes, which are obsolete, or smoothed away, not turgid and curved. That these two grasses must belong to one and the same genus, is evident to the most casual observer.

20. *T. attenuatum*. Slender American Wheat-grafs. Kunth Nov. Gen. et Sp. v. 1. 180.—Calyx lanceolate, bluntish, five-ribbed, roughish, three-flowered. Florets very slightly awned. Spikelets distant. Root fibrous.—Found in dry open places in Quito, flowering in January. Root perennial. Stems simple, three or four feet high, smooth. Leaves linear, flat, with a short stipula. Spike erect, five or six inches long. Third floret often imperfect. Kunth.

21. *T. scabrum*. Rough New-Holland Wheat-grafs. Brown n. 1. (Festuca scabra; Labill. Nov. Holl. v. 1. 22. t. 26.)—Spike elongated, lax. Calyx lanceolate, ribbed, pointed, many-flowered, half the length of the corolla. Florets rough, taper-pointed, shorter than their awns. Leaves flat, rough, with smooth sheaths.—Native of New South Wales, and the Cape of Van Diemen. Root apparently perennial, with thick downy fibres, not creeping. Stems slender, erect, eighteen inches high, smooth. Leaves narrow, hairy. Florets from five to ten, in sessile, alternate, rather distant, upright, oblong spikelets, from an inch to an inch and half in length.

22. *T. pectinatum*. Pectinate New-Holland Wheat-grafs. Brown n. 2. (Festuca pectinata; Labill. Nov. Holl. v. 1. 21. t. 25.)—Spikelets two-ranked, horizontally divaricated. Calyx awl-shaped, pointed, about six-flowered. Awns shorter than the florets. Leaves flat, ciliated.—Found by Labillardiere, in the island of Van Diemen. The root is fibrous, perfumed to be perennial. Stems numerous, tufted, erect, simple, a foot or more in height; leafy below; downy upwards. Leaves narrow, spreading, hairy and fringed, acutely pointed. Spikes solitary, erect, ovate-oblong, flat, two-ranked, two or three inches in length, of a dozen or more alternate, rather crowded, sessile spikelets, each near an inch long, which in the flowering season spread horizontally, but subsequently become reflexed. The calyx-valves are slender, somewhat unequal, pointed, but not awned, rather shorter than the florets, which are rough, ribbed, and furnished with straight awns, whose length, however, is less than that of each corresponding glume. The inner valve of the corolla is elliptic-lanceolate, fringed with hairs.

TRITNU, or TRIVETNU, in *Hindoo Mythology*, a name of Surya, the Hindoo regent of the sun. The word means three-bodied. See SURYA and TRIMURTI.

TRITOMA, in *Botany*, so named by Mr. Ker, late Gawler, from τρις, three, and τεμνω, to cut, whence comes the adjective τριμεσος, cut, or fit for cutting; in allusion to the three sharp angles of the leaves.—Ker in Curt. Mag.

744. Dryandr. in Ait. Hort. Kew. v. 2. 290.—Class and order, *Hexandria Monogynia*. Nat. Ord. *Coronarie*, Linn. *Asphodeli*, Juss.

Gen. Ch. *Cal.* nonc. *Cor.* of one petal, inferior, cylindrical, even, with six shallow, regular, marginal teeth. *Stam.* Filaments six, inserted into the receptacle, thread-shaped, simple, straight, projecting beyond the corolla, three alternate ones longer than the rest; anthers roundish, two-lobed. *Pist.* Germen superior, roundish; style of the shape and length of the longer stamens; stigma acute, somewhat downy. *Peric.* Capsule ovate, bluntly triangular, of three rather rigid valves, and three cells. *Seeds* numerous, smooth, crowded, in two rows, angular.

Eff. Ch. Corolla tubular, of one petal, with six marginal teeth. Stamens prominent, straight, inserted into the receptacle; three intermediate ones longest. Capsule ovate, of three cells, with many angular smooth seeds.

The present genus is well distinguished from ALETRIS, as well as from the VELTHEIMIA of some botanists; being, as its author observes, nearer in character to ALOE; from which, however, it differs greatly in its less succulent habit, and more absolutely monopetalous corolla; but especially in the long, prominent, unequal, straight, not ascending, stamens, and more firm, or harder, capsule. The insertion of the stamens into the receptacle, not into any part of the corolla, to say nothing of other characters, or of the different habit, essentially distinguishes this from the two other above-mentioned genera. (See all in their proper places.) When habit sanctions such a division of genera, we must, especially in a very natural order of plants, like the present, be content with technical characters which might otherwise seem too slight. *Blandfordia*, Sm. Exot. Bot. v. 1. 5. t. 4, is distinguished from all the above by its bristly seeds, imbricated upwards, in a prismatic capsule.

1. *T. Uvaria*. Great Orange-flowered Tritoma. Ait. n. 1. Curt. Mag. t. 758. (Aletris Uvaria; Linn. Syst. Veg. ed. 14. 337. Veltheimia Uvaria; Willd. Sp. Pl. v. 2. 182. Aloe Uvaria; Linn. Sp. Pl. 460. A. africana, folio triangulari longissimo et angustissimo, floribus luteis fetidis; Commel. Hort. v. 2. 29. t. 15.)—Leaves rough with minute prickles on the edges and keel. Corolla cylindrical-clubshaped.—Native of the Cape of Good Hope. Cultivated in Chelsea garden at the beginning of the 18th century. The plant is almost perfectly hardy in our climate, flowering in the open ground in August or September, only requiring a moderate protection from severe frost. The root is tuberous, perennial, tufted, bearing plenty of long, tapering, deep-green, three-edged leaves. Stems three feet high, round, stout, nearly naked, each bearing a dense cluster of very numerous, but short-lived, drooping flowers, richly coloured with orange and scarlet. Corolla above an inch long. Stamens yellow.

2. *T. media*. Lesser Orange-flowered Tritoma. Curt. Mag. t. 744. Ait. n. 2. Redout. Liliac. t. 161. (Aletris larentosa; Andr. Repos. t. 54.)—Leaves smooth at the edges and keel. Corolla cylindrical-clubshaped.—Native of the Cape of Good Hope, from whence it is said to have been introduced in 1789, by Mr. Williams, nursery-man, of Turnham Green. As hardy as the last, but flowering either in winter or the early spring, so that a frame, or greenhouse, is requisite to have the plant in perfection. It is smaller than the preceding, with a glaucous tinge on the leaves, whose edges and keel are perfectly smooth. Stems a foot and half or two feet high. Flowers sometimes elegantly tipped with green.

3. *T. pumila*. Least Orange-flowered Tritoma. Ait.

n. 3. Curt. Mag. t. 764. (Veltheimia pumila; Willd. Sp. Pl. v. 2. 182.)—Leaves two-ranked, roughish at the edges and keel. Corolla cylindrical at the base; bell-shaped above.—Native of the Cape, from whence it was sent by Mr. Masson to Kew, in 1774. It flowers late in autumn, and seems as hardy as the others, but is smaller than even the last. The flowers are of an uniform orange, and distinguished by their bell-shaped, or globose, limb. Leaves not at all glaucous.

TRITOMA, in *Entomology*, a genus of the Coleoptera order of insects; the characters of which are, that the antennæ are clavated or club-shaped, the club being perfoliate, and the anterior palpi or feelers hatchet-formed. It has seven species, as follow.

BIPUSTULATUM. Black, with wing-sheaths marked by a scarlet lateral spot. Found in England.

GLABRUM. Smooth, black, with pitchy antennæ and feet. Found in Sweden.

DUBIUM. Black, with wing-sheaths and feet testaceous.

VITTATUM. Red, with black wing-sheaths; fillet red. Found in India.

MORIO. Black, silky, with antennæ and feet of the same colour.

SERICUM. Blackish, silky, with feet testaceous. Found in Germany.

COLLARE. Black, with the sides of the thorax and abdomen red. Found in New Holland.

TRITON, in *Ancient Geography*, a marsh of Africa Propria, in which is the source of a river of the same name; furnished by Pliny Pallantias. This lake was 20 leagues in length from E. to W., and about six leagues wide; and it contained several islets. The mouth of the river was in the Mediterranean, in the gulf of the Lesser Syrtis. Herodotus mentions this river.—Also, a river of the isle of Crete. Near its source was a temple, dedicated to Minerva Tritogenia.—Also, a town of Africa, in Libya.—Also, a town of Greece, in Bœotia.

TRITON, in *Mythology*, a sea demi-god, held by the ancients to be an officer, or trumpeter, of Neptune, attending on him, and carrying his orders and commands from sea to sea.

The poets and painters represent him as half man, half fish, terminating in a dolphin's tail, and bearing in one hand a sea-shell, which served him as a trumpet.

Some of the ancients make him the son of Neptune, and the nymph Salacia; Hesiod, of Neptune and Amphitrite; Numenius, in his book De Piscationibus, makes him the son of Oceanus and Tethys; and Lycophron, the son of Nereus.

But though Hesiod and the mythologists only speak of one Triton, the poets have imagined several; giving some of them for trumpeters to all the sea-gods, particularly to Neptune and Venus; accordingly they were frequently introduced on the ancient theatre, and in the naumachia.

In effect, the Tritons not only officiated as trumpeters in Neptune's retinue, but were also supposed to draw his chariot, *i. e.* the sea-shell in which he rode over the waters: as we find in Virgil, *Æneid*, x. 209; Ovid, *Metam.* l. 10. 333; and on a medal of Claudius.

The fable of the Tritons, no doubt, took its rise from what are called the sea-men, or mermen; for that there are such things as sea-men has been believed in many ages. See MERMAID and SEA-COW.

The poets ordinarily attribute to Triton the office of calming the waves, and of making tempests cease. Thus, in the first of the *Metamorphoses*, we read that Neptune, desiring

to recall the waters of the deluge, commanded Triton to found his trumpet, at the noise of which the waters all retired.

Thus Ovid :

“ Cæruleum Tritona vocat, conchaque fonanti
Inspirare jubet, fluctusque et flumina signo
Jam revocare dato, &c.”

And Virgil :

“ Huc venit immanis Triton, et cærulea concha
Exterrens freta : cui laterum tenuis hispida nanti
Frons hominem præfert, in Pristin definit alvus.”

Of Triton, as connected with the Argonautic expedition, Herodotus gives the following account. Speaking of the river Triton, which discharged itself into the lake Tritonis, where was an island called Phla, he says it was believed that the island must have been inhabited by the Lacedæmonians ; and he adds, it was reported by tradition, that when Jason had built at the foot of mount Pelion the ship which was called Argo (see ARGONAUTIC), and had stowed in it a hecatomb, and a tripod of brads, he undertook the voyage to Delphi by the tour of Peloponnesus ; and that, taking his route by the promontory of Malea, the north wind drove him upon Libya, where he found his ship run aground in the lake Tritonis ; and while he was endeavouring to extricate himself, a Triton appeared to him, and told him, that if he would give him the tripod he had in his ship, he would shew him how to get clear of this danger ; upon which Jason, agreeing to the proposal, gave him the tripod, which the Triton laid up in his temple, and foretold Jason and his crew, that when one of their descendants should carry off that tripod, it was fixed by fate that there should be one hundred Greek towns built upon the lake Tritonis ; in fine, that the Libyans being informed of this oracle, kept the tripod carefully concealed. The explication given of this fable is, that the Triton who appeared to the voyagers under a human form was a prince who reigned in that place, whom Pindar and his scholiast name Eurypilus. He gave good instructions to the heroes to avoid the sand-banks which lie in and about the Syrtes. This, says Banier, is the whole mystery ; the prediction which they put in his mouth having only been invented after the event ; that is, after the Greeks were settled in that part of Africa, and had built cities there. Our heroes, in gratitude for the signal service done them by Eurypilus, made him a present of the above-mentioned tripod. Diodorus, who also speaks of it, says there was upon the tripod an inscription in very ancient characters, and adds, that it was preserved to the latest times, among the people called Hesperitans, in Cyrenaicum.

TRITON, in the *Linnaean System of Natural History*, a genus of the Mollusca order of worms ; the characters of which are, that the body is oblong, the tongue spiral, the tentacula twelve in number, and bipartite, six on each side, and the three hinder ones cheliferous. There is one species, viz. *T. littoreus*, which is found in the clefts of submarine rocks.

TRITON *Avis*, in *Ornithology*, a name under which Nie-remberg has described a bird of the West Indies, famous for its fine singing, and found in Hispaniola : it is said to have three different notes, and to be able to give breath to sounds of all three kinds at the same time : it is also said to be a very beautiful bird. Ray.

TRITONEA, or TRITOGENIA, in *Mythology*, a name given to Minerva, derived from the river Triton, near which she was born, and where she had been seen for the first time.

TRITONIA, in *Botany*, was so named by Mr. Ker, late Gawler, from *triton*, a weather-cock, in allusion to the variable direction of the stamens of the different species.—Ker in Sims and Konig's Ann. of Bot. v. 1. 227. Dryand. in Ait. Hort. Kew. v. 1. 90.—Class and order, *Triandria Monogynia*. Nat. Ord. *Enfatæ*, Linn. *Irides*, Juss.

Gen. Ch. *Cal.* Spatha inferior, shorter than the corolla, of two oblong, membranous, pointed or toothed valves. *Cor.* of one petal, superior ; tubular at the base ; swelling in the throat ; limb divided to its very bottom into six, nearly regular and equal, segments, each of which, in the lower part, is more or less contracted into a claw. *Stam.* Filaments three, inserted into the tube, unconnected with the throat, variously directed, curved, shorter than the limb ; anthers oblong, curved. *Pist.* Germen roundish ; style thread-shaped, erect ; stigmas three, linear, recurved, spreading. *Peric.* Capsule roundish-ovate, membranous, tumid, of three cells and three valves. *Seeds* numerous, globose, simple, neither winged nor pulpy, rather small.

Ess. Ch. Spatha of two membranous valves. Corolla tubular ; its limb in six deep segments, contracted at the base, nearly regular. Stigmas three, narrow, spreading. Capsule roundish-ovate. Seeds simple, globose.

The characters of this genus are confessedly very difficult to define ; yet its intelligent author considers the species to be easily discernible by their common habit. The *corolla* in some is quite regular, in others more or less irregular, yet never in a very strong or evident degree. “ The *bulb* is solid, ovate and depressed, or roundish with a point ; its coats reticulated ; the outermost spotted. *Leaves* grassy, broadish ; very rarely crisped at the edges. *Flowers* several, various in the different species ; in some their limb is large, bell-shaped, regular, reversed, the segments broad, the tube short, with an inflated spreading throat ; in others the corolla is of a smaller size, with a longer tube, a turbinate throat, the segments oblong, little dilated, disposed so as slightly to imitate a two-lipped flower, one of them broader than the rest ; in others again the segments are linear-oblong, spreading in a wheel-shaped manner, equal, the throat but slightly dilated, and the tube very long. The *stamens* of the two-lipped species are ascending, of the regular reversed ones erect ; *anthers* in the wheel-shaped flowers contiguous, incumbent.”

1. *T. crispa*. Curled-leaved Tritonia. Ait. n. 1. Curt. Mag. t. 678. (*Gladiolus crispus* ; Willd. Sp. Pl. v. 1. 210. Jacq. Ic. Rar. t. 267. Thunb. Diff. n. 7. t. 1. f. 2. Andr. Repos. t. 142.)—Leaves wavy and crisped at the margin. Segments of the corolla flat, shorter than the tube, not quite uniform.—Native of the hills of *Rode Sand* and *Piketberg* at the Cape of Good Hope, flowering from October to December. *Thunberg*. Sent by Mr. Maffon in 1787 to Kew garden. In England it flowers in the spring, or summer. The shortish, many-ribbed, wavy, but not fringed, *leaves* mark this species. The *flowers* are spiked, not numerous, of a tawny flesh-colour ; the tube often red, two inches long, curved ; three lower segments of the limb furnished with a deep-red central stripe.

2. *T. viridis*. Green-flowered Tritonia. Ait. n. 2. Curt. Mag. t. 1275. (*Gladiolus viridis* ; Ait. ed. 1. v. 3. 481. Vahl Enum. v. 2. 96. Ker Ann. of Bot. v. 1. 231.)—Stalk triangular, with membranous angles. Segments of the corolla lanceolate, shorter than the tube ; five of them ascending ; one deflexed.—Found at the Cape by Mr. Maffon, who sent it to Kew garden, in 1788, where it blooms in July. The *leaves* are linear-lanceolate, with a strong mid-rib. *Spike zigzag*. *Flowers* not numerous, pale green, with a purplish tinge, especially in the tube, and

TRITONIA.

at the back of the limb. We should suppose these flowers, by their colour, to be fragrant at night.

3. *T. striata*. Streaked Tritonia. Ker Ann. of Bot. v. 1. 228. (*Gladiolus striatus*; Jacq. Ic. Rar. t. 260. Willd. Sp. Pl. v. 1. 210. Vahl Enum. v. 2. 89.)—Leaves wavy, crisped, and fringed. Three alternate segments of the corolla crisped; all lanceolate, with long claws.—Native of the Cape of Good Hope; not as yet known in the English collections. The *leaves* are alternate, lanceolate, glaucous, many-ribbed, minutely fringed. *Flowers* light blue, prettily variegated with white, yellow, and crimson; their tube hardly so long as the limb.

4. *T. rosea*. Trumpet-flowered Tritonia. Ait. n. 3. (*T. capensis*; Curt. Mag. t. 618, and t. 1531. *Gladiolus roseus*; Jacq. Ic. Rar. t. 261. Willd. Sp. Pl. v. 1. 217. Vahl Enum. v. 2. 110.)—Sheath taper-pointed. Upper segment of the corolla broadest; throat funnel-shaped; tube twice the length of the limb.—Native of the Cape. Sent to Kew by Mr. Masson in 1793, where it flowers in June and July. The *stem* is leafy. *Leaves* green, many-ribbed, taper-pointed. *Flowers* spiked, three or four inches long, flesh-coloured, or buff with purplish veins; the three lower segments striped with crimson at the base. The *corolla* however varies in size as well as colour; see the figures cited.

5. *T. longiflora*. Long-flowered Tritonia. Ait. n. 4. (*Ixia longiflora*; Willd. Sp. Pl. v. 1. 203. Redout. Liliac. t. 34. Curt. Mag. t. 256; and t. 1502, *Tritonia*. *Gladiolus longiflorus*; Linn. Suppl. 96.)—Segments of the corolla regular, linear-oblong, obtuse; tube thread-shaped, angular and slightly dilated at the top; four times as long as the limb, and six times as long as the nearly equal valves of the *spatha*.—Native of the Cape. Introduced by Mr. Masson in 1774, and now a general favourite in our greenhouses, flowering in the spring. The very long and slender, regular, buff-coloured *flowers*, often tinged with a rose-colour, sufficiently discriminate this elegant species. The *stalk* is very tall and slender, naked except at the lower part.

6. *T. rockensis*. Bending-flowered Tritonia. Ker in Curt. Mag. t. 1503. Ait. Epit. 375. (*Ixia paniculata*; De la Roche Diff. 26. t. 1, according to Mr. Ker. *Gladiolus longiflorus*; Thunb. Diff. n. 22.)—Segments of the corolla regular, elliptical, concave, scarcely twice as long as the slender, deflexed tube. Stamens and style prominent.—Imported from the Cape in 1809, by Messrs. Lee and Kennedy. Nearly akin to the last, to which we should, but for Mr. Ker's authority, have referred the branched variety, figured by De la Roche.

7. *T. lineata*. Pencilled Tritonia. Ker Ann. of Bot. v. 1. 228. Ait. n. 5. (*Gladiolus lineatus*; Salis. Prodr. 40. Curt. Mag. t. 487. Redout. Liliac. t. 55. *Ixia squalida* β; Willd. Sp. Pl. v. 1. 206.)—Limb of the corolla three times the length of the curved tube, bell-shaped; its upper segment largest: outer ones abrupt.—Native of the Cape. Sent to Kew by Mr. Masson in 1774, but more recently introduced into our greenhouses by way of Holland, flowering in May. The *stem* is two feet high. *Leaves* green, with a solitary mid-rib. *Spike* drooping before the flowers open, which are large, of a straw-colour, tinged with orange, and marked with fine, dark, parallel and branching, veins. Each of the three lower segments has a yellow internal spot near the base. The tube, about half an inch long, scarcely equals the length of the *spatha*.

8. *T. securigera*. Dwarf Copper-coloured Tritonia. Ker Ann. of Bot. v. 1. 228. Ait. n. 6. (*Gladiolus securiger*; Willd. Sp. Pl. v. 1. 219. Vahl Enum. v. 2. 109. Curt. Mag. t. 383. *Montbretia securigera*; Redout. Liliac. t. 53.)

—Limb of the corolla twice the length of the tube; its upper segment largest; each of the three lower bearing at its base an erect, compressed prominence. Outer valve of the *spatha* blunt, with three teeth.—Found at the Cape by Mr. Masson, who sent it to Kew in 1774. It flowers freely in May and June, and increases by offsets. The *stem* is but a span high. *Leaves* two-ranked. *Flowers* tawny; the three lower segments yellow at the base, with a deeper hue of red about the middle.

9. *T. flava*. Yellow Tritonia. Ker Ann. of Bot. v. 1. 228. Ait. n. 7. (*Gladiolus flavus*; Willd. Sp. Pl. v. 1. 218. Vahl Enum. v. 2. 110.)—Limb of the corolla twice the length of the tube; each of the three lower segments bearing at its base an erect, compressed prominence. Outer valve of the *spatha* pointed.—Found at the Cape by colonel William Paterson, who sent it to the famous countess of Strathmore in 1780. The somewhat broader *leaves*, pointed *spatha*, and uniform deep yellow of the *corolla*, are said in the first edition of *Hort. Kew.* to distinguish this from the last.

10. *T. refracta*. Bent-spiked Tritonia. Ker Ann. of Bot. v. 1. 228. (*Gladiolus refractus*; Jacq. Ic. Rar. t. 241. Willd. Sp. Pl. v. 1. 215. Vahl Enum. v. 2. 109.)—Spikes bent backwards. *Flowers* erect, reversed. Limb of the corolla thrice the length of the tube, bell-shaped, two-lipped; its three lower segments smallest.—Native of the Cape. We have not heard of it in any English garden. The *stem* is branched, singularly bent, scarcely rising above the long, erect, two-ranked *leaves*. *Spikes* horizontal, of several *flowers*, whose three upper segments are purplish, lower yellow or orange.

11. *T. squalida*. Sweet-scented Pink Tritonia. Ker in Curt. Mag. t. 581. Ait. n. 8. (*Ixia squalida* α; Willd. Sp. Pl. v. 1. 206. Vahl Enum. v. 2. 73. *I. hyalina*; Redout. Liliac. t. 87.)—Limb of the corolla bell-shaped, regular; its segments rounded, transparent in the margin below, close together; one of them gibbous at the base.—Native of the Cape. Sent to Kew by Mr. Masson, in 1774. The *stalk* is naked, ascending, much taller than the *leaves*, which are many-ribbed, equitant; the outer ones bluntish. *Spike* reclining, of about half a dozen large, very sweet-scented *flowers*, whose tube is scarcely half the length of their limb, and whose colours are a mixture of dull pink, with a dirty pellucid white, like wet paper. The *claw* of each segment is red, with a distinctly defined white membranous border, that of the three innermost segments lying over the others. *Style* longer than the *stamens*, as in the two following. The depreciating name of *squalida* is surely not suitable to this elegant species.

12. *T. fenestrata*. Open-flowered Orange Tritonia. Ker in Curt. Mag. t. 704. Ait. n. 9. (*Ixia fenestrata*; Jacq. Ic. Rar. t. 289.)—Limb of the corolla funnel-shaped, regular; its segments obovate, distant, transparent in the margin below. Stamens and style reclining.—Native of the Cape, said to have been imported in 1801, by Mr. W. Salisbury, of the Sloane-street Botanic Garden. It blossoms in the spring, and differs from the last in having scentless *flowers*, of a deep rich orange-colour; the membranous edges of their segments pink. The *corolla* is also differently shaped, as our specific character expresses. The *tube* is short, scarcely exceeding the *spatha*. *Stem* often branched.

13. *T. crocata*. Saffron-coloured Membranous Tritonia. Ker Ann. of Bot. v. 1. 228. Ait. n. 10. (*Ixia crocata*; Linn. Sp. Pl. 52. Willd. Sp. Pl. v. 1. 205. Vahl Enum. v. 2. 73. Thunb. Diff. n. 20. Curt. Mag. t. 184. Linn. fil. Pl. Rar. 14. t. 7.)—Limb of the corolla funnel-shaped, regular; its segments obovate, close together, transparent

in their lower half.—Native of the Cape, and one of the first of its tribe cultivated in the gardens of Europe, where it has always been a great favourite, flowering in spring. The brilliant orange-colour of its *corolla*, contrasted with the membranous transparency of the lower half of its segments, all close together, has a very striking appearance. We have some doubts whether Miller's t. 239. f. 2. be not rather taken from the foregoing species, which in the shape and disposition of its segments that figure most resembles.

14. *T. deusta*. Tall Copper-coloured Tritonia. Ker in Curt. Mag. i. 622. Ait. n. 11. (*Ixia deusta*; Willd. Sp. Pl. v. 1. 205. Vahl Enum. v. 1. 74. *I. crocata*, nigro maculata; Andr. Repof. t. 134. *I. miniata*, nigro maculata; Redout. Liliac. t. 89.)—Limb of the corolla regular, widely spreading; its segments imbricated, obovate, solid throughout; the three outermost gibbous underneath. Tube rather shorter than the spathe.—Found at the Cape of Good Hope, by Mr. Masson, who sent it to Kew in 1774. Allied to the two last, but taller, with still deeper orange-coloured flowers, whose segments have no marginal transparency. The three outermost have a sort of hollow, or depression, just above the base, marked with a very dark spot, and prominent beneath. Jacquin's *Ixia miniata* is taken by Vahl for a variety of the present, destitute of spots; but the figure more resembles our *fenestrata*, n. 12, in the shape and position of the segments of the *corolla*, though wanting their membranous margin. See the following.

15. *T. miniata*. Tall Late-flowering Tritonia. Ker in Curt. Mag. t. 609. Ait. n. 12. (*Ixia miniata*; Jacq. Hort. Schoenbr. v. 1. 10. t. 24?)—Limb of the corolla funnel-shaped, somewhat two-lipped, reversed; its segments obovate, close, solid throughout. Tube the length of the spathe. Found at the Cape of Good Hope, by Mr. Masson, who sent it to Kew garden in 1795. It flowers in August, and is the tallest and strongest of this genus, having a branched stem, eighteen inches or more in height. The flowers are scentless, of a rather dull orange-colour; their three lower segments, (turned uppermost by the reversed posture of the flower,) marked at the base with an oblong yellow spot, indicating a degree of irregularity in the *corolla*. This circumstance does not appear in Jacquin's figure, above quoted, where all the segments have a similar mark. How far such characters are variable in this difficult tribe, requires a longer experience, and more intimate practical acquaintance with it, than we can boast, to decide with certainty. More has been done by Mr. Ker than any other person, to clear up the subject; but a wider range of practical observations and experiments is still wanted, in order to a correct understanding of what makes a permanent species. In the perception of natural genera, this botanist seems to us to display great abilities, whether their technical limitations be, as yet, perfected or not. With respect to colour, and even proportion of parts, in the flowers of this family, Jacquin's reputed varieties of *Ixia maculata*, in the 1st vol. of his *Hortus Schoenbrunnensis*, are sufficient to drive any botanist to despair.

TRITONUS, in *Music*, a dissonant interval, composed of three tones, two major and one minor; and which is, in practice, called the sharp 4th. This interval on keyed instruments is equal in nominal semitones to the false 5th: the numerical ratios, however, are not equal; that of the tritonus being only 32 to 45; which is occasioned by the tritonus having only one tone major instead of two semitones major, which the false 5th contains. See FIFTH.

But the most considerable difference between the false 5th and the sharp 4th is, that the latter is a major discord, and

that the parts are resolved by separation; and whereas the other is a minor discord, and resolved by approximation of the two parts.

The chord of the sharp 4th is only an inversion of the chord of the \sharp to the sharp 7th of the key, by giving the discord to the base.



TRITOPATORIA, τριτοπατορεια, in *Antiquity*, a solemnity in which it was usual to pray for children to the δ εοι γενεθλιαι, or *gods of generation*, who were sometimes called τριτοπατορες.

TRITORIUM, in *Chemistry*, a vessel generally made of glass, used for the separation of liquors of different densities, as oil and water. Its largest diameter is in the middle, and it terminates with an aperture at each of the two extremities. The lower extremity, the aperture of which is very narrow, is dipped into the mixed liquor, and when it is sufficiently filled, the upper orifice is to be stopped close, by pressing the thumb upon it, by which means the liquor contained will not run out at the lower aperture, when the vessel is raised from the mixed liquor. When the fluids of which this liquor consists have perfectly separated according to their respective densities, by removing the thumb, the heavier fluid will run out at the lower extremity, and the separation will be thus effected. Macquer's Dict. Chem.

TRITTAU, in *Geography*, a town of the duchy of Holstein; 20 miles E. of Hamburg.

TRITTYARCHI, τριττυαρχοι, among the Athenians, were magistrates who had the command or government of the third part of a tribe. See PHYLARCHUS.

TRITUM PROMONTORIUM, *Sebba-Rous*, in *Ancient Geography*, a promontory of Africa, at the west entrance of the gulf of Numidia; called by Pomponius Mela *Metagonium*.

TRITURATION, TRITURA, or *Tritus*, formed from *triturare*, to *thresh*, of *tero*, I wear, rub, or grind, in *Pharmacy*; grinding; the act of reducing a solid body into a subtle powder, called also *levigation*, *pulverization*, &c.

The trituration of woods, barks, minerals, and other hard and dry bodies, is performed by the rotatory motion of a pestle in metalline, glass, agate, or Wedgwood-ware mortars; and in mills, by means of large rollers of hard stone.

The same term is also applied to the comminuting, bruising, and dividing of humid matters into little parts. The trituration of moist bodies is performed in marble or stone mortars, with pestles of wood, glass, ivory, &c. The word trituration is generally applied to denote the division that is made of several bodies together, to unite them with each other; as, e.g. the extinction of mercury in the operation of *Æthiops mineral*, and others similar.

Trituration, Boerhaave observes, has a wonderful force to dissolve some bodies, and will render them as fluid as if they were fused by the fire. Thus if you grind the powder of myrrh and salt of tartar together, they will dissolve each other. By rubbing new and bright filings of iron in a mortar, with double their weight of clean sulphur, the iron will be dissolved, so as by diluting it with water to afford the vitriolum Martis.

Gold long ground in a mortar with salt of tartar, will yield a kind of tincture; and rubbed with mercury in a mortar of glass, it entirely dissolves into a purple liquor, and becomes a most powerful medicine.

Dr. Langleotte has written a curious treatise of the great effects of trituration in chemistry, and describes a peculiar way

way he employed to grind gold, by which, he says, he could render it as fluid as the fire does, and make an aurum potable by the bare motion of a mill.

This author, in the Philosophical Transactions, mentions his way of grinding gold, and describes two engines, or philosophical mills, for the purpose; with one of which, in the space of fourteen natural days, he reduced a leaf of gold to a dusky powder, and, putting it into a shallow retort, placed in a sand-heat, he thence obtained, by gradually increasing the fire, and giving a strong one at last, a very few red drops, which, digested *per se*, or with tartarized spirit of wine, afforded a pure and genuine aurum potable.

The success of this operation the doctor attributes, in a great measure, to the salt of the air, which, in grinding, plentifully mixes and unites itself with the gold.

It has been observed, that there appears to be an error in reducing vegetable matter to the state of impalpable powder; as in this state, both during the process of grinding and afterwards, the air and light act powerfully upon them, and produce changes, which, although they be not well understood, yet appear to alter the medicinal virtues of the substances.

TRITURATION is also used, in *Medicine*, for the action of the stomach on the food, by which it is fitted for nutriment. See DIGESTION.

TRIVADI, in *Geography*, a town of Hindoostan, in the Carnatic. The pagoda forms a citadel; 23 miles S.W. of Pondicherry. N. lat. $11^{\circ} 42'$. E. long. $79^{\circ} 45'$.

TRIVANDOOR, a town of Hindoostan, in Madura; 16 miles N. of Nattam.

TRIVATOOR, a town of Hindoostan, in Marawar; 20 miles N. of Trumian.

TRIVATORE, a town of Hindoostan, in the Carnatic; 6 miles S.E. of Arcot.

TRIVELAWARY, a town of Hindoostan, in the Carnatic; 12 miles N. of Trichinopoly.

TRIVEMBAR, a town of Hindoostan, in Marawar; 27 miles N. of Ramanadporum.

TRIVENALORE, a town of Hindoostan, in the Carnatic; 13 miles N. of Tiagar.

TRIVENI, a term in the Sanscrit tongue, said to mean a triad of rivers; a junction of three of the most important streams of Hindoostan being pre-eminently distinguished by this appellation. These are the Yamuna or Jumna, the Ganga or Ganges, and the Saraswati; being, in the mythological mysticisms of the Hindoos, personifications or symbols of their three great goddesses, Lakshmi, Parvati, and Saraswati.

The Hindoo poets, as indeed all their writing priests or philosophers, and even mathematicians, seem to be, call the Triveni the *three plaited locks*; and elegantly wreath this idea into many pleasing allegories. See RADHA.

The spot of junction of the three river-goddesses in question, near Illahabad in Bengal, is extensively esteemed very sacred; and pilgrims resort thither from distant regions to bathe in the purifying triune stream. Of this we have taken sufficient notice under our article JUNCTIONS; and under that of SUICIDE, an account is given of meritorious self-destruction at this revered spot. See also SATI.

The Triveni has been noticed as a fruitful source of poetical allusion.

We cannot refrain from briefly alluding, in this place, to some supposed coincidences in Irish and Indian mythology, of which see something under our articles SOMA and SURYA. And we allude to them here in view to the opportunity of saying that poetical traditions existed, and perhaps still exist, in Ireland of a mythological origin and junction of three

rivers, reminding us strongly of the Indian Triveni. The Irish rivers appertain to the county of Kilkenny; and our own Spenser has described them so exactly in the style of Eastern hyperbole, that we must invite the reader to turn to our article KILKENNY, where he will find an extract from Spenser descriptive of the mythological origin and junction of the Irish Triveni, that may be almost suspected as of Oriental origin.

TRIVENTO, in *Geography*, a town of Naples, in the county of Molise, the see of a bishop, immediately under the pope; 11 miles N. of Molise.

TRIVERBIAL DAYS, in the *Roman Calendar*, denoted judicial days, or such as were allowed to the prætor for hearing of causes.

They were otherwise called *dies fasti*, in *quibus licebat pratorii fieri tria verba, do, dico, addico*.

Of these court-days, the Romans had only twenty-eight in the whole year; whereas with us, one-fourth of the year is term-time, in which three courts constantly sit for the dispatch of business; besides the close attendance of the court of chancery for determining suits in equity, and the numerous courts of assize and nisi prius that sit in vacation for the trial of matters of fact.

TRIVESPER, in *Mythology*, one of the epithets of Hercules.

TRIVET, NICHOLAS, in *Biography*, an English historian of the thirteenth century, was the descendant of a respectable family in Norfolk. Having entered among the Dominicans in London, he studied at Oxford and at Paris; and at the latter place collected from books on the history of the Normans and Franks such passages as related to the English nation, and supplied their defects from the best accounts which he could procure in his own country. In this way he composed his "Annals of the Six Kings of England sprung from the Counts of Anjou," introducing a detail of the most remarkable events that occurred under the Roman pontiffs, the emperors, the kings of France, and other contemporary princes, together with an account of learned men, particularly of his own order, and intending that his work should be a continuation of that of William of Malmbury. He also wrote various other works, partly containing illustrations of ancient authors, but none of them were printed, except his commentary on St. Augustine's book "De Civitate Dei." Soon after his return from France he became prior of a monastery in London, where he died in 1328, at the age of nearly 70 years. His historical work has passed through several editions under different titles, for which we refer to Aikin's Gen. Biog.

TRIVIAL NAMES, *Nomina Trivialia*, in *Botany*, were first used by Linnæus in his dissertation entitled *Pan Suecus*, published at Upsal in 1749. The plants there enumerated, with a view to their economical qualities as the food of domestic cattle, are each designated by its generic and specific name. The same measure was adopted in the first edition of the *Species Plantarum*, published four years after, and was extended subsequently to every department of natural history. Linnæus originally intended his specific definitions to be used as names; but however compendiously such might be constructed, they were soon found totally unmanageable for that purpose. He therefore adopted the method of Rivinus, of mentioning each plant by a sort of appellative, in addition to its generic name; not intending, like Rivinus, that such appellative should comprehend the specific definition of the plant, which Linnæus knew to be impossible. That no such expectation might be formed of these names, and that students might not too much rely on them, as any thing like definitions, he termed them *nomina trivialia*, as serving for common

common every-day use. They are now however usually called specific names, in contradistinction to generic ones; the original specific names of Linnæus being at present more properly termed specific definitions, or differences. Trivial names may contain the essential characters of the several species, as *Sagina procumbens* and *apetala*, in which case they are but a repetition, or an anticipation, of the specific differences. They more usually serve to express some concomitant circumstance, tolerably certain as a distinctive mark of each species, though not in the specific character, such as *annua*, *perennis*, *fruticosa*; or *alba*, *lutea*, *rubra*, &c. Former appellations of each species, such as *Hydropiper* and *Perficaria*, especially if the plants be remarkable for their medical or economical uses, as *Cinnamomum*, *Rhabarbarum*, *Alfimbium*, *Napus*, *Rapa*, &c. are very commodious, though injudiciously laid aside by some reformers. These must always begin with a capital letter, being proper names, not required to agree in gender with the generic name. In Zoology, such appellations of species as we have last mentioned are peculiarly useful, and generally preferred by Linnæus to all others.

TRIVICARY, in *Geography*, a town of Hindoostan, in the Carnatic; 20 miles S.E. of Gingee.

TRIVICUM, **TRIVICO**, in *Ancient Geography*, a small town of Italy, on the frontiers of the Hirpins and of Apulia. It lay on the Trajan way, at a distance E. of Benevento.

TRIVIDHA, in *Mythology*, a name of the Hindoo goddess Parvati. The word is said to mean three-fold, the Hindoo goddesses corresponding in many points with the triple Hecate of the Greeks.

TRIVIER, in *Geography*, a town of France, in the department of the Sefia; 6 miles N.E. of Biella.

TRIVIGILLO BAY, a bay in the gulf of Honduras, on the coast of Mexico.

TRIVIGNANO, a town of Italy, in the Trevisan; 7 miles W.N.W. of Treviso.

TRIVIKERA, or **TRIVIKRAMA**, in *Mythology, a name of the Hindoo god Vishnu. It means the three-stepper, alluding to his having in one of his avatars, or incarnations, deceived a powerful sovereign into a promise of giving him all he could cover in three steps.*

TRIVIUM, a term invented in the times of barbarism to express the three sciences that were first learned in the schools, *viz.* grammar, rhetoric, and logic; and the schools in which these sciences were taught were called *triviales*.

The *quadrivium*, to which the scholar next proceeded in his way to the summit of literary fame, comprehended the four mathematical sciences, *viz.* arithmetic, music, geometry, and astronomy.

TRIOUFETTA, in *Botany*, named by Plumier, serves to commemorate John Baptist Triumfetti, of Bologna, doctor in medicine and philosophy, and lecturer at the botanic garden of Rome, which was under his direction. He published there, in 1685, a thin quarto volume entitled *Observationes de ortu ac vegetatione plantarum*, including descriptions and engravings of several new species. This is an able work, though more frequently quoted for its figures than its philosophy; a very common case. The author published in 1703 a refutation of some criticisms that had appeared against his book. He died in 1707. His brother, Lælius Triumfetti, likewise professor of botany at Rome, is said to have been well skilled in the knowledge of plants, though he does not appear as an author.—Linn. Gen. 239. Schreb. 321. 332. Willd. Sp. Pl. v. 2. 853. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 3. 145. Plum. Gen. 40. t. 8. Juss. 290. Lamarck Illustr. t. 400. Gærtner. t. 111. (*Bartramia*); Linn. Gen. ed. 5. 184. Lamarck Illustr. t. 400. Gærtner.

t. 111.)—Class and order, *Dodecandria Monogynia*. Nat. Ord. *Columnifera*, Linn. *Tiliacea*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of five lanceolate, deciduous leaves, with a bristly point just below the summit. *Cor.* Petals five, linear, obtuse, erect, concave, bent backward just above the base. *Stam.* Filaments sixteen, equal, ascending, awl-shaped, straight, the length of the corolla; anthers simple, roundish, of two cells. *Pist.* Germen superior, roundish; style the length of the stamens; stigma in two acute divisions. *Peric.* Capsule globose, covered all over with hooked prickles, separating into four cells. *Seeds* one or two in each cell, erect, convex at the outside, angular at the inner.

Ess. Ch. Calyx of five leaves, deciduous. Petals five. Capsule prickly, separating into four parts.

Obs. The supposed want of a calyx in the original *Triumfetta* is a manifest error, subsequently corrected by Linnæus; as is likewise, if we mistake not, the dorsal point attributed to each petal. Yet Gærtner uses the former character to strengthen the difference between *Triumfetta* and the original *Bartramia*, though surely every principle of character and habit proclaim their identity. **BARTRAMIA** therefore, is now retained as the name of a very distinct and elegant genus of Mosses. See *Musci*.

1. *T. Lappula*. Bur Triumfetta. Linn. Sp. Pl. 637. Willd. n. 1. Ait. n. 1. (*T. fructu echinato racemoso*; Plum. Ic. 253. t. 255. *Lappula bermudensis althæoides spicata, fructu orbiculari majore*; Pluk. Phyt. t. 245. f. 7.)—Leaves heart-shaped at the base. Calyx soon deciduous. Flowers in densely whorled aggregate spikes.—Native of the West Indies and South America. A shrub four or five feet high, flowering about July and August in our stoves, where it was cultivated in Miller's time, but is seldom much noticed, the yellow flowers being small and inconspicuous. The leaves are stalked, alternate, several inches broad, roundish, toothed, downy, with three or five shallow acute lobes. *Capsules* the size of a pea, armed with prominent hooked prickles, which stick to the coats of animals, and are widely dispersed, each capsule splitting when ripe into four parts, lodging solitary seeds. The spikes are terminal, several together, alternate.

2. *T. glandulosa*. Glandular Triumfetta. Forsk. Cat. Fl. Arab. Fel. 112. n. 297. Vahl Symb. v. 3. 62. Willd. n. 2.—Leaves ovato-lanceolate; downy and hoary beneath; their lower serratures more or less glandular. Flowers axillary, from the upper leaves.—Gathered by Forskall in the middle region of the hills of Arabia Felix. Branches woody, round, villous. Leaves on short stalks, numerous, three inches long, gradually smaller upward, clothed on both sides with soft starry hairs, but greenest on the upper; entire at the base, but otherwise serrated. *Stipules* awl-shaped.

3. *T. Bartramia*. Currant-leaved Triumfetta. Linn. Sp. Pl. 638. Willd. n. 3. Ait. n. 2. (*Lappago amboinica*; Rumph. Amboin. v. 6. book 10. 59. t. 25. f. 2. *Lappula bengalensis tetraspermos, ribesii folio, echinis orbicularibus ad foliorum exortum plurimis simul sessilibus*; Pluk. Phyt. t. 41. f. 5.)—Leaves acutely lobed and toothed; entire at the base; roughish on both sides. Flowers racemose, partly aggregate; the lower ones axillary.—Native of the East Indies. The leaves are roughish to the touch, not downy. We are not certain of having seen authentic specimens, Linnæus having been very superficially acquainted with the species of this genus. Our's has but four seeds in each capsule.

4. *T. velutina*. Velvet-leaved Triumfetta. Vahl Symb. v. 3. 62. Willd. n. 4.—Leaves roundish-ovate, slightly lobed,

lobed, pointed; softly downy on both sides. Stem erect. —Native of the island of Mauritius. We have a specimen from thence, given by Thouin to the younger Linnæus, which we conceive must be Vahl's plant, though, being in seed, the *inflorescence* has a racemose appearance, the floral leaves having perhaps fallen off. The *stem* is round, downy. *Leaves* alternate, stalked, two or three inches long, more or less evidently five-ribbed, unequally serrated, clothed with soft starry hairs on both sides, but much the most copiously on the under; the base is undivided, not heart-shaped. *Stipulas* lanceolate, tapering, fringed, of a rusty hue. *Flowers* from the bosoms of the upper leaves, according to Vahl. In our specimen, which answers in other respects to his description, the *capsules*, smaller than a pea, form compound, terminal, interrupted *clusters*; their partial stalks aggregate, deflexed, from a quarter to half an inch long. The prickles of each *capsule* are copiously barbed with minute, reflexed, pale hairs.

5. *T. procumbens*. Procumbent Triumfetta. Forst. Prodr. 35. Willd. n. 5. — Leaves roundish-heart-shaped, obtuse, slightly three-lobed; very downy beneath. Stem procumbent. —Native of the Society isles. Our specimen is from Otaheite, gathered by the younger Forster. The *stem* is woody, round, downy and hoary; the younger *branches* leafy. *Leaves* about the size and shape of those of a gooseberry, bluntly serrated, usually three-lobed, on long downy stalks; their upper side green, nearly even, clothed with feathered, simple, deciduous hairs; the under paler, covered with soft starry hairs, and reticulated with prominent veins. Of the *flowers* or *fruit* nothing is mentioned, nor does the specimen before us shew traces of either.

6. *T. hirta*. Hairy-panicled Triumfetta. Vahl Symb. v. 3. 63. Willd. n. 6. — Leaves three-lobed, acute; smooth above. Panicle terminal, compound, hairy. — Found by Von Rohr, in the West Indian island of St. Martha. *Stem* shrubby. *Leaves* three or four inches in length and breadth, seven-ribbed, unequally serrated; three or five of the lowermost serratures glandular; the base rather heart-shaped; the extremity divided into three ovate, distant, pointed lobes: the under side is clothed with very minute starry pubescence, and its ribs with long feathered hairs. *Footstalks* most hairy when young. *Panicle* diffuse, with alternate, twice or thrice forked, branches, most hairy in the lower part. *Flowers* small, stalked, solitary at the forks of the panicle, but otherwise aggregate. *Calyx* hoary. Vahl.

7. *T. femitriloba*. Mallow-leaved Triumfetta. Linn. Mant. 73. Willd. n. 7. Ait. n. 3. Jacq. Amer. 147. Hort. Vind. v. 3. 41. t. 76. (T. n. 2; Browne Jam. 233.) — Leaves divided half way down into three lobes. Panicle terminal, compound, downy. —Native of the West Indies. Introduced at Kew in 1773, by John earl of Bute. It flowers in the stove in July. The *stem* is shrubby, bushy. *Leaves* clothed on both sides with fine, soft, silky hairs. *Flowers* yellow, not many together, in more or less compound terminal *panicles*. Browne says, the leaves, steeped for some time in water, give out a copious clear mucus; and that the fibres of the bark serve, in the inland parts of Jamaica, to make ropes, &c. We do not by any means understand Linnæus's comparison of this species to *T. Lappula*. He had no authentic specimen of either.

8. *T. grandiflora*. Large-flowered Triumfetta. "Vahl Eclog. v. 2. 34." Willd. n. 8. — "Leaves ovate, undivided, somewhat heart-shaped, serrated, rather hairy; the floral ones lanceolate. Branches hairy." —Native of the

island of Montserrat. *Corolla* twice or thrice as large as in any other species with which Vahl was acquainted.

9. *T. macrophylla*. Large-leaved Triumfetta. "Vahl Eclog. v. 2. 34." Willd. n. 9. — "Leaves ovate-heart-shaped, undivided, unequally serrated, pointed, downy; glandular at the base." —Native of South America. Like *T. Lappula*, but having a *calyx*, Vahl judged it to be a different species. We have already expressed our disbelief of the want of a *calyx* in any species of this genus. Plumier distinctly represents one in his generic figures, taken from *T. Lappula* itself. The *macrophylla* is said to differ from what we shall next describe, in the shape, as well as downiness, of its *foliage*.

10. *T. rhombifolia*. Rhomb-leaved Triumfetta. Swartz Ind. Occ. 863. Willd. n. 10, misspelt. (T. rhomboidea; Jacq. Amer. 147. t. 90.) — Leaves rhomboid, slightly hairy; the uppermost ovate-lanceolate, nearly sessile. Flowers in axillary tufts. —Native of dry, waste, bushy places in Jamaica, and other parts of the West Indies. The *stem* is shrubby, two or three feet high, erect, branched, downy. *Leaves* contracted and entire at the base; the lower ones rhomboid, and somewhat hexagonal, an inch and half long, on *footstalks* nearly of their own length; all rugose and more or less hairy. *Flowers* pale, in axillary tufts, accompanying most of the upper or smaller leaves, each tuft of about three three-cleft flower-stalks. *Petals* with hairy claws, and five nectariferous glands at their base. *Capsule* of three single-seeded cells. Swartz.

11. *T. annua*. Annual Triumfetta. Linn. Mant. 73. Willd. n. 11. Ait. n. 4. (T. foliis oblongo-ovatis, obtusè serratis, petiolis longissimis; Mill. Ic. v. 2. 199. t. 298.) — Leaves ovate, acute, serrated, undivided; rarely three-lobed. —Native of the East Indies, flowering with us in August and September. Miller cultivated this for curiosity; but it has nothing to excite popular admiration. The *root* is annual. *Leaves* three or four inches long, on long stalks; but it does not appear from Miller's description, whether they are smooth, downy, or rough. *Flowers* small, deep yellow, in tufts at the ends of the branches; sometimes with only four *petals* and eight *stamens*. *Capsule* of four single-seeded cells.

TRIUMFETTA, in Gardening, furnishes plants of the shrubby and herbaceous kinds; among which the species cultivated are, the prickly-seeded triumfetta (*T. lappula*), and the annual triumfetta (*T. annua*).

Method of Culture.—These plants are increased by seeds, which must be procured from their native places, and be sown on a hot-bed, or in pots plunged in the bark-bed of the stove: when the plants have one or two inches growth, they should be removed into separate pots, re-plunging them in the bark-bed till well re-rooted.

They afterwards require to be kept constantly in the stove, or hot-house, and to have the management of other ligneous plants of the stove kind.

They produce variety in stove collections.

TRIUMPH, TRIUMPHUS, a ceremony, or solemnity, practised among the ancient Romans, to do honour to a victorious general, by affording him a magnificent entry into their city.

The triumph was the most pompous spectacle known among the ancients: authors usually attribute its invention to Bacchus, and derive the term from *δριμαχος*, one of his titles; and tell us, that he first triumphed upon the conquest of the Indians; and yet this ceremony was only in use among the Romans.

As long as the ancient discipline of the republic continued, no general could pretend to a triumph who had not extended the

the limits of the empire, and slain at least five thousand of his enemies in battle, without any considerable loss on his own part: to this purpose an express law was established, and he was obliged to make oath before the quaestors, that the account delivered to the senate was true. But this law became obsolete, and intrigue and faction procured a triumph in favour of generals whose merit was not very considerable.

The general who vanquished his enemies in a naval engagement, had also the honour of a naval triumph. These were first granted to C. Duillius, in the year 449, after his defeat of the Carthaginians.

The triumph was of two kinds, the *less* and the *greater*. The *less* triumph was granted upon a victory over some unequal and unworthy enemy, as over pirates, slaves, &c. This they called *ovatio*, because the only sacrifices offered in it were sheep.

The *greater* triumph, called also *curulis*, and simply *the triumph*, was decreed by the senate to a general upon the conquering of a province, or gaining a single battle. The order and economy of the triumph were thus: the general having dispatched couriers with tidings of his success, the senate met in Bellona's temple to read the letters: this done, they send him the title *Imperator*, with orders for him to return, and bring his victorious troops along with him.

When he was arrived near the city, the general and principal officers took oath of the truth of the victory; and the day of triumph was appointed.

The day being arrived, the senate went to meet the conqueror without the gate called Capena, or Triumphalis, and marched in order before him to the Capitol. He was richly clad in a purple robe, embroidered with figures of gold, setting forth his glorious achievements; his buskins were beset with pearl, and he wore a crown, which at first was only laurel, but afterwards was gold; in one hand he bore a laurel branch, and in the other a truncheon. He was drawn in a car, or chariot, adorned with ivory and plates of gold, drawn usually by two white horses; though sometimes by other animals, as that of Pompey, when he triumphed over Africa, by elephants; that of Mark Antony, by lions; that of Hellogabalus, by tigers; that of Aurelian, by deer; and that of Nero, by hermaphrodite maids, &c.

At his feet were his children, or sometimes on the chariot-horses. It is added, that the public executioner was behind him, to remind him, from time to time, that these honours were transitory, and would not screen him from the severity of the laws, if he should ever be found delinquent.

The cavalcade was led up by the musicians, who had crowns on their heads; after them came several chariots, in which were plans of the cities and countries subdued, done in relief: they were followed by the spoils taken from the enemy, their horses, arms, gold, silver, machines, tents, &c. After these came the kings, princes, or generals subdued, loaded with chains, and followed by mimics and buffoons, who insulted over their misfortunes. Next came the officers of the conquering troops, with crowns on their heads.

After these appeared the triumphal chariot, before which, as it passed, they all along strewed flowers, and the music played in praise of the conqueror amidst the loud acclamations of the people, crying *Io triumphe!*

The chariot was followed by the senate, clad in white robes; and the senate by such citizens as had been set at liberty or ransomed.

The procession was closed by the priests, and their officers and utensils, with a white ox led along for the chief victim.

In this order they proceeded through the triumphal gate,
VOL. XXXVI.

along the Via Sacra, to the Capitol, where the victims were slain.

In the mean time all the temples were open, and all the altars laden with offerings and incense; games and combats were celebrated in the public places, and rejoicings appeared every where.

What was horrible amidst all this mirth was, that the captives, when arrived at the forum, were led back to prison and strangled; it being a point of religion with them, not to touch the victims till they had taken full revenge of their enemies. The rites and sacrifices being concluded, the triumpher treated the people in the Capitol, under the porticoes, and sometimes in Hercules's temple.

The most considerable triumphs were those of Cæsar after the taking of Utica, and of Augustus after the victory of Actium. Cæsar had four triumphs, which lasted four days, and were conducted with the most extraordinary splendour and magnificence. The first was the triumph of the Gauls, on which occasion there were presented to the view of the Romans the names of three hundred nations and eight hundred cities subdued by the death of a million of enemies, which Cæsar had defeated in several battles. The second triumph was that of Egypt: the third represented the defeat of Pharnaces; and the fourth exhibited pictures of Scipio, Petreius, and Cato.

The triumph of Augustus lasted three successive days, and was not less magnificent than the former.

After Augustus, the honour of a triumph became an appendage of sovereignty.

TRIUMPHAL Arch, Car, and Column. See the articles.

TRIUMPHAL Crown, or Garland. See CROWN.

This is said to have been taken from Apollo's crowning his head with a laurel, after killing the Delphian serpent.

TRIUMPHAL Gown, toga triumphalis. See TOGA.

TRIUMPHANT CHURCH. See CHURCH.

TRIUMPHO de la Cruz, in *Geography*, a cape on the coast of Honduras. N. lat. 15° 56'. W. long. 88° 25'.

TRIUMVIR, one of three persons who govern absolutely, and with equal authority, in a state.

The word is little used but in the Roman History. Cæsar, Crassus, and Pompey, were the first triumvirs, *i. e.* the first who divided the government of the republic among them.

There were also other officers, called *triumvirs, triumviri*; as the *triumviri*, or *tresviri capitales*, created in the year of Rome 463, to take care of prisoners, and superintend the execution of criminals.

Triumviri monetales, who were magistrates created at the same time to superintend the coinage of the money: whence that mark still extant on many ancient coins, **IIIVIRI**. They seem to have been created about the time of the first coinage of silver in Rome, or 266 years B.C. Pomponius ascribes their first creation to the year of Rome 463, or 289 B.C. These officers were very considerable, and were chosen out of the senatorial rank, till Augustus appointed them from the equestrian, and the alteration seems to have continued. However this be, the title *triumviri* remained till after Caracalla, as appears from inscriptions given us by Gruter, and by Bouteroue. But under Aurelian it is probable there was but one master of the Roman mint, called the "Rationalis," which change is supposed to have taken place under Gallienus. The "Rationalis" was succeeded by the "Procurator monetæ." The *triumviri* made a part of the *centumviri*. The title they bear on medals, which is common on the coins of Augustus and Tiberius, is **IIIVIR. A.A.Æ.F.F, triumviri auro, argento, ære, flando, feriando,**
R r which

which signifies, that they had the direction of casting and striking of gold, silver, and brass. Julius made *quatuor viri*, who continued for 15 years, till the battle of Actium, when Augustus restored the *triumviri*.

There were also *triumviri adibus reficiendis*, officers appointed to look at the reparation of temples; *triumviri colonis deducendis*, for the conducting and settling of colonies; *triumviri*, for the raising of troops; *nocturnal triumviri*, to prevent or extinguish fires; *triumviri*, to review the forces, &c.

In the Acilian family we read of one M. Acilius IIIIVIR VALETU; that is, *triumvir of health*, or a magistrate of health. M. Spanheim takes him to have been a magistrate established to perform sacrifices to the gods of health, to dedicate their temples, &c.

Onuphrius and Vaillant read *triumvir valetudinis*; Patin, *triumvir valetudinarius*; but M. Spanheim, with much more reason, reads *triumvir valetudo*; in like manner, as on a medal of the Aquilian family, we read IIIIVIR VIRTUS; signifying that one M. Aquilius had been made *triumvir* to repair the temple of Virtue, and Acilius that of Health.

TRIUMVIRATE, TRIUMVIRATUS, an absolute government administered by three persons, with an equal authority.

There are two famous triumvirates at Rome; Pompey, Cæsar, and Crassus, established the first; and Augustus, Mark Antony, and Lepidus, the second.

This latter triumvirate gave the last blow to the liberty of the republic. Augustus having vanquished Lepidus and Antony, the triumvirate sunk into a monarchy.

TRIUNE, *Tres in Uno*, three in one; a term sometimes applied to God, to express the unity of the Godhead, in a trinity of persons.

TRIXIS, in *Botany*, from *τριζος*, *three-fold*, because the florets of the circumference have three deep distant segments. The name is borrowed by Swartz from Browne, who originally applied it to what is now *Perdicium radiale* of Linnæus and other writers.—Swartz Prodr. 115. Ind. Occ. 1374. t. 26. Schreb. Gen. 581. Willd. Sp. Pl. v. 3. 2337. Mart. Mill. Dict. v. 4. (Baillieria; Aubl. Guian. 804. Juss. 188. Lamarck Illustr. t. 712.)—Class and order, *Syngenesia Polygamia-necessaria*. Nat. Ord. *Compositæ oppositifolia*, Linn. *Corymbifera*, Juss.

Gen. Ch. *Common Calyx* imbricated, ovate, of eight or ten ovate-oblong, pointed, convex, nearly equal scales; the outermost slightly keeled, membranous at the tip. *Cor.* compound. Perfect florets, in the disk, numerous, funnel-shaped, with a very short tube, and upright five-cleft limb. Female ones, in the radius, fewer, shorter, funnel-shaped, with a compressed tube, and a three-cleft limb, whose hinder segment is larger than the two in front. *Stam.* in the florets of the disk, filaments five, the length of the tube; anthers united into a five-toothed cylinder, rising above the limb. *Pist.* in the florets of the disk, Germen linear, downy; style thread-shaped, the length of the stamens, divided at the top; stigmas reflexed: in the female florets, Germen oblong; style thread-shaped, divided at the top; stigmas reflexed. *Peric.* none, except the closed unaltered calyx. *Seed* of the florets of the disk, often abortive: of the female ones ovate, slightly compressed, bordered, convex behind, obtuse, hairy, and somewhat triangular, at the summit. Down none. *Recept.* chaffy, with oblong, acute, concave, membranous scales.

Eff. Ch. Receptacle scaly. Seed-down none. Seeds hairy in their upper part. Florets of the radius three-cleft. Calyx imbricated.

1. *T. terebinthinacea*. Balsamic Trixis. Swartz Ind.

Occ. 1375. Willd. n. 1.—Branches rough. Leaves ovate, finely serrated; rough with minute bristles above; with short dense hairs beneath.—Native of rocky vallies among the mountains of the west side of Jamaica, flowering in May. The stem is shrubby, six feet high, rough, with opposite, round, leafy branches, rough with very dense, short, rigid hairs, as are also the *footstalks*. Leaves opposite, crossing each other, from four to six inches, or more, in length, and three, or more, in breadth, bright green, finely and acutely serrated, veiny, somewhat triple-ribbed; rough like a file above; hairy or downy beneath; tapering at each end. *Stipulas* none. *Flowers* very numerous, small, white, fragrant, but acquiring a turpentine scent when bruised. They compose large, terminal, corymbose, dense panicles, with opposite downy stalks, and hairy awl-shaped bractes.

2. *T. aspera*. Harsh-leaved Trixis. Swartz Prodr. 115. Willd. n. 2. (*T. scabra*; Swartz Ind. Occ. 1378. Baillieria aspera; Aubl. Guian. 804. t. 317.)—Branches silky, with close-pressed hairs. Leaves ovate, serrated, taper-pointed; harsh above; rough with depressed hairs beneath.—Native of Guiana, Cayenne, and the West Indies. As tall as the last, but of a more slender habit. Branches smooth to the touch, being covered with close hairs, pointing upwards, not with rigid prominent bristles, as in the foregoing. Leaves not half so large, rough like a fine file, on the upper surface, when full-grown; pale beneath, with flattened, not prominent, bristly hairs. *Flowers* larger, but fewer, in looser panicles. We cannot, on an examination of specimens, doubt this being Aublet's plant, and therefore we retain the original specific name. His *B. sylvestris* appears to be, as Willdenow makes it, a mere variety, though his *aspera* only is used for intoxicating fish.

3. *T. erosa*. Jagged Trixis. Swartz Prodr. 115. Ind. Occ. 1377. Willd. n. 3.—Branches bristly. Leaves broadly-ovate, with deep irregular notches and serratures; roughish on both sides; pale beneath.—Native of various parts of the West Indies. This is the size of the first species, but its leaves are more deltoid, deeply jagged, and less hairy, though roughish with minute scattered bristles. *Flowers* white, much like the first, but fewer and rather larger, on hairy stalks. The *calyx-scales*, in every one of our specimens, are much broader and rounder than Swartz's figure represents. Aublet gives five teeth to all his florets.

TROADENSE MARMOR, in *Natural History*, a name given by the ancients to a species of white marble, dug in Mount Ida, and greatly used in building.

TROARN, or TROUARD, in *Geography*, a town of France, in the department of the Calvados, on the Dive; 6 miles E. of Caen.

TROAS, the Troade, in *Ancient Geography*, a country of Asia Minor, commencing at the promontory Lectum, and extending as far as the Propontide. It took its name from the famous city of Troy, its capital. It extended a little towards the south. If indeed under the appellation of Troade we comprise the whole extent of the country which was subject to the Trojans, that is, almost the whole kingdom of Priam, we must comprehend almost the whole extent of the two Mysiæ and Lesser Phrygia. But the Troade, properly speaking, comprised merely the country which lay between the Dardanis to the north-east, and the country of the Leleges, to the south-east, the Hellespont and the Ægean sea. Ptolemy includes the Troade in Lesser Phrygia. Its principal rivers were the Simois, the Scamander or Xantippus, and the Andrius. Its principal towns were Troja or Ilium Sigeum, Sminthime, &c.

TROAS-ALEXANDRIA. See ALEXANDRIA.

TROAT,

TROAT, among *Sportsmen*, the cry of a buck in rutting time.

TROCADIE, in *Geography*, a small island in the gulf of St. Lawrence, near the north coast of St. John's island.

TROCAR, or TROCHAR, an instrument commonly used in *Surgery*, for tapping the abdomen, in cafes of ascites and ovarian dropsy; in the tunica vaginalis, in cafes of hydrocele and the joints, in bad cafes of hydrops articuli, &c. Trocars are also employed for tapping the bladder, when there is no other mode of evacuating the urine, and the symptoms which the patient suffers are so urgent, that no time remains for the trial of milder plans of relief. Abscesses have likewise been opened in some instances with a trocar; though it must be allowed that, in these cafes, the lancet is generally a better instrument.

A trocar consists of two pieces, *viz.* a perforator or filette, and a silver cannula. The latter is so constructed and adapted to the first part of the instrument, that when the puncture is made, they both enter the wound together with perfect ease; after which, the filette being withdrawn, the cannula remains in the wound, and affords a convenient channel for the escape of the fluid outward.

Such are the uses of a trocar, and the principles upon which the instrument ought to be made. It has been proposed to make the perforator with a flat lancet-point, in order that it may enter the flesh with greater facility; but time and experience seem still to give the preference to the filette, which is of a triangular shape. It is true, that it cannot so readily make the necessary puncture; yet if sharp, and in good condition, no great fault can be found with it, in regard to the difficulty of making it enter the flesh; and it is certain, that its cannula is better calculated than the tube of a flat trocar to afford an outlet to fluids, which are at all thick and gelatinous.

The trocar is an instrument which should never be used for the discharge of fluids, except when the practitioner knows with certainty, not only that such fluids are present, but also that their quantity is considerable, so that no injury will be done to the parts beyond them by the sudden introduction of the instrument. In all other cafes, cautiously making a small puncture with a lancet, is the most prudent practice. Whenever a trocar is used, surgeons likewise avoid introducing the instrument to a dangerous depth. The instant the perforator has passed through such parts as intervene between the fluid and the surface of the body, it has performed all that it ought to do: the attentive operator feels a sudden cessation of resistance to the instrument, and he immediately holds back the filette, whilst he only pushes forward the cannula. See PARACENTESIS.

TROCHAIC, TROCHAICUS, in the *Latin Poetry*, a kind of verse consisting of trochees, or in which that foot predominates; as the iambus does in the iambic.

The 18th ode of the 2d book of Horace's Odes consists of strophes of two verses, the first of which is trochaic dimeter catalectic, *i. e.* trochaic, composed of three trochees, and a syllable at the end, or wanting a syllable in the first foot; which some call the *Euripidean* trochaic:

— *Nōn* | *ēbūr* | *nēque* | *āu* | *rēm*
Largiora | *flagito*.

Long verses of fifteen half feet, which are more particularly distinguished by the name of trochaic, are nothing more than tetrameter iambics, or of eight feet, the first of which wants a syllable; as there are others where it is wanting at the end. Thus,

— *Prō* | *pēccā* | *tō māg* | *nō, pāu* | *lūm fūp* | *plicū* | *fāñs* | *ēf*
pātrī. Ter.

TROCHANTER, *Major* and *Minor*, in *Anatomy*, two considerable processes of the thigh-bone. See EX-TREMITIES.

TROCHAR, in *Surgery*. See TROCAR.

TROCHE, TROCHISCUS, in *Pharmacy*, a form of medicine, made into a cake or tablet, to be held in the mouth to dissolve gradually.

The troche is properly a dry composition; the chief ingredients of which, after having been brought into a very fine powder, and mixed with sugar, are incorporated with some proper liquor, as distilled waters, wine, vinegar, or mucilages, and reduced into a mass, which is moulded into little cakes, or balls of any form, at pleasure, and dried in the air, far from the fire. As remedies they are of little importance; and the preparation of them properly belongs to the confectioners; and they should be altogether rejected from the Pharmacopeia, as the London and Dublin colleges have done.

There have been and still are troches of various kinds, and for various intentions; as *purgative*, *alterative*, *aperitive*, *corroborative*, &c. troches.

Latin authors call them *pastilli*, *rotule*, *placentule*, *orbes*, and *orbiculi*; and the English, frequently, *lozenges*.

The following troches are described in the Edinburgh Pharmacopeia; *viz.*

Troches of Carbonate of Lime, prepared by rubbing to powder four ounces of prepared carbonate of lime, an ounce of gum arabic, one drachm of nutmegs, and six ounces of refined sugar, and forming them by means of water into a mass fit for making troches. These are intended as antacids; but in the state of the stomach which requires them, the efficacy of the carbonate of lime is counteracted by the sugar.

Troches of Liquorice are formed by dissolving in hot water extract of liquorice and gum arabic, of each one part, and two parts of refined sugar, and then straining; and afterwards evaporating the solution into a proper state for troches. These troches are demulcent, and serve to allay the tickling irritation which occasions coughing; but the simple extract of liquorice, refined by straining and inspissation, found in the shops under the name of refined liquorice, will answer the same purpose.

Troches of Liquorice with Opium are obtained by well rubbing two drachms of opium, with half an ounce of the tincture of balsam of Tolu; adding gradually eight ounces of simple syrup, and five ounces of extract of liquorice, softened by hot water, and afterwards sprinkling in five ounces of powdered gum arabic; then drying the mass, and forming it into troches, each weighing ten grains. These troches are rendered more efficacious than the former for the same purpose, by the opium; six troches containing one grain of opium, and from six to ten may be taken in twenty-four hours.

Troches, Gum, are prepared by rubbing four parts of gum arabic, one part of starch, and twelve parts of refined sugar to powder, and forming it into a mass with rose-water fit for forming troches. These are simple demulcents, and serve to allay a tickling cough.

Troches of Nitrate of Potash are obtained by beating to powder one part of nitrate of potash, and three parts of refined sugar, and forming them into a mass fit for troches, by means of mucilage of gum tragacanth. Thus nitre may be agreeably taken in the dry state, and these troches may serve to cool the mouth in salivations, and to stop the progress of inflammatory fore-throat, when taken at its commencement. They may also be used as a general refrigerant in fevers, diluting largely during the use of them. The dose

dote is one or two taken every second or third hour. Thomson's Lond. Disp.

TROCHEE, TROCHÆUS, formed of τροχῶ, *I run*, because it moves quickly, in Greek and Latin *Poetry*, a kind of foot consisting of two syllables, the first long, the latter short: such as the words *vādē* and *mūsā*.

The trochee is the reverse of the iambus, and has just a contrary effect; the latter being light and sprightly, and the former weak and languid, as all those measures are which move from a long to a short syllable.

Some called the trochee, *choreus*, because it is proper for songs and dances. These give the denomination *trochæus* to the tribrachys. Quint. lib. x. cap. 4.

TROCHERA, in *Botany*. See EHRHARTA.

TROCHILUS, in *Architecture*, a hollow member, more usually called, by modern architects, the *scotia*; and, by our English workmen, the *caement*.

TROCHILUS, the *Humming-bird*, or *Honey-sucker*, in *Ornithology*, a genus of birds of the order Picæ; the characters of which are, that the bill is longer than the head, subulate-filiform, or cylindric, slender, with slightly-thickened tip; the upper mandible sheathing the lower; the tongue filiform, consisting of two conjoined slips forming a tube, and extensile; the legs slender and rather short, and feet formed for walking; the tail composed of ten feathers.

The humming-birds constitute a lively brilliant race, distinguished by their beautiful colours and diminutive size, peculiar natives of the American continent and adjacent islands, and, with few exceptions, confined to the hotter regions. The genus is extensive, and it has therefore been found convenient to divide them into two sections, *viz.* the curve-billed and the straight-billed.

* *Curve-billed.*

PARADISEUS. Red; head crested; blue wings, and two of the tail-feathers very long. This is the Paradise humming-bird of Latham. A native of New Spain.

PELLA. Red (purple-red, Shaw), with brown (black, Shaw) head; golden (topazine, Shaw) throat; green rump, and two very long middle tail-feathers. This is the Colibri topaze of Buffon, the long-tailed red humming-bird of Edwards, and the topaz humming-bird of Latham. It is the most brilliant of this section, and has a decided superiority to all the rest by its magnitude as well as colours. The female is far inferior to the male with respect to brilliancy of colour. This bird is a native of several parts of South America, but is principally found in Surinam and Guiana, frequenting the banks of rivers and brooks. During flight, they skim the surface of the water like swallows.

SUPERCILIOSUS. Gilded or shining brown; elongated middle tail-feathers (white at the tips, Shaw), grey beneath, with long bill and white eye-brows. Shaw. The supercilious humming-bird of Latham, distinguished from all others by the great length of its bill, and its strongly cuneated tail. The female differs by being of a pale rufous-grey beneath, by having a shorter bill, the lower mandible whitish, and the tail slightly cuneiform and tipped with white. Found in Cayenne.

POLYTMUS. Glossy-green, with black crown and tail; violet-brown wings, and two very long outer tail-feathers. This is the long-tailed black-cap humming-bird of Edwards, and black-capped humming-bird of Latham. An elegant species, of considerable size. A native of South America, and found also in Jamaica. The female is greenish above and white below; the sides of the neck varied with white and green, and the tail destitute of the two long plumes so conspicuous in that of the male.

FORFICATUS. Gold-green, with blue crown, and gold-blue forked tail, and two outer feathers very long. The long-tailed green humming-bird of Edwards, and fork-tailed humming-bird of Latham. An elegant but rare species; found in Jamaica.

LEUCURUS. Coppery-green, with brown quill-feathers; a reddish crescent in front of the neck, and white even tail. The white-tailed humming-bird of Edwards and Latham. Native of Surinam.

JUGULARIS. Gold-green, with a tinge of dusky-blue; with blood-red throat and breast, blackish abdomen, and even tail. Red-breasted humming-bird of Edwards and Latham. The garnet-throated humming-bird of Latham is of the same species. Found in Surinam.

THAUMANTIAS. Gold-green, with blackish quill-feathers, and tail-feathers edged with white; the exterior one entirely white on the outside. The admirable humming-bird of Latham, first described by Marcgrave. A native of Brasil and several other regions of South America.

DOMINICUS, or PECTORALIS. Green-gold, with velvet-black breast; white belly, and purplish steel-blue tail. The black-breasted and St. Domingo humming-bird of Latham. The female is said to be distinguished from the male by having the green on the fore-part of the neck divided by two white streaks, and the breast of a paler black than that of the male. A native of the West India islands.

MANGO. Copper-green, with black descending throat-stripe and abdomen; violet-brown wings, and ferruginous tail edged with black. The Mango humming-bird of Latham. The female is said to differ in having the two middle tail-feathers gold-green, like the back. A native of South America, particularly of Brasil, but found in St. Domingo, Jamaica, and other West India islands. Dr. Latham mentions a variety of this species, in which the throat, on each side of the black stripe, was white. Gmelin makes the "mellivora avis maxima" of Ray and Sloane a variety of this.

HOLOSERICEUS. Gilded-green, with brown wings; black tail and abdomen, and blue pectoral bar. The black-bellied humming-bird of Edwards and Latham. Native of Mexico and Guiana.

GALERITUS. Green-gold, with brown quill-feathers, and purple crest. Found in Chili.

EXILIS. Brownish-green, with a gloss of red; glossy-green crest with gilt tip, and black wings and tail. The little humming-bird of Latham, and humming-bird of a black colour of Bancroft. The smallest of the curve-billed section. Native of Guiana.

CYANEUS. Velvet-crimson, with blue back, and black wings. The crimson-headed blue humming-bird of Latham. A native of Mexico.

FURCATUS. Glossy violet-blue, with gold-green crown and throat, and black wings, abdomen, and forked tail. The lesser fork-tailed humming-bird of Latham. A native of several parts of South America, and of some of the larger West India islands.

MACROURUS, or FORCIPATUS. Gold-green, with violet head and neck; abdomen marked by a white spot, and forked tail. Cayenne fork-tailed humming-bird of Latham.

PURPURATUS. Green, with crown, wings, and bifurcated tail purple, and wreath blue. The purple-crowned humming-bird of Latham.

AURATUS. See JUGULARIS. Of this Gmelin gives a variety, *viz.* with cheeks, nape and throat golden-red; head and body black, with shining-green.

GRAMINEUS. See DOMINICUS or PECTORALIS.

TROCHILUS.

VIOLACEUS. Dark purple-violet, glossy on the foreparts, with green and gold wings and tail, the latter tinged with black. The violet humming-bird of Latham. Native of Cayenne.

MACULATUS. See **GUTTURALIS**.

PUNCTULATUS. Gold-green, with blackish wings; shoulders and back spotted with white, and brown tail with white tip. The spotted humming-bird of Latham. Native of Mexico, where it is called "Hoitzitzil."

ALBUS. See **GUTTURALIS**, of which it is a variety.

AURANTIUS. Brown, with orange head; yellow throat and breast, purple wings, and ferruginous tail. The orange-headed humming-bird of Latham. Native of South America.

FLAVIFRONS. Green, with yellow front, and black wings and tail. The yellow-fronted humming-bird of Latham, and yellow-fronted honey-sucker of Pennant.

VENUSTISSIMUS. See **CYANEUS**.

MARGARITACEUS. Bright-green, pearl-grey beneath, with the tail steel-blue at the base, purple-brown in the middle, and white at the tip. The grey-necked humming-bird of Latham. Conjectured by Dr. Shaw to be female?

HIRSUTUS. See **BRASILIENSIS**.

MULTICOLOR. See **HISTRIO**.

CINEREUS. Green-gold, ash-coloured beneath, with violet-brown wings, and rounded steel-blue tail with white tips. The ash-bellied humming-bird of Latham.

GULARIS. Gold-green; white beneath, with blackish wings and tail, and deep-blue throat and vent. Probably a native of South America.

FULVUS. Yellow, with the tail-feathers and covers thick; beneath brownish. A native of South America.

VARIUS. Green-gold; beneath whitish-brown, with a double pectoral band green-blue and blood-red. Found in South America.

CYANURUS. Green; cinereous beneath, with the throat, breast, and two very long middle tail-feathers blue. The blue-tailed humming-bird of Latham. Native of New Spain.

FURCIFER. Green-gold, with brown wings; white throat, and glossy blue-green breast and forked tail. Native of Paraguay.

MAXIMUS. Green-gold, with white throat, ferruginous vent, and blue crown, quill and tail-feathers. Ekelberg's humming-bird of Latham.

CAPENSIS. Green, with long middle tail-feathers, and blue wing-coverts. Ekelberg's humming-bird of Latham.

CHRYSOBRONCHOS. Gold-green, with very bright throat and breast; subferruginous wings, and white-edged tail. Native of Guiana.

SPARGANURUS. Gold-green, with emerald throat, and black forked tail, with a gold-crimson bar across the feathers. The bar-tailed humming-bird. A very beautiful species, said to be a native of Peru.

PORPHYRURUS. Brown, with velvet-black throat, and purple neck-stripes and tail. A variety of the mango, according to Latham. Native of South America and the West India islands.

GUTTURALIS. Green-gold, with emerald throat; whitish-rufous on each side; black breast, and black abdominal stripe. The *T. gularis* of Latham; and *maculatus* of Gmelin. The green-throated humming-bird of Latham.

NITIDUS. Violet-tailed humming-bird of Latham, and *T. albus* of Gmelin's Linnæus. Supposed by Shaw to be a variety of the preceding.

BRASILIENSIS. Gold-green; rufescent beneath, with violet-brown wings and tail; the latter tipped with white,

and white-feathered legs. The rufous-bellied humming-bird of Latham. The *T. hirsutus* of Gmelin's Linnæus. An elegant species. Native of Brazil.

FASCIATUS. Green-gold, with rufous undulations; blackish-rufous head; and a black band edged with white along each side of the body. Banded humming-bird. Native of Paraguay.

PUNCTATUS. Gold-green; beneath brownish undulated with white; with subviolaceous wings, and tail white at the base and tip. Scalloped humming-bird, strongly allied to the *Mango*, and it is not impossible, says Dr. Shaw, that it may be the young, in its first year's plumage.

AUREO-VIRIDIS. Gold-green, with blackish wings; and steel-blue tail with white tip. Native of the West India islands.

AURULENTUS. Dark gold-green, with brighter throat and shoulders; black breast, brown abdomen, and subviolaceous tail. A native of the island of Porto-Rico.

TRIMACULATUS. Gold-green; black beneath, with three white spots on each side; brown quill-feathers, and steel-blue tail. Native of South America. Dr. Shaw conjectures that this may be only a variety of *T. mango*, *holofericeus*, or *pectoralis*.

ELEGANS. Gold-green, with black breast; violet-black wings; and greenish-black forked tail. Native of St. Domingo.

HISTRIO. Brown, with gold-green crown, throat, breast, and shoulders; red belly, and blue cheeks. The harlequin humming-bird of Latham and Shaw, and the multicolor of Latham and others. A highly elegant species, and remarkable for its variety of colours. Native country uncertain.

CRISTATELLUS. Green, with shining gold-green crest; and black wings and tail. Gilt-crested humming-bird of Latham. A small and elegant species, much allied to the *T. exilis*.

* * *With straight Bills.*

PLATURUS. Gold-green, with brown belly, quill-feathers, and tail; the two middle tail-feathers naked with webbed tips. The racket-tailed humming-bird of Latham. This is a rare species, and a native of South America.

LATIPENNIS, or CAMPYLOPTERUS of Linn. Gmel. Gold-green; grey beneath, with brown wings and tail; and the shafts of the greater quill-feathers dilated and incurved. The broad-shafted humming-bird of Latham. One of the larger humming-birds, a native of Cayenne, and a very rare species.

AURITUS. Gold-green; white beneath, with slightly elongated violaceous ear-feathers, black wings, and lateral tail-feathers. The violet-eared humming-bird of Latham; an elegant species. Native of Cayenne. Gmelin mentions a variety with a purple band below the eyes, a large area near the ears, below which is a green-blue spot.

MELLIVORUS. Gold-green, with blue head, neck, and breast, and white nuchal bar, abdomen and tail. White-bellied humming-bird of Edwards and Latham. Native of South America, and not uncommon in Cayenne. The *T. fimbriatus*, or spotted-necked humming-bird of Latham and Gmel. Linn. is supposed to be a variety. There are also other varieties mentioned by Vieillot.

OURISSIA. Gold-green, with blue back, breast, and belly; brown quill-feathers, and golden-brown tail. The green and blue humming-bird of Edwards and Latham. Native of Surinam. N.B. The American word "*Ourillia*," signifying a sun-beam, is applied by some of the earlier writers to certain species of humming-birds, on account of the

the splendour of their colours. Gmelin mentions a variety, *viz.* T. green; beneath blue, with orange spot on the chin; quill-feathers and tail obscure.

SUPERBUS. Gold-green, with blue crown; double black-and-white cheek-stripe, and crimson throat and breast. Stripe-cheeked humming-bird of Shaw. This superb humming-bird is a most beautiful species, and one of the finest of this brilliant race. Native, probably, of South America.

SAPPHIRINUS. Bright sapphire-coloured, with slightly-gilded back; brown wings; black abdomen, and steel-blue tail. The sapphire humming-bird of Latham. Native of South America. Gmelin mentions a variety, *viz.* T. with sapphire breast, white belly, and tail blue-black.

SMARAGDO-SAPPHIRINUS. With bright sapphire-blue head and throat; gold-green body; brown wings, and steel-blue tail. The sapphire and emerald humming-bird of Latham. Native of South America and the West Indies. Shaw suggests that the two last mentioned humming-birds really constitute one species. He mentions a variety of the last from Viellot, *viz.* the blue-gorge humming-bird.

LUCIDUS. Bright gold-green, with deep-blue throat, breast, and tail; and a white spot behind each eye: supposed by Azara and Sonnini to be the same with the sapphire and emerald humming-bird. Native of Paraguay.

AMETHYSTINUS. Gold-green, varied beneath with grey and brown, with amethystine throat, and forked tail. The amethystine humming-bird of Latham. Native of Cayenne.

MOSCHITUS. Purple-brown; blackish beneath, with ruby-gold crown, topazine throat, and black-tipped tail. The ruby-necked humming-bird of Latham. To this species Dr. Shaw refers the T. elatus of Gmelin's Linnæus, or ruby-crested humming-bird of Edwards and Latham. This is one of the most beautiful of the straight-billed humming-birds. Native of South America, and particularly of Brasil, Guiana, and Surinam. The ruby-crested humming-bird is a variety.

PEGASUS. Gold-green; grey beneath, with brown wings, and blackish-purple tail with greenish hue. Grey-bellied humming-bird and gold-throated humming-bird of Latham. Dr. Shaw suggests that this may be a young female of T. moschitus.

HYPOPHLEUS. Gilded-brown; whitish beneath, with brown crown, and gold-green stripe down the middle of the throat. The brown-crowned humming-bird of Latham, conjectured by M. Viellot to be no other than an advancing young of T. moschitus.

CARBUNCULUS. Glossy-black, with dark-red crown and nape, fiery-red throat and breast, and gilded-rufous tail. The carbuncle humming-bird of Latham is suggested to be a variety of T. moschitus; rare in Cayenne.

CHRYSURUS. Gold-green, with cinnamon throat, brown quill-feathers, and topazine tail. Native of Paraguay.

COLUBRIS. Gold-green; about three inches in length; beneath white, with gold-red throat, and purple-brown wings and tail. The red-throated humming-bird of Edwards and Latham, red-throated honey-sucker of Pennant, guainumbi of Marcgrave. A beautiful species. A native of America, breeding in Carolina, Florida, and, as some say, in Canada; and also a native of Jamaica and some other West India islands. The female differs in having the whole under side white, without any redness on the throat, and all the tail-feathers, exclusive of the two middle ones, tipped with white. The general history of this beautiful bird is detailed by Mr. Pennant in his Arctic Zoology. Its flight is rapid, so that it is transient as lightning, and resembling this meteor in the

glare of its colours: it feeds only upon the wing, suspended over the flower from which it extracts nourishment. The most violent passions sometimes agitate the little bodies of these birds. Their contests in disputing possession of the same flower are very violent; tilting against one another with such fury, as if they intended to transfix their antagonists with their long bills. They are fearless of mankind, coming into apartments of houses, the windows of which are left open, but when approached, darting away with admirable velocity. Their nests, made in branches of trees amidst the thick foliage, are found with difficulty: they are of elegant structure, formed on the outside with moss, and within lined with down or gossamer collected from the great mullein, but sometimes constructed of flax, hemp, hair, and other soft materials. The female is said to be the builder, and the male supplies her with materials: both assist in the labour of incubation, which lasts twelve days: they lay only two eggs, which are white, and as small as pease. It is suggested that the patch-necked humming-bird of Latham's first supplement is no other than a young male of this species. The tomimeo of Gmelin is a variety.

RUBINEUS. Green-gold, with gold-red throat, purplish-brown wings, and rufous tail. The ruby-throated humming-bird of Latham. Native of South America, and particularly of Brasil, and is considered as one of the rarer kinds of humming-birds.

MELISUGUS. Gold-green, with glossy blue-green throat, violet-black wings, and feathered legs. The emerald-throated humming-bird of Shaw, the all-green humming-bird of Edwards, and the Cayenne humming-bird of Latham. This is one of Marcgrave's guainumbis.

COLLARIS. Rufous, paler beneath, with gold-green crown, and gold-red throat, with the feathers elongated on each side. The ruff-necked humming-bird of Latham. This species is numerous in Nootka Sound.

ORNATUS. Brownish, with rufous crest, emerald throat, and elongated rufous neck-feathers with gold-green tips. The tufted-necked humming-bird of Latham. Native of Guiana.

ALBIROSTRIS. Blackish, with gold-green throat; each feather edged with grey, and white bill, thighs, and vent. The white-billed humming-bird of Shaw. Native of Cayenne.

VIELLOTI. Blackish-olive, with golden glufs; beneath whitish, with violet-brown quill-feathers. Viellot's humming-bird, and black humming-bird of Latham. This small species is common in the island of St. Domingo, supposed by Viellot to be the T. niger of Linnæus.

LEUCOCROTAPHOS. Gold-green; beneath grey, with white belly; a whitish stripe behind the eyes, and blue-black quill and tail-feathers. The most common species in Paraguay.

MAUGEANUS. Gold-green; beneath glossed with violet-blue, with violaceous-black wings and tail, the latter slightly forked. Maugean humming-bird, or Tobago humming-bird of Latham. Native of the island of Porto-Rico, whence it was brought by M. Mauge.

RUBER. Sub-ferruginous; slightly spotted with brown, with the side-feathers of the tail violet-brown. The little brown humming-bird of Latham. Brought from Surinam.

CRISTATUS. Gold-green, cinereous beneath; with golden-blue pointed crest, and violet quill-feathers and tail. The crested green humming-bird of Edwards and Latham. The female differs in wanting the crest, and in being ash-coloured beneath. Native of South America, and some of the West India islands.

PILEATUS. Brown, with glossy-blue pointed crest. The T. puni-

T. puniceus of Linn. Gmel., and crested brown humming-bird of Latham.

MINIMUS. Gold-green; measuring about an inch and half in length; beneath whitish, with violet-brown wings and tail. Least humming-bird of Edwards and Shaw, &c. The smallest of the genus, and consequently of the whole feathered tribe: its general length being somewhat more than an inch and a quarter. Shaw's General Zoology, vol. viii.

STRIATUS. Brown; beneath white, with a longitudinal stria or streak green-gold; brown cap; black quill-feathers; base of the tail cinnamon-coloured, tip obscure. The brown-crowned humming-bird of Latham. Found in the island of Tobago.

OBSCURUS. Blue; crown obscure; chin and throat glossy-green; middle of the back greenish; rump, wings, and tail purple. The dusky-crowned humming-bird of Latham.

CYANOCEPHALUS. Green-gold, with head, tail-feathers, and crown blue; abdomen red. Found in Chili.

GLAUCOPIS. Green-gold, with blue front; white vent; violet-brown tail-feathers; pennated feet; tail steel-blue sub-furcated. The blue-fronted humming-bird of Latham. Found in Brasil.

CYANOMELAS. Variegated with white and blue; throat and breast red. Black and blue humming-bird of Bancroft and Latham. Found in Terra Firma and the Caribbee islands.

GUIANENSIS. Green, with crest and breast red; quill-feathers and tail-feathers green, variegated with red and purple. Guiana humming-bird of Latham.

FIMBRIATUS. See MELLIVORUS.

LONGICAUDUS. See PLATURUS.

CAMPYLOPTERUS. See LATIPENNIS.

NIGER. See VIELLOTI.

LEUCOGASTER. See PEGASUS.

BICOLOR. See SMARAGDO-SAPPHIRINUS.

VIRIDISSIMUS. See MELLISUGUS.

RUFUS. See COLLARIS.

PUNICEUS. See PILEATUS.

TOBACI. See MAUGEANUS.

ELATUS. See MOSCHITUS.

TROCHILUS is also a name used by Aristotle, Pliny, and others of the ancient naturalists, for the *regulus cristatus*, or, as we call it, the golden-crowned wren.

TROCHILUS is also the name of a remarkable water-bird, being very long-legged, yet web-footed.

It is a very swift runner on the ground, and is thence called by the Spaniards *corriza*. Its beak is straight and black at the end, and the opening of its mouth very wide; it has black eyes surrounded by a white naked membrane, and that by a brown one. On its under part it is white; its back, shoulders, and wings, are of a ferruginous colour; its running is so very swift as to equal the flight of most birds. Aldrovand. de Avib. lib. xix. c. 35.

TROCHING, the small branches on the top of a deer's head.

TROCHITÆ, or **TROCHITES**, in *Natural History*, a kind of figured fossil stones, resembling parts of plants; vulgarly called *St. Cuthbert's beads*.

They are usually of an opaque, brownish colour; they break like spar, glossy and shining, and are easily dissolved in vinegar. Their figure is generally cylindrical, sometimes a little tapering, the circumference smooth, and both the flat sides covered with fine radii drawn from a certain hole in the middle to the circumference.

Two or three, or more, of the simple trochitæ, joined together, constitute what the naturalists call an *entrocobus*.

In these the trochitæ, or single joints, are so set together, that the rays of the one enter into furrows in the other, as in the sutures of the skull. They are found in great plenty in the bodies of the rocks at Braughton and Stock, two villages in Craven, at all depths under ground; also in Mendip-hills, &c. sometimes only sprinkled here and there, and sometimes in large strata, or beds, of all magnitudes, from the size of the smallest pin, to two inches about.

They are often found ramous or branchy, several rudiments of large branches arising from the stem, or cylinder, and sometimes still smaller from these. The branches being deeply inserted into the stem, the tearing them off leaves great holes in them. See *ENTROCHUS Ramosus*.

Dr. Lister has discovered a sort of little fragment among them, which he takes to have been the apices of them; and another sort, which he imagines to have been the roots: for he supposes them to be a sort of rock-plants.

M. Beaumont, in the Philosophical Transactions, assures us, that he has found, that all the cliffs in some mines are made up of these entrochi, some of which have been converted into a reddish matter; while others, becoming white spar, compose bodies of that substance: and considering that all the cliffs, for a very large circumference in some places, consist almost wholly of these stones, it has been thought by some, who suppose them plants, that there have been, and still are, whole fields or forests of these under ground, as there are of coral in the Red sea. In the courses between the cliffs are found of these fossils, at all stages and degrees of maturity, growing up in the gritty clay, and rooted in the rake-mold stones, many of them of the form and dimensions of a tobacco-pipe, with the evident beginnings of circles and sutures; and others full-grown, formed of perfect spar, and at their point of maturity.

The central matter, in many, continues still white and soft, as the whole substance is, by some, thought to have been at first; and is continually refreshed by the mineral streams and moisture, which have free access to it through five hollow flits, or feet, in the figured roots, or through the mass of clay usually lying under the plain roots.

From the curiosity of their make, and from this accidental resemblance of plants, many have thought them to be such; and affirm, that they may vie with most of the vegetable kingdom, and are shaped and formed like them; having stem, branches, roots, an inward pith, as likewise joints and runnings in their grit, and sometimes cells to supply the place of veins and fibres.

Others have thought it highly probable, these rock-plants are lapides sui generis, and not parts of animals or plants petrified, as many authors have imagined. If the figured roots, on which they sometimes grow, give any suspicion they might have belonged to an animal, particularly a species of the *stella arborefcens*, the trunks seem to them to evince the contrary: nor are they reducible to any known species of vegetables. M. Beaumont tells us, that he had by him above twenty different species of *trochites*, all of them wonderfully regular, and not to be paralleled by any vegetable he knows of in nature; and it is inconceivable how so many species, diffused through many parts of the earth, should come to be lost. They are certainly, indeed, not vegetable remains, but are truly parts of the *stella arborefcens* petrified. See farther, Keppellus *Essai de Entroch.* and the articles *ENTROCHUS*, *STAR-stb*, and *STAR-stone*.

TROCHITIFER GLANS. See *GLANS Trochitifera*.

TROCH-

TROCHLEA, τροχλία, one of the mechanical powers, usually called a *pulley*; which see.

TROCHLEA, in *Anatomy*, a name given to some articular emanations of bones, which resemble in form the groove of a pulley: viz. that of the humerus, adapted to the ulna.

TROCHLEARIS, a muscle of the eye. See EYE.

TROCHMI, in *Ancient Geography*, the name of one of the three Gaulish nations, which, according to Strabo, established themselves in that part of Galatia which respects the Euxine sea, and that which touches on Cappadocia.

TROCHOCARPA, in *Botany*, from τροχος, a wheel, and καρπος, fruit, serving to express the orbicular depressed form of the nut, like a little toothed wheel.—Brown Prodr. Nov. Holl. v. 1. 548.—Class and order, *Pentandria Monogynia*. Nat. Ord. *Epacrideæ*, Brown.

Gen. Ch. Cal. Perianth inferior, of five equal, erect, ovate leaves, with two smaller ones, of the same shape, at the base, permanent. Cor. of one petal, funnel-shaped; tube cylindrical, pervious, longer than the calyx; limb in five deep, ovate, spreading segments, bearded on the upper side. Nectary cup-shaped, five-lobed, surrounding the base of the germen. Stam. Filaments five, thread-shaped, the length of the tube, inserted into its lower part; anthers oblong, incumbent, included within the tube. Pist. Germen superior, ovate; style very short; stigma simple. Peric. Drupa globose, depressed, juicy. Seed. Nut orbicular, with ten lobes, finally separating into as many distinct cells, with a kernel in each.

Eff. Ch. Outer calyx of two scales. Corolla funnel-shaped, with a pervious naked tube, and a five-cleft, spreading, bearded limb. Stamens within the tube. Drupa pulpy. Nut wheel-shaped, ten-lobed, ten-celled.

1. *T. laurina*. Laurel-leaved Trochocarpa. Br. n. 1. (*Cyathodes laurina*; Rudge Tr. of Linn. Soc. v. 8. 293. t. 9.)—Found near Port Jackson, New South Wales. A small tree, smooth in every part, with very hard wood. Leaves scattered, on short stalks, elliptic-lanceolate, acute, entire, many-ribbed, with somewhat of the aspect of a *Rufcus*, each near two inches long. Spikes rather lax, terminal and axillary, shorter than the leaves. Flowers white, small. Fruit less than a pea.

TROCHOID, Τροχοίς, or *Trochoides*, formed from τροχος, wheel, and εἶδος, form, in *Geometry*, a curve, whose genesis may be thus conceived: if a wheel or circle be moved with a two-fold motion at the same time, the one in the right line, and the other circularly about its centre, and these two motions be equal, i. e. describe two equal lines in the same time: and if in the radius, which at the beginning of the motion reaches from the centre of the wheel, or the first point of the line which describes the circumference: if, I say, in this radius, a point be taken any where, except in the centre, this point will describe a curve, one part of which will be below the line described by the centre, and the other above it. This line, thus described by the point taken in the radius, is called the trochoid.

The right line which joins the two extremities of the trochoid, and which is either the path the wheel makes, or a line parallel to that path, is called the *basis of the trochoid*.

The axis of the trochoid is the diameter of the wheel, perpendicular to the base in the middle of the motion; or that part of the radius between the trochoid and its base. The point, in which the axis is cut into two parts by the line described by the centre of the wheel, is called the *centre of the trochoid*; the uppermost point of the axis the

vertex of the trochoid; and the plane comprehended between the trochoid and its base, the *trochoidal space*.

The trochoid is the same with what we otherwise call the *cycloid*; for the properties, &c. of which, see CYCLOID.

TROCHOIDES LACUS, or *Trochoide Lake*, in *Ancient Geography*, a lake in the isle of Delos. It was on the borders of this lake, that, according to the mythologists, Latona was brought to bed of Apollo and Diana; and here the first of these deities had a temple.

TROCHTELFINGEN, in *Geography*, a town of Wurtemberg, lately imperial; 16 miles N.W. of Buchau N. lat. 48° 16'. E. long. 9° 18'.—Also, a town of Germany, in the county of Oettingen, on the Eger; 4 miles S.W. of Nordlingen.

TROCHUS, in *Antiquity*, denotes the exercise or game of the hoop. The hoop was of iron, five or six feet in diameter, set on the inside with a number of iron rings. The boys and young men used to whirl this along, as our children do their hoops, directing it with a rod of iron, having a wooden handle: which rod the Grecians called *ραβδος*, and the Romans *radius*. The clattering of the ring served partly to the diversion, and partly as a notice for persons to keep out of the way. Horace de Art. Poet. ranks this exercise among other manly sports:

“Ludere qui nescit, campestribus abstinet armis,
Indoctusve, pilæ, discive, trochive quiescit.”

TROCHUS, in *Natural History*, the name given by authors to a genus of shells; some of the species of which resemble the figure of the trochus, or top, which boys play with. As there are many species of this shell, however, which are flattened and have nothing of this form, the whole series of them are much better named, by a denomination taken from the shape of the mouth, which is of an oval figure, and is alike in all these species, and different from all other shells. They are therefore aptly characterised by a late French writer under the name of *cochlea ore depresso*.

The trochi, or tops, form the fifteenth family of shells in Da Costa's arrangement; and he defines them to be shells of a conic or pyramidal shape, the top being broad and flattish, and gradually tapering thence to a very sharp point; the aperture or mouth is most generally angular, low, and narrow. This is a numerous family, and abounds with curious and fine shells. See *Trochus*, under CONCHOLOGY.

There is a fossile species of trochus, not yet discovered recent. It is a large kind, flattish, and like a cochlea helix, generally about two inches in diameter, much wrinkled, with sharp prominent edges like plates, which are spiked at regular distances, running across the spires; and the whole shell is likewise striated. This trochus is found in the limestone of Coalbrook-dale in Shropshire, and Dudley in Staffordshire.

TROCKENBERG, in *Geography*, a town of the duchy of Stiria; 4 miles N.N.W. of Rein.

TROCTOU, a small island in the East Indian sea, near the coast of Quêda. N. lat. 6° 30'. E. long. 99° 33'.

TROCTUS, in *Ichthyology*, a name given by Aristotle, Ælian, Athenæus, and others of the Greek writers, to the fish called *amia* by Pliny, and most other of the later, as well as ancient Latin writers; but by some, *lechia* and *glaucus*. It is properly a species of the *stomber*; which see.

TROCZENIECZ, in *Geography*, a town of Poland, in the palatinate of Braclaw; 20 miles S. of Braclaw.

TRODEN, a town of Germany, in the principality of Querfurt; 8 miles S.E. of Juterbock.

TRODENA,

TRODENA, a town of the county of Tyrol; 16 miles S.S.E. of Bolzano.

TRÆZEN, or TREZEN, *Damala*, in *Ancient Geography*, a town situated towards the S.E. extremity of the peninsula of the Argolide, at a small distance from the sea, and at the junction of the two rivers, the Chrysoorhoes and the Hylycus. This town took its name from a hero, the son of Pelops, and the brother of Pitheus. The last reigned there, and was admired for his virtues and the mildness of his government. The veneration which his conduct had excited, remained to the time of Pausanias.

Træzen abounded with a variety of monuments; among which we may reckon the tomb of Pitheus in a temple constructed in honour of Diana Conservatrix by Theseus, after his return from Crete, as an acknowledgment of his having escaped the fury of the Minotaur; a portico ornamented with the statues of women and children; a chapel consecrated to the Muses, and a great number of temples. The inhabitants of Halicarnassus, in Caria, regarded Træzen as their capital. A great part of the territory of Træzen was an isthmus extending into the sea, and as far as Hermione to the W. The port lay N. of the town, and was called "Pogonis portus."

TREZEN, a town of the Peloponnese, in the interior of Messenia. Ptolemy.

TREZENE, a town of Asia Minor, in Caria. Strabo.

TROGEN, in *Geography*, a town of Switzerland, and chief place of the Protestant part of the canton of Appenzell, celebrated for its manufacture of cloth. Near it is a mineral spring, containing copper, sulphur, and alum, used externally for several complaints; 7 miles S.E. of St. Gall. N. lat. 47° 14'. E. long. 9° 33'.

TROGILIUM, in *Ancient Geography*, a promontory of Asia Minor, in Ionia, W.S.W. of mount Mycale, and S.S.E. of the promontory Posidium.

TROGILUS, a country of Macedonia. Steph. Byz.

TROGLODYTES, TROGLODYTÆ, formed of *τρογλη*, *caverna*, and *δυνα*, *I enter*, a people of Ethiopia, said to have lived in caves under ground.

Pomp. Mela gives a strange account of the Troglodytes. —He says, they did not so properly speak as shriek; and that they lived on serpents, &c. Tzetzes calls them *Ichthyophagi*. Montanus takes them to be the same with those called in Scripture *Ghananim*. Ptolemy in Strabo will have the name written without the *l*, *Trogoditæ*.

These Troglodytes, so called by the Greeks from their primeval habitations in natural caverns, or in mountains excavated by their own labour, were probably, as sir William Jones conjectures (*Works*, vol. iii. p. 166, 8vo.) the first inhabitants of Africa, where they became in time the builders of magnificent cities, the founders of seminaries for the advancement of science and philosophy, and the inventors (if they were not rather the importers) of symbolical characters. Upon the whole he concludes, that the Ethiops of Meroë were the same people with the first Egyptians, and hence likewise, as might be easily shewn, with the original Hindoos. We have already, aided by the conjectures and historical details of the learned Bryant, and of the indefatigable traveller Bruce, traced the probable origin of these people under the article *CUSH*. Having accompanied the Cushites or Cuthites in their migrations to Abyssinia, and suggested the reason of their forming excavations in the mountains and rocks for their habitations, we shall now attend them in their peregrinations towards the south. Besides other arts, with which they seem to have been

acquainted, they employed themselves in astronomical observations; and accordingly wished to disengage themselves from the tropical rains and cloudy skies, that hindered their correspondent observations with their countrymen, descended from the same ancestors, who had established themselves at Meroë and Thebes. But upon advancing within the southern tropic, they still found rains; and, therefore, constructed houses, such as the fears of a deluge had induced them to prepare. They found solid and high mountains in a fine climate; but, more fortunate than their countrymen to the northward, they found gold and silver in large quantities, which determined their occupation, and constituted the riches and consequence of their country. In these mountains, called the "mountains of Sofala," large quantities of both metals were discovered in their pure and unmixed state, lying in globules without alloy, or any necessity of preparation or separation. The balance of trade, so long against the Arabian and African continents, turned now in their favour, from the immense influx of these precious metals, found in the mountains of Sofala, just on the verge of the southern tropical rains. The northern colonies advanced gradually from Meroë to Thebes, intent upon the improvement of architecture and building of towns, which they began to substitute for the caves which they and their ancestors, the Cushites, originally occupied; and they thus became traders, farmers, artificers in various branches, and even practical astronomers, from having a meridian night and day free from clouds, for such was that of the Thebaid. As their brethren, who still inhabited the mountains, did not enjoy similar advantages, being confined by six months' continued rain to their caves, we may naturally imagine that their sedentary life would render them useful in reducing to practical purposes the observations daily made by those of their countrymen who lived under a purer sky. Letters too, or at least one sort of them, and arithmetical characters, as we are informed, were invented by this middle portion of the Cushites; while trade and astronomy, the natural history of the winds and seasons, were employing that part of the colony which was established at Sofala, more to the southward. The very nature of the commerce of the Cushites, the collecting of gold, the gathering and preparing of spices, necessarily fixed them perpetually at home: but his profit depended on the dispersion of these spices through the continent, otherwise his mines, and the trade produced by the possession of them, would be of little avail. A carrier was necessary for the dispersion of their disposable commodities; and such they found in their own vicinity. These carriers were denominated Berbers or Shepherds, as well as distinguished by other appellations of similar import. These shepherds of the Thebaid and Ethiopia were wholly employed in the dispersion of the Arabian and African goods all over the continent; and they rose to be a great people. As that trade increased, their cattle multiplied, and consequently they increased in number, and the extent of their territory was enlarged. Nothing was more opposite than the manners and life of the Cushite, and his carrier the shepherd. The first, although he had forsaken his caves, and now lived in cities which he had built, was necessarily confined at home by his commerce, amassing gold, arranging the invoices of his spices, hunting in the season to provide himself with ivory and with food through the winter. The mountains, and the cities he afterwards built, were situated upon a loamy, black earth, so that as soon as the tropical rains began to fall, he was deprived of his cattle, by swarms of flies (see *ZIMB*) which appeared wherever that loamy earth was; which made him

absolutely dependent upon the shepherd, who was himself also affected by this circumstance. The shepherd, as a carrier, was enabled to perform his long and toilsome journeys across Africa by means of the camel, emphatically called by the Arabs "the ship of the desert." When Carthage was built, the carriage of this commercial city fell into the hands of the Lehabim, or Lubim, the Libyan peasants, and became a great accession to the trade, power, and number of the shepherds. For a further account of these shepherds, see *SHEPHERDS of Egypt*.

As the Abyssinians of the Arabian stock had no symbols of their own to represent articulate sounds, they borrowed those of the Troglodytes above mentioned; and to them we may with probability trace the origin of the Abyssinian written language, or the Ethiopic, which is a dialect of old Chaldaean, and a sister of Arabic and Hebrew; and many improvements in science and the arts, as well as in commerce, at an early period, were introduced into Africa, and through Abyssinia and Ethiopia into Egypt, by these people. It has indeed been suggested that the *Gyffies* (see the article) were Troglodytes from the rocks near Thebes, where a race of banditti still resemble them in their habits and features; but it seems more probable that the Gypties, whom the Italians call Zingaros and Zinganos, were no other than Zingarians, who might, in some piratical expedition, have landed on the coast of Arabia or Africa, where they might have rambled to Egypt, and at length have migrated, or been driven into Europe.

TROGLODYTES is also an appellation given to a sect of Jewish idolaters.

The prophet Ezekiel relates, chap. viii. ver. 8, 9, 10, &c. that God, among other abominations of the Israelites, which he set before him, shewed him seventy old men, who, with their censers in their hands, adored secretly all kinds of animals and reptiles painted on the wall.

Phaëdrus, on this vision of the prophet, erects these idolaters into a sect of Israelites, who, hiding themselves under ground, and in caves, adored all kinds of idols.

And yet the prophet plainly shews, that it was in secret parts of their houses, and not in subterraneous caverns, that these seventy Israelites idolatized. The name Troglodytes, then, is feigned; and so, probably, is the sect.

TROGLODYTES, in *Ornithology*. See WREN.

TROGODOS, TROBODOS, or *Trobos*, in *Geography*, a name given by the Greeks of the present day to mount Olympus, which divides the island of Cyprus longitudinally. In order to distinguish it from another mountain of the same name in Natolia, and from another more famous in Macedonia, the ancients gave this the name of "Little Olympus." On its summit they had built a temple dedicated to Venus, the entrance of which, by a regulation very strange for a spot consecrated to the goddess of Love, was prohibited to women: they were even forbidden to look at it. To this temple, an elegant and sacred recess, where were celebrated the enjoyments of nature, had succeeded retreats erected for privations. Numbers of convents were built on the same ground. There, laborious Cœnobites embellished the slope of the mountain with gardens, and plantations of all sorts, laid out with taste. This was the most charming abode in the island; and the rich Cypriots went thither, during the summer, to enjoy the coolness of agreeable groves, watered by limpid streams, directed with considerable art. Insensible to a happy harmony of nature and industry, the Turk has carried his ferocity and ravages into this beautiful district: the monasteries have been demolished,

and cool and cheerful spots have been clothed with the rugged garb of sterility. Sonnini.

TROGON, CURUCUI, in *Ornithology*, a genus of the Picæ; the characters of which are, that the bill is shorter than the head, cultrated, hooked, and serrated at the margin of the mandibles; the nostrils are covered with bristles; and the feet, short, simple, covered with down, are formed for climbing, having two toes forward, and two backward.

The birds of this genus are mostly inhabitants of South America: they feed on fruits, and all agree in their general habits of life. In Guiana they are denominated *Couroucouis* or *Curucui*, from their notes being very much like that word.

Species.

STRIGILATUS. Cinereous, with a fulvous abdomen; wings striated with white; tail-feathers black, the three lateral ones outwardly banded and tipped with white. The cinereous curucui of Latham. Inhabits Cayenne and Guiana.

CURUCUI. Golden-green; of a fulvous red beneath; throat black; wing-coverts and the three exterior tail-feathers white, striped with black. Red-bellied curucui of Latham. Of this species there are several varieties, viz. one mentioned by Maregrave, which had the wing-coverts plain brown, the bill ash-coloured, irides saffron-coloured, and without the bare spot under the eye mentioned by Brisson in his description:—another, with a yellow abdomen; the green yellow-bellied cuckoo of Edwards:—another, described and figured by Buffon, of a cinereous-grey, with very slight traces of green-gold, especially on the back and middle tail-feathers; the lower part of the belly and the vent only being red; the tail very long, having the outer webs of the three lateral feathers and the tips plain white; the three outer quills are also marked with black and white on the exterior webs. This species is a very solitary bird, being found only in the thickest forests; and in pairing time never more than two are found together, when the male has a very melancholy note, never uttered except whilst the female is sitting. They pair in April, and lay three or four white eggs. The male, during the incubation of the female, supplies her with food, and by his song helps to pass away the time. The young, when first hatched, are altogether without feathers, and are fed by the old birds with small worms, caterpillars, and insects; but are deserted by them, when they are able to shift for themselves; and the parent-birds return to their solitary haunts, till August or September, when they are prompted to produce another brood. At St. Domingo and in other islands these birds are called "Demoiselle," or "Dame Angloise," where attempts have been made to tame them, but ineffectually, as they refuse to eat, and consequently die. They are also found in Cayenne, Peru, Brasil, and Mexico.

VIRIDIS. Golden-green; beneath yellow; throat black; with the three lateral feathers on both sides obliquely dentated with white. The yellow-bellied curucui of Latham. Of this species there is a variety, viz. the less, with white abdomen: the white-bellied curucui of Latham. This species inhabits Cayenne.

RUFUS. Rufous, with the body beneath yellow; wings striated with black and grey; the three lateral tail-feathers striated with black and white, with white tips. The rufous curucui of Latham. Found in Cayenne.

VIOLACEUS. Violet-coloured, with a green back; wing-coverts and secondary quills spotted with white; the three lateral tail-feathers barred with black and white, with white tips.

tips. The violet-headed curucui of Latham. Found in Cayenne.

MACULATUS. Striped with dusky and brown; crown green; wing-coverts and secondary quill-feathers green, white at the tips; tail dusky, with white bars. Spotted curucui of Latham; inhabiting Ceylon.

FASCIATUS. With a ferruginous back; body beneath fulvous red; head and neck dusky, with a white fascia on the breast; wings fasciated with black and white; apex of the tail black. Fasciated curucui of Latham; inhabiting Ceylon, but rare, and called by the inhabitants "Rautvan-kondea."

ASIATICUS. Green, with the forehead, crown, and hind part of the neck red; throat blue, with a red spot; quills and tail-feathers black. Blue-cheeked curucui of Latham; inhabiting India.

INDICUS. Dusky, with ferruginous spots above; beneath yellowish, striped with dusky; head black, with white stripes; tail very long, and barred. Indian curucui of Latham; called in India by the natives "Bungummi."

NARINA. Above green, with a red belly. *Male*, with the head, neck, back, throat, jugulum, breast, and wing-coverts green, which last are greyish behind; quills black, bordered externally with white. *Female*, with the throat, jugulum, and wing-coverts brown; abdomen in front cineraceous. Le Vaillant says, that this bird is an inhabitant of Caffraria, and the country of Auteniqua to the river Gamtoo, and that the name Narina, in the Hottentot language, signifies a flower. The female lays four nearly round eggs, and during her incubation the male has a melancholy note, but at all other times he is silent.

TROGUS POMPEIUS, in *Biography*, a Latin historian, flourished in the time of Augustus, and wrote 44 books, under the title of "Philippics," so called from their subject, which was the Macedonian empire, originating with Philip, the father of Alexander. An epitome of this work by Justin is extant. Justin denominates Trogus a man of antique eloquence, and Pliny, who often refers to him in his Natural History, distinguishes him by the appellation of "feverissimus auctor," as a most exact author.

TROIA, or **TROJAN Games**, *Ludi Trojani*, were games instituted by Aescanias, son of Æneas; and which afterwards passed to the Romans, and were celebrated in the Circus by the youth of Rome.

One of the number, who presided over the solemnity, was called *princeps juventutis*; and was always of one of the first families in Rome.

At first, it is supposed, they only engaged on foot, and on horseback; because Virgil, who describes these games in the *Æneid*, lib. v. only speaks of horses and cavaliers, without any mention of bigæ or quadrigæ, which were not in use in Rome till long after Aescanias. And yet Dion, speaking of Cæsar's games, says, the youth there combated in chariots: but it is thought by some, that these were not the Trojan games, but races and combats of a different kind, proper for young people, of a more advanced age.

The Trojan games were renewed by Augustus, after the victory at Actium, A.U. 726; began to decline under Tiberius, and terminated under Claudius.

TROIA, in *Ancient Geography*, a town of Chaonia, in Cestria. Steph. Byz.—Also, a town or rather village of Egypt, in the vicinity of mount Troicus. This was the ancient habitation of the Trojans, who followed Menelaus to his captivity. Strabo.—Also, a town of Italy, at the bottom of the Adriatic gulf, in the country of the Veneti. Steph. Byz.—Also, a town of Asia, in Cilicia.—Also, a

place of Italy, in the territory of the town of Larentum. According to Livy, it gave name to the place where Æneas landed, on his arrival in Italy; situated, according to Dion. Halic., four stadia from the sea.

TROJA, or *Troy*, a celebrated city of Asia Minor, and capital of the small country called *Troas*, or *Troade* (which see), and Phrygia Minor, situated to the north-west: See *PHRYGIA Minor*.

TROJA, in *Geography*, a city of Naples, in Capitanata, on the river Chilare, the see of a bishop, containing six churches and six convents. It was built on an eminence, out of the ruins of Æcas, a city destroyed by Constantine II. It is said to have been founded by Bagianus, catapan or viceroy of the province in the eleventh century, by order of the emperors Basil and Constantine, as a bulwark against the inroads of the Norman adventurers, and to have had its name in commemoration of the famous city, which, by its fall, immortalized the heroes of Greece. It was long accounted a key to the Apennines, and as such was exposed to many assaults and sieges; 33 miles S.W. of Manfredonia. N. lat. 41° 24'. E. long. 15° 18'.

TROJA, a small island in the Mediterranean, near the coast of Italy. N. lat. 42° 43'. E. long. 11° 5'.

TROJAN, a town of Servia; 16 miles S. of Sabacz.

TROIL, among *Tinners*, denotes a feast, or occasion of merriment, by eating and drinking; called also a *duggle*.

TROILINSKAÏA, in *Geography*, a town of Russia, in the country of the Cossacks, on the Don; 80 miles E. of Azoph.

TROIS-CINQUE, in the *French Distillery*, a term used to express their brandy, when of a peculiar strength, consisting of five parts alcohol and three parts phlegm.

The method of distilling the wines into brandy in France, is exactly the same with that used with us to draw the spirit from our wash or fermented liquor of malt, treacle, sugar, or whatever other kind. They only observe more particularly to throw a little of the natural lee into the still along with the wine; and the poorest wines are sure to succeed best on the trial, making by much the finest brandies. We are apt to wonder that we cannot, from the wines of particular countries, distil their particular brandies; but the whole mystery consists in this, that they do not send us over the same wines which they use in distilling, because these latter would not be liked as wines, nor would keep in the bringing over. Sometimes in Scotland they meet with the poor and pricked wines, the same that the French distil their brandies from; and from these they distil a spirit, not to be known from the brandy distilled in France.

The lee which the French add in the distillation gives the brandy that high flavour for which we so much esteem it: but they themselves like it so much the worse for it. The French notion of a proof strength, determined by the chaplet or crown of bubbles, is the same with ours; and all their fine spirits are found of this strength.

But they have one particular expedient for those brandies which prove foul and seedy, or retain the taste of certain weeds which grow among the wines; they draw them over again, with a design to free them from that adventitious flavour. In this operation they always leave out the faints, or rather they change the receiver as soon as ever the stream comes proof; then mixing together all that ran off before, they make a brandy stronger than the ordinary kind, and this is what they call *trois-cinque*.

The distillers in France scarcely ever bring their brandies higher than this; for they have the art to persuade the foreign merchant, that the phlegm of French brandy is

natural and essential to it: but the truth is, that the spirit alone contains the flavour and excellence of the brandy, and it might as well be reduced to half its bulk for exportation, and sent over in the state of alcohol, and then lowered with common water to the proof strength.

The French use no art in colouring their *trois-cinque*, any more than their common proof-brandy, nor do they add any thing to give them an additional flavour; the thing which they principally value themselves upon, both in regard to brandies and wines, being to make them perfectly natural: so that all the colour we find in their brandies, is acquired from the cask, and the time they are left in it. This is often twelve or eighteen months, sometimes two or three years; in this time they acquire a brown colour, and lose their acrid taste.

The greatest adulteration of brandies is in England: the French have no temptation to do it, they having no cheaper spirit, since the prohibition of molasses in their country. The Dutch are in the same condition, having no molasses-spirit, and only a very coarse and nauseous sugar-spirit, and a yet worse malt-spirit of their own manufacture; a single gallon of which would spoil a whole piece of brandy. The French brandy also paying no duty in Holland, is as cheap, or nearly so there as in France itself. The duties being high upon brandy in England, it is greatly adulterated, and that with all sorts of spirits; as malt, molasses, cyder, and sugar spirits; and when this is done in a dexterous and sparing manner, the cheat is not easily detected. Shaw's Essay on Distillery.

TROIS MARIES, Les, in *Geography*, a town of France, in the department of the Mouths of the Rhône, by the inhabitants of the country held a sacred place, as having been, according to tradition, the residence of the three Marias, and Lazarus after our Saviour's crucifixion; 15 miles S. of Arles.

TROIS RIVIÈRES, Les, a town of the island of Martinico.

TROIS RIVIÈRES, a town of Canada, on the river St. Lawrence, lying nearly midway between Quebec and Montreal, and so called from three rivers, into which the river St. Maurice is divided by two islands, whose streams unite about a quarter of a mile below the town, and afterwards fall into the great river of St. Lawrence. It was formerly the capital of the French government in New France, and much resorted to by several nations which come down those rivers to it, and trade in various sorts of furs. The town contains about 250 or 300 houses, and ranks as the third town, in respect of size, in the provinces. It is one of the oldest settlements in the country, and its founder, it is said, calculated upon its becoming in a short time a city of great extent. It has hitherto, however, increased but very slowly in size, nor can it be expected to improve much, at least until the country bordering upon the river St. Maurice becomes settled. The bank of iron-ore in its vicinity, which promised opulence, is nearly exhausted. The fur-trade also, from which great benefit was expected, is now almost wholly transferred to Quebec and Montreal; and it is merely the small quantity of furs brought down the St. Maurice, and some of the northern rivers that fall into the St. Lawrence, nearer to the town of Trois Rivières than to Quebec or Montreal, that is shipped there. These furs are laden on board the Montreal ships, which stop opposite to the town as they go down the river. The streets of Trois Rivières are narrow, and the houses in general small and indifferent, many of them being built of wood. In the town are two churches, an English Episcopalian, and a large Roman Catholic parish-church,

formerly served by the Recollets, or Franciscan friars, but the order is now extinct in Trois Rivières. The old monastery of the order is deserted, and the houses near it lie uninhabited. The college or monastery of the Jesuits, a large old stone-building in the same neighbourhood, has been converted into a gaol. The only religious order at present existing in the town is that of St. Ursula, the sisterhood of which is as numerous as the convent can well allow. This was founded by M. de St. Vallier, bishop of Quebec, in the year 1677: the building is spacious, and situated near that formerly belonging to the Recollets; and annexed to it under the same roof is an hospital, attended by the nuns, and containing about twelve or fourteen beds, for the convenience of patients, who are well accommodated. The sisters of this convent are particularly distinguished for their curious work made of the bark of the birch-tree, and of which they manufacture pocket-books, work-baskets, dressing-boxes, &c. which they embroider with elk-hair, dyed of the most brilliant colours. They also make models of the Indian canoes, and various warlike implements used by the Indians. Almost all the birch-bark canoes in use on the St. Lawrence and Utawa rivers, and on the nearer lakes, are manufactured in Trois Rivières, and its vicinity, by Indians. These canoes are constructed very neatly, and on the water they appear very beautiful. The canoes are so light, that two men can easily carry on their shoulders one that is capable of containing six people. Their size varies, some being sufficient for only one person, and others capable of accommodating any number as far as twenty. They are navigated with paddles, and move with surprising velocity. The country in the vicinity of Trois Rivières has been represented by some French travellers as wonderfully fertile, and as one of the most agreeable parts of Canada; but, according to Mr. Weld (*Travels through Lower Canada*, vol. ii.) it is totally the reverse. It is a level barren tract, and so sandy, that in walking along many of the streets of the town, and the roads in the neighbourhood, you sink into the land at every step above the ankles. The air also swarms with mosquitoes, indicating the low damp situation of the place; 44 miles W.S.W. of Quebec. N. lat. 46° 23'. W. long. 72° 20'.

TROIS RIVIÈRES, a bay on the E. coast of the island of St. John, in the gulf of St. Lawrence.—Also, a river of St. Domingo, formed by the union of three streams, and running into the sea on the N. coast of the island, near Port Paix.

TROISSEREUX, a town of France, in the department of the Oise; 4 miles N.W. of Beauvais.

TROITZ, or *TROITSKOE Monastr*, that is, *The Convent of the Holy Trinity*, a convent of Russia, which is so large, as at a little distance to have the appearance of a small town; and, like many convents in this country, is strongly fortified, according to the ancient mode of defence, being surrounded with high brick walls, strengthened with battlements and towers. Beside the convent or habitation for the monks, the walls inclose an imperial palace, and nine churches, constructed by different sovereigns. The convent is a large range of building encircling a court, and is far too spacious for the present inhabitants. It formerly contained 300 monks, together with a proportionate number of students; and was the richest ecclesiastical foundation in Russia. The fraternity possessed considerable estates, upon which were at least 100,000 peasants: these estates, as well as all the other church-lands, being now annexed to the crown, the members receive small pensions. With their revenues their number has been greatly diminished, and they scarcely amount

amount at present to 100 monks. Their habit is black, with a veil of the same colour; they eat no meat, and the discipline of the order is very strict. This convent is distinguished in the annals of this country as the asylum for the Russian sovereigns, in cases of infurrection or danger; and is more particularly known to foreigners for the refuge it afforded to Peter the Great, when he put an end to the administration of his sister Sophia; 40 miles from Moscow.

TROITZK, a town of Russia, in the government of Penza; 76 miles W.N.W. of Penza. N. lat. 54°. E. long. 43° 34'.

TROITZKOE, a town of Russia, in the government of Upha; 200 miles E. of Upha. N. lat. 54°. E. long. 61° 44'.—Also, a town of Russia, in the government of Upha; 16 miles N.E. of Sergievsk.

TROITZKOI, a town of Russia, in the government of Simbirsk; 20 miles N. of Sizran.—Also, a town of Russia, in the government of Archangel, on the Pineg; 28 miles S.E. of Pineg.—Also, a town of Russia, in the government of Upha; 40 miles N.W. of Belebeev.—Also, a town of Russia, in the government of Tobolsk, on the Oby; 204 miles N. of Tobolsk. N. lat. 61° 24'. E. long. 42° 50'.—Also, a town of Russia, in the government of Tobolsk; 40 miles N.W. of Narim.—Also, a town of Russia, in the province of Uftiug; 32 miles S. of Lalsk.—Also, a town of Russia, in the government of Kostrom; 40 miles S. of Vetluga.—Also, a town of Russia, in the government of Kostrom; 12 miles N. of Vetluga.—Also, a town of Russia, in the government of Tobolsk; 14 miles N.N.E. of Tasievskoi.

TROKI, or **TROCKI**, a town of Lithuania, and capital of a palatinate to which it gives name. This town was built by the great duke Gedimin, in the year 1321, and is situated among lakes; it was formerly the residence of the great dukes, who afterwards removed their seat to Wilna. In the year 1655, it was demolished by the Russians; 16 miles W. of Wilna. N. lat. 54° 33'. E. long. 24° 44'.

TROLHÆTTA, a town, or rather village, of Sweden, in West Gothland; 15 miles E.S.E. of Uddevalla. For an account of the canal of Trolhætta, see **CANAL**.

TROLLING, among *Anglers*. To troll, is to fish for pikes with a rod whose line runs on a reel. See **PIKE-FISHING**.

TROLLIUS, in *Botany*, a name given to this plant, our Globe-flower, by Conrad Gesner, which, though of barbarous etymology, has been universally retained. This might be attributed to respect for its illustrious author, were there not so many bad reasons for which barbarous names have been admitted. The derivation of *Trollius* is said to be from an obsolete German word *trol*, or *trolen*, expressing any thing globular. Hence it is synonymous with the English name of this flower; as well as with the French one, *boule d'or*. Professor Martyn says, after Haller, "*Trollblume*, in German, seems to signify a magical flower." From what we have seen and heard of the festive uses of the Globe-flower in the north of Europe, there appears to be some idea of this kind attached to it, which nevertheless may not be the origin of the name.—Linn. Gen. 282. Schreb. 378. Willd. Sp. Pl. v. 2. 1333. Mart. Mill. Dict. v. 4. Sm. Fl. Brit. 597. Ait. Hort. Kew. v. 3. 359. Pursh 391. Salif. Tr. of Linn. Soc. v. 8. 302. Julf. 233. Lamarck Illustr. t. 499. Gærtn. t. 118.—Class and order, *Polyandria Polygynia*. Nat. Ord. *Multisiliqua*, Linn. *Ranunculaceæ*, Julf.

Gen. Ch. *Cal.* none. *Cor.* Petals about fourteen, sometimes fewer, roundish-ovate, concave, converging, deciduous, three in each outer row, five in the innermost. Nectaries about nine, linear, flat, incurved, perforated at the base within side. *Stam.* Filaments numerous, linear, much shorter than the corolla; anthers linear, erect. *Pist.* Germens superior, numerous, sessile, columnar; styles short; stigmas pointed, shorter than the stamens. *Peric.* Capsules numerous, collected into a head, oblong, compressed, curved, pointed, bursting at the inner edge, of one cell. *Seeds* numerous, obovate, angular, polished, inserted along the inner edge of each valve.

Ess. Ch. Calyx none. Petals numerous. Nectaries about nine, oblong, flattened. Capsules numerous, oblong, with many seeds.

Obf. Linnæus erroneously in Gen. Pl. calls the capsules ovate and single-seeded.

1. *T. europæus*. European Globe-flower. Linn. Sp. Pl. 782. Willd. n. 1. Fl. Brit. n. 1. Engl. Bot. t. 28. Fl. Dan. t. 133. Lightf. Scot. 295. (*Ranunculus globosus*; Ger. Em. 955. R. sextus; Camer. Epit. 385. Globe Crowfoot; Petiv. Herb. Brit. t. 43. f. 2.)—Petals closely converging. Nectaries the length of the stamens.—Native of mountainous, rather moist, meadows and pastures in the north of Europe, especially Lapland, Sweden, Germany, Switzerland, Wales, the northern counties of England, and Lowlands of Scotland, flowering in May and June. The root is perennial, of many stout fibres. *Herb* smooth. *Stem* erect, two feet high, round, leafy, branched in the upper part. *Leaves* deeply divided into many wedge-shaped, deeply cut and toothed, acute, spreading lobes; the radical ones on long stalks; the rest nearly sessile, alternate. *Flowers* solitary at the naked summits of the branches, erect, globular, above an inch wide, of an elegant bright uniform yellow. *Nectaries* obtuse. *Seeds* black. Haller and Lightfoot say the flowers are fragrant, which we have not observed. The Scotch call them *Luken-gowans*, or Cabbage-daisies. In Westmoreland we have seen these flowers gathered by the peasants, with great festivity, and made into garlands for the young men and women, as well as to decorate the porches of their cottages. Linnæus mentions them as used in Sweden to firew the floors on holidays.

2. *T. asiaticus*. Asiatic Globe-flower. Linn. Sp. Pl. 782. Willd. n. 2. Ait. n. 2. Curt. Mag. t. 235. (*Helieborus aconiti folio, flore globoso croceo*; Amm. Ruth. 76. n. 101.)—Petals spreading. Nectaries nearly equal to them in length.—Native of the banks of rivers in Dauria. *Amman*.—A hardy, but not very common, perennial in our gardens, flowering in May or June. It requires a mixture of loam and bog earth, in a northern exposure, and must have due supplies of water in dry summers, for want of which we have, after several years successful cultivation, lost the plant. This species is very like the former in habit, though somewhat larger, with more copious and acute teeth, or serratures, to the leaves. The flowers however are distinguished by their spreading petals, of a rich orange-colour, and the still deeper hue of their large and numerous nectaries, almost, or quite, equal to the petals in length. The flower being much more open than in *T. europæus*, the nectaries, as well as stamens and pistils, are displayed in full view, and the whole makes a very handsome appearance.

3. *T. americanus*. American Globe-flower. Muhlenb. Cat. 54. Donn. Cantabr. ed. 5. 139. (*T. laxus*; Salif. Tr. of Linn. Soc. v. 8. 303. Pursh n. 1. Ait. Epit. 375.)—Petals

—Petals spreading, slightly concave. Nectaries hardly so long as the stamens.—Native of Pennsylvania, flowering in May. Specimens and seeds were sent us in 1793, by the late Rev. Dr. Muhlenberg, under the above name, by which he has published the plant in his *Catalogus Plantarum Americae Septentrionalis*. This name is so singularly apt, one species of this genus being appropriated, as it appears, to each of three quarters of the world, that, though we by no means approve of specific names taken from particular countries, on a limited scale, we cannot reject this: still less can we assent to an arbitrary change of the other two. On this subject we have the universal suffrage of botanists in our favour. The species before us is smaller than either of the other two, and seems to have scarcely more than five petals, which are obovate, and of a yellow, not orange, colour. Their spreading position sufficiently distinguishes the plant from *T. europæus*, as the shortness of the nectaries does from *asiaticus*. The capsules are short and abrupt, crowned by the rather elongated styles.

Mr. Donn mentions two other American species, by the names of *intermedius* and *hybridus*, which we presume to be varieties of *americanus*. We have observed a difference of appearance, with respect to size and colour, in plants raised from our original parcel of seeds, and Dr. Muhlenberg makes but one American species. The date of the introduction of *T. americanus* ought to be 1794, not 1805.

T. patulus, Salisb. Tr. of Linn. Soc. v. 8. 303; *Helleborus ranunculinus*, Sm. Plant. Ic. t. 37, is most evidently no *Trollius*, on account of its tubular nectaries.

TROLLIUS, in *Gardening*, comprises some hardy, herbaceous, showery, perennial plants, as the globe ranunculus, or globe-flower, among which the species cultivated are the European globe-flower (*T. europæus*); and the Asiatic globe-flower (*T. asiaticus*).

These two plants are of a rather tall hardy growth, affording considerable ornamental effect in their large flowers, which grow in the first sort in a particular converging manner, or turn in an inward direction, or somewhat revolute mode, so as to give them a perfect globular form, from which they derive the name of globe-flower. They appear in both sorts in the beginning of summer. Those in the Asiatic or latter kind, however, are not connivent, but spread out and shew some of the inner parts, which are of a fine saffron-colour, and display a striking elegant singularity in their appearance, which renders them highly valuable for their use in the flower-garden. They are both desirable flower-plants.

Method of Culture.—The means of propagation and increase in these plants are occasionally by sowing the fresh seeds of them, and the parting of their roots.

In the former method, the seeds should be sown in shallow drills, in a somewhat shady border or other place, in the autumnal or spring seasons, covering them in to the depth of nearly half an inch, when they readily grow and produce plants for setting out in other parts.

In the latter mode, the roots should be taken up in the autumnal season, when the leaves decay and fall off, or very early in the spring months, and be divided into several parts, but not by any means into too small slips, and then be planted out either where they are to remain, or in nursery rows, where they are to continue for twelve months, when they will be ready to set out finally.

The seedling plants should be set out in summer, or towards the autumnal season, in rows about six inches asunder, where they are to continue about six or eight weeks, to become

perfectly strong, and be finally planted out in the places where they are to remain.

And the root-plants, which are set out in rows, may be removed in the autumn or spring seasons to the spots where they are finally to grow and continue.

As these plants are natives of moist and shady situations, they are generally the most successfully planted in places where the circumstances are the same in this climate, though they will commonly grow very well in any border or compartment of the garden which is not over dry, or without moisture.

These plants multiply extremely fast by the roots, and are of a great many years duration.

They are highly deserving of a situation in all curious collections in the flower-gardens and pleasure-grounds, where they have a fine effect in the clumps, borders, and other compartments.

TROMBA, in *Geography*, a small island near the coast of Istria. N. lat. 45° 3'. E. long. 13° 52'.

TROMBA, in the *Italian Music*, either denotes the common trumpet, the buccina of the ancients, or the modern sacbut, but more properly our trumpet.

TROMBETAS, in *Geography*, a river of Brasil, which runs into the river of the Amazons at Pauxis.

TROMBETTA, in *Ichthyology*, a name given by the Italians to the fish commonly called *scopolax* by authors. See **TRUMPET-FISH**.

TROMBETTA, in the *Italian Music*, a small trumpet, being the diminutive of tromba.

TROMBONE, a wind-instrument blown by the mouth, and resembling in form the military trumpet, of which it is the base, the name implying the *great trumpet*. It differs, however, from the trumpet in being divided into two branches or parts fitted to sockets, giving the performer power to lengthen and shorten the general tube at his pleasure, according to the different tones which he wishes to produce. On which account it is called in Latin, *tuba ductilis*. The Germans call it *pausaune*, and the French *sacqueboute*.

Zarlini has described this instrument under the title of *trombone amovibile*, and the quantity and quality of the sounds it is capable of producing, very exactly.

“The trombone,” says he, *Supplimenti Musicali*, lib. iii. cap. 5. “is an instrument truly worthy of consideration, which I have seen and often heard by good performers, beginning at the lowest sound which it is capable of producing; when, being closed in all the joints, it can produce no sound less than the octave; then from the octave to the 5th; nor from that can it produce a less interval than the 4th; and from the 4th to the 3d major, then the 3d minor, after which another 4th, the key-note, from which it can form a complete series of eight notes. No other sounds than these can be produced without altering, moving, and lengthening the instrument.”

Père Merfenne, in his experiments on this instrument, (*Harmon. Instrum. lib. ii.*) found it capable, by lengthening or shortening the lower part of the instrument, of forming a regular series of fifteen sounds, from double C in the base, to C on the sixth line.

The instrument is made of brass, of which there are five sorts: canto, alto, tenor, base, and double-base. It is much used in the large churches of Germany. They can produce all the tones and semitones in gradation. The manner of writing for them is the same as for different voices, and on the same staff of five lines.

The image shows a musical score for four parts: Canto, Alto, Tenor, and Bass and Double Bass. Each part is written on a five-line staff. The Canto part is in treble clef and contains a melodic line with various ornaments (asterisks) and a flat sign. The Alto and Tenor parts are also in treble clef and feature similar melodic lines with ornaments and a flat sign. The Bass and Double Bass part is in bass clef and contains a lower melodic line with ornaments and a flat sign. The score is arranged in four horizontal staves, with the Canto staff at the top and the Bass and Double Bass staff at the bottom.

The double-bass of this instrument goes a 5th lower than any other bass. It has the finest effect in funeral processions, and in general in melancholy strains. We never hear it with more pleasure in England than in Handel's dead march in Saul. Its use should be rare, and its effects would be more striking. But tromboni and double-drums are now so frequently used at the opera, oratorios, and in symphonies, that they are become a nuisance to lovers of pure harmony and refined tones: for, in fact, the vibrations of these instruments produce noise, not musical sounds.

TROMELIA, in *Ancient Geography*, a town of the Peloponnesus, in Achaia Propria.

TROMNES, in *Geography*, a small island in the North sea, near the coast of Lapland. N. lat. $68^{\circ} 5'$. E. long. $15^{\circ} 26'$.

TROMP, MARTIN HARPERTZON, in *Biography*, a famous Dutch admiral, was born at the Brill in 1597. At the age of eight years he was destined for the sea-service, and was sent on board a ship bound for the East Indies. Whilst he was very young he was taken prisoner by an English pirate, with which he continued for two years, acquainting himself with the stratagems and manœuvres practised in that kind of service: and being afterwards employed in the Mediterranean, he was captured by the Turks, from whose custody he had the good fortune to make his escape. In the service of the States, he accompanied the famous Peter Hein in his various expeditions, and being his favourite, fought by his side when he was killed. By various gradations he was advanced to the rank of admiral, and in February 1639, he pursued a Spanish squadron, and in an engagement off Graveline, captured and destroyed five men of war and four frigates. In October of the same year he engaged another Spanish fleet in the Downs, and obtained a glorious victory, taking or destroying the greatest part of the fleet, though sheltered by the English. On this occasion he saved the life of Oquendo, the Spanish commander, by sending a frigate to his relief, when his own ship was sinking. His name now became famous through Europe, and the king of France enrolled him by patent among the French nobility. In 1652, Tromp and Blake, the English admiral, had a rencontre in the Downs, in consequence of which the Dutch fleet, after having sustained some loss, was obliged to retire. Having on another occasion met with a disappointment in fulfilling his orders for attacking Blake by reason of a storm, he was disgraced and recalled, and De Ruyter was appointed to supersede him; but his command was restored to him in the same year. In November he attacked Blake, commanding an inferior force, in the Downs, and after a severe engagement, obliged him to

retire into the Thames, with the loss of five ships. Tromp with some degree of arrogance triumphed, and fixed a broom on his top-mast, intimating vain-gloriously that he would sweep away the English from the Channel. This triumph, however, was of no long duration. In February 1653, the two powerful fleets of Holland and England had an engagement which lasted three days; one of which terminated in the loss of eleven men of war to the Dutch, but it is said that Tromp lost no reputation in this action. This engagement was succeeded by another off Nieupoort, in which Tromp and De Ruyter mutually rescued each other from imminent peril; but the termination of the contest was unfavourable to the Dutch, who suffered considerable loss. These two Dutch commanders made complaints to the States of the insufficiency of their equipment, and great exertions were made to supply them with both ships and men. In July, Tromp with eighty-five ships defeated the English fleet with ninety-four; but before they could come to an engagement, which was prevented by a storm, the Dutch fleet was augmented to 120 sail. On the 6th of August the contending fleets rushed to action. The first day was indecisive: the second was unfavourable to Tromp, who, according to his usual practice, pierced the enemy's line, and was surrounded, being deserted by his own squadron. Whilst he was fighting with desperate valour, he fell by a musket-shot, as he was giving orders on the deck; exclaiming, before he expired, "Take courage, my lads, I have run my course with glory!" The Dutch seamen, having lost their commander, could not be re-animated, and a disastrous, though dearly bought, defeat closed the day, and also the war. The remains of Tromp were interred with funeral honours in the church at Delft, and a magnificent mausoleum was erected to his memory. Un. Hist. Moreri.

TROMP, CORNELIUS, the second son of the preceding, was born at Rotterdam in 1629, and having been educated with a view to the navy, he was appointed, at the age of 19, to the command of a ship of war against the Corsairs on the Barbary coast. When the war broke out between England and the United Provinces in 1665, he was one of the admirals in the sea-fight off Solebay, when the Dutch fleet was defeated, though by his masterly retreat the victors were prevented from making the most of their success. In some subsequent engagements Tromp distinguished himself by his valour, though not always unblended with temerity, and seldom with any great success. Complained of by De Ruyter, who was superior in command, he was superseded; nor was he again employed till the year 1673, when the two rival admirals, being reconciled, fought

in concert and mutual assistance in the engagements with the French and English, off the Dutch coast, in June and August. After peace with England had taken place, Tromp, in 1675, visited London, and being honourably received, was made a baronet by Charles II. Having this year conducted a fleet to succour Denmark in its war with Sweden, he was invested by the king with the order of the Elephant. Upon the death of De Ruyter, in 1677, he was appointed his successor as lieutenant-admiral-general of the United Provinces. He continued, however, in the service of Denmark, and at the peace withdrew from the navy; but in 1691, when the war with France was renewed, he resumed his command. Whilst a fleet was fitting out, he was seized by a disease which terminated his life at Amsterdam, on the 29th of May, in his 62d year. His remains were deposited in the magnificent tomb of his father at Delft. Un. Hist. Moreri.

TROMPE, in the *Manege*. See DECEIVED.

TROMPERWICK, *Gulf of*, in *Geography*, a bay of the Baltic, on the north-east coast of the island of Usedom; a dangerous road for vessels which are driven thither by the wind, or misguided by darkness. N. lat. 54° 40'. E. long. 13° 40'.

TROMSOË, an islet on the coast of Lapland, near the Storstennüfs, or Great Rocky Cape; *stor*, in the Scandinavian dialect, signifying great, and hence probably are derived our words *store* and *store-house*. Here, in the latitude of 69° 38', a village has been lately founded under the protection of the Danish government, and endowed with peculiar privileges and immunities; being intended to facilitate the exchange of commodities, and to diffuse the benefits of civilization over these sequestered regions. For two whole months at Tromsoë the sun never sets; and as he wheels his oblique apparent course, he skirts the northern horizon at midnight, and again attends with fiercer beams in progress of the day, the sky being, with little variation, bright and cloudless. The change of temperature is confined to a very narrow range. The greatest heat, on the 15th of July, was observed at 2 o'clock in the afternoon, when the thermometer rose to 61° or 62° of Fahrenheit, and the greatest cold at 1 o'clock in the morning, when the thermometer stood at 50° or 52°. This low islet is covered with birches, though the prospect was saddened by patches of snow lying still unmelted in the streets, the gardens, and the fields. Von Buch's Travels in Norway and Lapland.

TRONAGE, TRONAGIUM, an ancient custom, or toll, paid for the weighing of wool.

The word comes from *trona*, an old name for a beam used in weighing.

TRONATOR, an officer of the city of London, whose business it was to weigh the wool brought into that city.

TRONCHIN, THEODORE, in *Biography*, a celebrated physician, was born at Geneva in 1709, and being disappointed in his expectations from lord Bolingbroke when he visited in England, he repaired to Leyden in order to study under Boerhaave, whose Elements of Chemistry he had perused; and after passing through a course of medical instruction, he graduated M. D. in 1730, publishing on the occasion a dissertation "De Nympha," patronized by Boerhaave. He settled at Amsterdam, and became a member of the college of physicians and an inspector of hospitals. Here he distinguished himself as a zealous promoter of inoculation. In 1754 he returned to Geneva, and ranked among the most distinguished practitioners in Europe, not only on account of his established reputation, but from the number and quality of his patients. His native city erected

in his favour a chair of medicine, and the Society of Pastors admitted him into their body. He was employed by the duke of Orleans in the inoculation of his children, and by other persons of rank at Paris: and in 1763 he went to Parma, for the purpose of inoculating the family of the duke. Although he declined to comply with the invitation of the empress of Russia to spend two years at Petersburg, he accepted, in 1766, the offer of being principal physician to the duke of Orleans. His practice was simple, administering few medicines, and relying chiefly on diet and regimen, with the regulation of the passions and affections. In nervous complaints abounding in a luxurious capital, he recommended temperance and exercise. With the practice of inoculation, he patronized the cool treatment in the natural small-pox, and also the free admission of air in other diseases. On mothers he urged the suckling of their children. In the exercise of his profession he was exemplary for his humanity and charity. In conversation he was mild and modest, and in his manners agreeable and polite. He had little time for writing: but besides his inaugural dissertation already mentioned, he published a treatise "De Colica Pictonum," in 1757, and he contributed several articles to the "Encyclopædia," and to the "Memoirs of the Academy of Surgery." Of the works of Baillou, he gave an edition in 1762, with a preface on the state of medicine. He had the honour of being enrolled as a member of the chief medical and scientific societies in Europe. He died at Paris in 1781, in the 73d year of his age. Nouv. Dict. Hist. Gen. Biog.

TRONCO, in the *Italian Music*, by the French called *coup de grace*, is used to intimate to the voices as well as instruments, that they are not to draw out the sound to its natural length, but cut it short; that is, only continue it long enough to be heard, by which means there is a small silence between each sound; which has a very good effect in expressions of grief, to make signs; and also in expressions of wonder and surprize, &c.

TRONCONNÉE, or TRONCONNÉ, in *Heraldry*, denotes a cross or other thing, cut in pieces, and dismembered; yet so as that all the pieces keep up the form of a cross, though set at a small distance from one another.

TRONE, in *Agriculture*, a term applied provincially to a drain or small trench of that kind, in some places.

TRONE, in *Geography*, a town of Sweden, in Helsingland; 7 miles N.W. of Soderhamn.

TRONE Pound, in Scotland, contains twenty Scotch ounces. But because it is usual to allow one to the score, the trone pound is commonly twenty-one ounces.

TRONE Stone, in Scotland, according to sir John Skene, contains nineteen pounds and a half.

TRONE Weight was the same with what we now call *troy weight*.

TRONECKEN, in *Geography*, a town of France, in the department of the Sarre; 12 miles S.S.E. of Traarbach.

TRONINGE, a town of Sweden, in the province of Halland; 8 miles E. of Halmstad.

TRONIS, in *Ancient Geography*, a country of Greece, in the Phocide, which contained many ancient monuments.

TRONQUIÈRE, LA, in *Geography*, a town of France, in the department of the Lot; 12 miles N. of Figeac.

TRONTO, a river which forms a boundary between the marquise of Ancona and the province of Abruzzo Ultra, and runs into the Adriatic, N. lat. 42° 52'. E. long. 13° 59'.

TRONUM, in *Ancient Geography*, a place on the route from Dyrrachium to Salome, between Pons Tiluri and Biludium. Anton Itin.

TRONZAN,

TRONZAN, in *Geography*, a town of France, in the department of the Po; 7 miles N.W. of Turin.

TROO, a town of France, in the department of the Loir and Cher; 10 miles S.W. of Vendôme.

TROON BAY, a bay on the W. coast of Scotland, and county of Ayr; N. of Troon Point.

TROON Point, a cape on the W. coast of Scotland, and county of Ayr. N. lat. $55^{\circ} 36'$. W. long. $4^{\circ} 36'$.

TROONGOOMBA, a town of Africa, in the kingdom of Ludamar; 12 miles S.W. of Benowm.

TROOP, a small body of horse, or dragoons, usually about fifty or sixty; commanded by a captain, captain-lieutenant, cornet, quarter-master, and three or four corporals, who are the lowest officers in a troop; answering to a company of foot.

TROOP, *Independent*, is a troop that is not embodied in, or joined with, any regiment.

TROOP, *To beat the*, is the same with beating the assembly.

TROOPS of the *Houhold*. See *HOUSHOLD*.

TROOP-Ship, is generally used to conduct troops from one place to another.

TROOPER, in the *Military Art*, a private man in a troop of horse.

TROPÆA, in *Mythology*, a name given to Juno, because she was thought to preside over triumphs; and in these ceremonies sacrifices were offered to her.

TROPÆA, in *Ancient Geography*, a town of Italy, in Brutium, towards the west. As the name signifies trophy, it is thought that the place assumed it after a victory gained here by Sextus Pompeius.

TROPÆA Drufi, a town of Germany, according to Ptolemy, situated between the Sala and the Rhine, in the place where Drusus died; though this fact is questioned on the authority of Dion Cassius, l. xv. Tacitus reports that it was the place where Tiberius was saluted emperor by the Roman army. The Romans were accustomed, after their victory, to raise a trophy, consisting of the arms of the vanquished, and to inscribe on its base the names of all the nations which had participated in the defeat: and in process of time this trophy became a town.

TROPÆA Pollucis, or *Trophies of Pollux*, were situated in Sparta, beyond the temple of Esculapius, according to Pausanias, who adds, that Pollux erected them after a victory which he gained over Lyncæum.

TROPÆA Pompeii, a name given to a monument erected by Pompey, after having terminated the war of Spain against Sertorius, upon which he caused to be inscribed, according to Pliny, that from the Alps to the extremity of Farther Spain, he had subdued 876 towns. This monument was adorned with the spoils which had been preserved, and on this account Strabo (l. iii. p. 156.) designates it by the term *ανδραματια*. It was situated on the way which entered Spain by the plain of Juncaria, at the distance of sixty-three miles from Narbonne.

TROPÆA Romanorum & Syllæ, the trophies of the Romans and of Sylla, were erected by the Romans and by Sylla on the plain of Cheronæa, in Bæotia, to commemorate a victory obtained over Taxilus, general of the army of Mithridates. Pausanias.

TROPÆA, a town of the Peloponnesus, in Arcadia, upon the route from Psophis to Telphusa, to the left of Ladon, and near the wood called Aphrodisium. Pausanias.

TROPÆA Augusti, a town of Italy, in Liguria, according to Ptolemy, near Portus Herculis.

TROPÆA Augusti, or *Trophies of Augustus*, situated near the sea, between Nice and Portus Herculis.

TROPÆOLUM, in *Botany*, the diminutive of *tropæum*,

or *τροπαιον*, a warlike trophy. This fanciful but elegant name was chosen by Linnæus, in *Hort. Cliff.* 143, for the present singular and striking genus, because he conceived the shield-like leaves, and the brilliant flowers, shaped like golden helmets, pierced through and through, and stained with blood, might very well justify such an allusion. Particularly when the plants are ostentatiously trained over the trellis or alcove of a garden, as is commonly the case. The names of *Nasturtium indicum*, *Cardaminum*, and *Acriviola*, given by preceding botanists, in reference to the cress-like flavour of the herbage, are all liable to exception, for various reasons, explained in the *Philosopbia Botanica*. It is remarkable that the first of these has remained, as the popular appellation of this genus; though Indian Cress, conveying the same idea in English, with more precision, is preferable.—Linn. Gen. 186. Schreb. 249. Willd. Sp. Pl. v. 2. 298. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 2. 339. Juss. 269. Lamarck Illustr. t. 277. Gærtn. t. 79. (*Cardaminum*; Tourn. t. 244. *Acriviola*; Boerh. Lugd.-Bat. ed. 2. v. 1. 244.)—Class and order, *Oxandria Monogynia*. Nat. Ord. *Tribilate*, Linn. *Geraniis affine*, Juss. Rather, in our opinion, totally undetermined.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, five-cleft, slightly spreading, acute, coloured, deciduous; two inferior segments narrowest; base elongated behind into a straight, tubular, awl-shaped, closed nectary, longer than the segments. *Cor.* Petals five, roundish, inserted between the segments of the calyx; the two uppermost sessile; three lower with oblong fringed claws. *Stam.* Filaments eight, awl-shaped, short, unequal, declining; anthers oblong, straight, ascending. *Pist.* Germen superior, roundish, three-lobed, striated; style simple, erect, the length of the stamens; stigma in three acute segments. *Peric.* Berries three, combined, dry and leathery; externally convex, deeply furrowed and wrinkled; internally angular. *Seeds* solitary, roundish, agreeing nearly with the shape of the berries; their coat simple, very thin.

Ess. Ch. Calyx of one leaf, with a nectariferous spur behind. Petals five, unequal. Berries three, dry, coriaceous.

Obf. Willdenow and Hort. Kew. have, by mistake, "petals four."

1. *T. minus*. Small Indian-cress or *Nasturtium*. Linn. Sp. Pl. 490. Willd. n. 1. Ait. n. 1. Curt. Mag. t. 98. (*Cardaminum minus et vulgare*; Feuill. Peruv. v. 3. 14. t. 8. f. 2. *Nasturtium indicum*; Lob. Ic. 616. Ger. Em. 252.)—Leaves peltate, slightly wavy; their angles bristle-pointed. Petals acute.—Native of Peru, from whence its seeds were brought very early to Europe. Gerarde cultivated this species, but it has been supplanted by the following in our gardens. The writer of this found it in general cultivation about Geneva, in 1787, and restored it to the English collections. Like the rest of the present genus, this plant is a hardy annual in the natural climate of Europe, though perennial, if sheltered from frost. The stems are branched, lax and twining, many feet in length, round, smooth, leafy. Leaves scattered, roundish, somewhat laterally peltate, wavy, angular, entire, smooth; their ribs radiating from the spot where the long wavy footstalk is inserted. Flowers axillary, solitary, on long simple stalks resembling the footstalks; their colour a deep yellow, variegated and streaked with orange and red. The calyx is coloured like the petals; its spur near an inch and half long. Petals about an inch. Fruit greenish. The whole plant has a hot pungent taste, resembling cresses of various kinds. The flowers are slightly fragrant.

2. *T. majus*. Great Indian-cress or *Nasturtium*. Linn. Sp.

Sp. Pl. 490. Willd. n. 2. Ait. n. 2. Curt. Mag. t. 23. (Cardaminum ampliori folio, et majori flore; Feuill. Peruv. v. 3. 14. t. 8. f. 1. Viola indica scandens, nasturtii sapore, maxima odorata; Herm. Lugd.-Bat. 628. t. 629.)—Leaves peltate, wavy, with blunt naked angles. Petals obtuse.—From the same country. Introduced into England in 1686, as appears by the manuscripts of Peter Collinson. This is now the most commonly cultivated species, seen in every cottage garden; as it rises, without any care, from self-sown seeds. The flowers are abundant from June till the whole plant perishes by the autumnal frosts. This species is larger than the foregoing, especially its petals, which are also much more rounded and obtuse. A daughter of Linnæus is recorded as having observed a kind of flashing light from these flowers in an evening. We have watched for this phenomenon, but know not whether we ever perceived it, or whether our eyes were merely dazzled by the brilliancy of the colours. The seeds are hot and pungent, much used for pickles; and the flowers are often intermixed with salad herbs, both for ornament and flavour.

There is a double-flowered perennial variety of this species, common in greenhouses, and readily increased by cuttings.

Another variety, with small jagged petals, called *T. pinnatum* in Andr. Repof. t. 535, and Ait. Epit. 375, came up under our inspection in a bed of the common *T. majus*, and having been immediately sent to Messrs. Lee and Kennedy at Hammersmith, in 1800, was preserved, and dispersed by cuttings all over the kingdom. It scarcely ever attempts to form any seed, and is cultivated just like the double kind, on whose botanical history, and origin, it appears to throw considerable light.

3. *T. hybridum*. Mule Indian-cress or Nasturtium. Linn. Mant. 64. Willd. n. 3. "Berg. Aët. Holm. for 1765. 32. t. 1."—Leaves wedge-shaped, five-lobed, entire, scarcely peltate.—A variety of the last, which, according to Linnæus, sprung up accidentally in a garden at Stockholm. It rarely produced seed in the Upsal garden, but was propagated by cuttings. A seedling plant however is preserved in the Linnæan herbarium. The leaves are palmate, but wedge-shaped at the base, deflexed, on very long slender footstalks, whose insertion is quite at the bottom, nor do we find a single leaf in any degree peltate. The nectary is said to be obtuse; the corolla scarcely ever of any determinate form. We retain this as a species, merely in conformity to our predecessors. Its history is presumed to be authentic; but a few varieties are more extraordinary.

4. *T. peregrinum*. Fringed Indian-cress or Nasturtium. Linn. Syst. Nat. ed. 10. v. 2. 998. Mant. 2. 371. Hellen. Diff. 18. Willd. n. 4, excluding the synonym of Jacquin, and perhaps of Feuillée.—Leaves peltate, palmate, deeply five-lobed. Petals all jagged and fringed. Nectary straight, about twice the length of the corolla.—Native of New Granada, from whence it was sent by Mutis and his pupils to Linnæus, who also received a garden specimen from his friend Duchesne. This species is not known in England. The leaves are all slightly, but uniformly, peltate, with five, rarely seven, deep lobes, various in breadth and acuteness, the middle one sometimes three-cleft, the two next occasionally having a lateral external lobe. Flowers rather smaller than in *T. minus*, though the nectary is as long, and of the same taper form, scarcely curved, and by no means hooked.

Petals unequal in size, all deeply and irregularly lacinated, with fine capillary segments. We find these segments variable in breadth, like the foliage, in our numerous native specimens, but their general aspect is the same. Lamarck's t. 277. f. 3, represents this plant. Feuillée's plate and de-

scription, if good for any thing, must belong to a different species, or variety, three of whose petals are very small, and quite entire. His nectary is too imperfectly drawn for us to determine any character from thence. We have seen in the foregoing species how liable the petals are to the most extraordinary variation, so that we dare not, from Feuillée's figure alone, attempt to define his as a distinct species.

5. *T. aduncum*. Hooked Indian-cress or Nasturtium. Sm. Tour on the Continent, ed. 1. v. 1. 158. ed. 2. v. 1. 165. (*T. peregrinum*; Willd. n. 4. Ait. n. 3. Jacq. Hort. Schoenbr. v. 1. 51. t. 98. Andr. Repof. t. 617. Curt. Mag. t. 1351.)—Leaves peltate, palmate, deeply five-lobed. Two petals jagged; three smaller fringed. Nectary hooked, the length of the larger petals.—Native of Peru. Cultivated in the open air at Gibraltar, where it is called the Canary-bird flower, and perhaps in other parts of Spain. In Germany, England, and even the south of France, this is a greenhouse plant, very tender with us, and seldom ripening seed. The leaves do not much differ from the real *T. peregrinum*, but the flowers are constantly very distinct, nor do any specimens or figures, that we have seen, shew them to be variable in any degree worthy of notice. Their calyx is pale green, with a remarkably hooked spur, hardly an inch long if it could be straightened. Petals lemon-coloured; the two uppermost deeply jagged, rarely hair-pointed; three lower much smaller, oblong, undivided, copiously fringed. Jacquin's figure displays a luxuriance of foliage greater than we have met with, some leaves having seven, more or less pinnatifid, lobes. There can be no doubt of this being a very distinct species. A figure of it was drawn for the 30th plate of our *Spicilegium Botanicum*, but that work never proceeded to a third fasciculus, and the figure would now be superfluous.

6. *T. pentaphyllum*. Five-leaved Indian-cress or Nasturtium. Lamarck Dict. v. 1. 612. Illustr. t. 277. f. 2. Willd. n. 5. (*T. quinatum*; Hellen. Diff. 20. t. 1.)—Leaves quinate; leaflets ovate, entire, stalked. Petals undivided, shorter than the segments of the calyx.—Gathered by Commerçon at Buenos Ayres, where this elegant and singular species climbs amongst Indian figs, and other shrubs, according to a manuscript note before us. The stem is slender, clothed with numerous, irregularly scattered, leaves, on footstalks an inch or an inch and a half long; leaflets on short partial stalks, acute, all undivided; the central one an inch in length; the two nearest the stalk not half so large. Flowers numerous, solitary, on axillary stalks extending rather beyond the leaves. Tube of the calyx above an inch long, conical, deep orange-coloured, contracted towards the end, which is oval; segments about a quarter as long, ovate, acute, green towards the point, two of them prominent, and rather larger than the rest. Petals not discernible in the flowers we have examined. Professor Hellenius describes them "ovate, entire, nearly sessile, a quarter the length of the segments of the calyx;" which answers to Lamarck's definition.

Three more species of this genus are described in the *Flora Peruviana*, one of them having only two petals; but of these no specimens have fallen under our inspection.

TROPÆOLUM, in Gardening, furnishes plants of the herbaceous, annual, and perennial, trailing and climbing kinds, among which the species cultivated are the small Indian cress or nasturtium (*T. minus*); and the great Indian cress or nasturtium (*T. majus*).

In the first sort, there are varieties with deep orange-coloured flowers inclined to red, with pale yellow flowers, and with double flowers.

And in the second kind, there are varieties with pale yellow

yellow flowers, orange-coloured flowers, and the double-flowered.

It may be noticed that they are both natives of Peru, and commonly esteemed to be annual plants, though they may be continued through the winter, if they are kept in pots, and sheltered in a greenhouse or glass-case, in the same manner as the variety with double flowers.

The stalks will climb six or eight feet high, when they are trained up, and thus the flowers make a good appearance; but when they trail upon the ground, they will spread over the neighbouring plants and become unsightly: the flowers are frequently eaten in fallads; they have a warm taste, like the garden cress, and hence the plant has its common name nasturtium; they are likewise used for garnishing dishes: the seeds are pickled, and by some are preferred to most pickles for sauce, under the false name of capers.

Method of Culture.—These plants, in all the single varieties, may be increased by seeds, which should be sown in the spring in patches where they are to flower in the borders, or in drills in the garden.

They afterwards only require to be kept free from weeds, and to be well supported by sticks.

The double variety must be increased by planting cuttings of the branches in pots of light mould in the early part of the summer, placing them in the shade, and giving frequent light waterings, but not too freely in the winter months: those planted early may be rendered more forward by being plunged in a moderate hot-bed.

It requires to be protected in the greenhouse in the winter, being well supported with sticks.

Both the sorts are cultivated in the garden as flowering plants, and for culinary uses in fallads and pickles, being often in the former view trained against fences and walls, or to run on trellages, railings, palings, hedges, the sides of arbours, and some other kinds of supports. Also to run on branchy sticks set in the borders and other parts.

In the latter intention, the common single sorts and varieties are often grown, which supply young tender leaves and berries that are much esteemed by some for the purpose of eating, the former as a warm relishing agreeable fallad article, and the latter as a very pleasant sort of pickle while young and fresh. The flowers are also warm in their taste, and afford a very ornamental garnish, in many cases, both for fallad dishes and those of the meat kind. When the plants are raised in these views, the seeds should be sown in the small compartments of the kitchen garden in the later spring months, in small patches or shallow drills to the depth of an inch, and the plants when up have the support of a few branchy sticks, by which means they afford supplies in each of these ways for two or three months.

They all afford variety in the borders, clumps, &c. in the summer, and the double sorts among potted plants.

TROPÆUM *Q. Fabii Maximi Æmiliani*, the trophies of Fabius, &c. in *Ancient Geography*, were situated, according to Strabo, near the place where the Isere discharges itself into the Rhone, and on this spot 30,000 Romans, commanded by Fabius, defeated 200,000 Gauls, in commemoration of which, the general caused to be erected on the field of battle a trophy of white stone.

TROPÆUS, in *Mythology*, a name given to Jupiter, for the same reason that *Tropæa* was given to Juno.

TROPATENA, in *Ancient Geography*, a country of Asia, extending, according to Ptolemy, from the territory of the Geli-Margasi to that of the Amariaci.

TROPE, **TROPUS**, in *Rhetoric*, a word or expression used in a different sense from what it properly signifies.—

Or, a word changed from its proper and natural signification to another, with some advantage.

As when we say an *ass*, for a *stupid person*; *thunder-bolt of war*, for a *great captain*; to *wash the blackamoor white*, for a *fruitless undertaking*.

This change of sense is never to be used, but where it gives a force and dignity, or renders the discourse more significant, weighty, and graceful.

It is called *trope*, τροπος, from the Greek, τροπος, *verto*, *I change*; because the words are here transferred from the things they properly import, to others which they only import indirectly: and that tropes only signify the things they are applied to, by reason of the connection and relation those things have with those others, whose proper names they are.

This change, or inversion, is performed various ways; but chiefly four: whence arise four principal tropes; *viz.* the *Metaphor*, *Metonymy*, *Synecdoche*, and *Irony*; which see respectively.

Some authors confound trope with figure; but they are very different things. Most authors, as F. de Colonia, &c. make figure the genus, and trope a species; defining figure to be, an ornament in discourse, by which it is raised above the common language; and trope to be that peculiar kind of ornament which consists in the change of the sense, &c.

But Vossius makes trope and figure to be two collateral and independent things; defining trope to be the change of the sense, &c. and figure to be any ornament, except what becomes so by such change, &c. See **FIGURE**.

With regard to the difference between tropes and figures we may observe, that tropes mostly affect single words, but figures whole sentences: a trope conveys two ideas to the mind by means of one word; but a figure throws the sentence into a different form from the common and usual manner of expression; and besides, tropes are chiefly designed to represent our thoughts, but figures our passions. The reasons which have occasioned the introduction of tropes are, according to Quintilian, three: *viz.* necessity, emphasis, and beauty. Tropes were first introduced from necessity, because no language contains a sufficient number of proper words to express all the different conceptions of our minds. Tropes do also on many occasions express things with greater force and evidence than can be done by proper words; thus when Virgil (*Æn. lib. vi. v. 842.*) calls the Scipios two thunder-bolts of war, he gives us a more lively image of the rapid force and speedy success of their arms, than could have been conveyed by a long description in plain words. And moreover, beauty and ornament have been another cause of the use of tropes: and it is the business of an orator to entertain his hearers, at the same time that he instructs them. Accordingly some subjects require a more florid and elegant address than others, and variety of expression is also pleasing in a discourse.

The following directions, however, are proper to be observed in the choice of tropes. As every trope gives us two ideas, one of the word expressed, and another which by means of that the mind connects with it: it is necessary that the relation between these two should appear very plain and evident; for an obscure trope is always faulty, unless where some particular reason makes it necessary; and therefore tropes ought not to be too far-fetched, lest they should thus be rendered obscure.—Again, as a trope ought to be very plain and evident, so likewise should it bear a due proportion to the thing it is designed to represent, so as neither to heighten nor diminish the just idea of it. Poets, however, are allowed a greater liberty in this respect than orators. Farther, as a moderate use of tropes, justly applied,

beautifies and enlivens a discourse, so an excess of them causes obscurity, by running it into abstruse allegories and riddles. Moreover, as one use of tropes is pleasure and entertainment, we should endeavour to make use of such as are smooth and easy; and if it should be necessary to use a harsh trope, it is proper to soften it by some precaution. Finally, care should be taken how we transfer tropes from one language into another. It was customary for the Roman soldiers to carry their money in their girdles; hence it was the same thing with them to say, *a person had lost his girdle* (Hor. Ep. lib. ii. ep. 2.), as that *he had lost his money*. And because the Romans wore the toga in time of peace, and a different garb when engaged in war, their writers sometimes use the word toga to signify peace. But as neither of these customs is in use among us, so neither would the tropes suit our language, or be generally understood by us. There is also a beautiful trope in the account of St. Paul's shipwreck, in the use of the word *αντοφθαλμειν* (Acts, ch. xxvii. v. 15.) which we translate to *bear up* into the wind, but which properly signifies to *look* or *keep its eyes against* it: to this purpose Plutarch says of Demosthenes, that he could not *αντοφθαλμειν τω αγγυριω*, *look against* or *resist the power of money*. Ward's Orat. vol. i. lect. 25. See also on this subject, Blair's Lect. vol. i. lect. 14.

Besides the four capital tropes above-mentioned, there are several inferior ones. When the trope is too bold, it is called an *hyperbole*; when continued, it is an *allegory*; when too obscure, an *enigma*; when it shocks us, or is too remote, a *catachresis*.

Add to these, other tropes: as the *metalepsis*, *antonomasia*, and *litotes*, or *extenuation*. See *METALEPSIS*, &c.

Some also refer the six kinds of scoffing, or derision, to the tropes; *viz.* the sarcasm, diafym, charientism, asteism, mysterism, and mimefis; but this without sufficient reason. See *SARCASM*, *IRONY*, &c.

TROPEA, in *Geography*, a town of Naples, in Calabria Ultra, built on a rock near the sea-coast, the see of a bishop, suffragan of Reggio. It contains five parish-churches, eleven convents, and about 4000 inhabitants, of whom the most wealthy and the handicraftsmen reside within the walls, whilst the husbandmen and labourers dwell in the outskirts, on the lands which they cultivate. Its situation is admirable, on the point of a lofty rock impending over the sea, and joined to the main land by an isthmus that is almost cut through at the gates, and thus leaves only a small passage to the town. A little to the N. lies a large island, on which some sheep are turned to graze, and a small one, with a hermitage placed on its summit, in a most romantic position. The streets of Tropea are narrow, the houses high, and built of stone, with great solidity. Two gates give admittance, one to those who come up the hill from the bay, and the other to such as approach along the high plain, on which is a pleasant walk near two miles long. This level is half a mile broad between the sea and a chain of mountains so steep and rugged, that they apparently cut off all communication by land with the rest of Calabria. The whole flat, and sides of the hills, yield abundance of grapes, mulberries, olives, pulse, vegetables, and garden-fruit. Copious streams rush from the mountains, and after watering the orchards, are collected into one body, and turn a great number of mills. In 1783, it suffered greatly from an earthquake; 37 miles N.N.E. of Reggio. N. lat. 38° 40'. E. long. 16° 13'.

TROPER, in our *Old Writers*, is used for a book of alternate turns and responses in singing mas. Lindevode calls it *liber sequentiarum*.

TROPHIS, in *Botany*, from τροφικε, or τροφιν, *food, fodder*,

&c. because cattle feed on the leaves and young branches, when there is a scarcity of grass, in the woody parts of Jamaica.—Browne Jam. 357. Linn. Gen. 516. Schreb. 679. Willd. Sp. Pl. v. 4. 733. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 5. 370. Juss. 442. Lamarck Illustr. t. 806. (Bucephalon; Plum. Gen. 52. t. 20. Linn. Gen. 575.)—Class and order, *Dioecia Tetrandria*. Nat. Ord. *Calycifloræ*, Linn. *Uncertain*, Juss.

Gen. Ch. Male, *Cal.* none. *Cor.* Petals four, obtuse, spreading. *Stam.* Filaments four, capillary, longer than the petals; anthers of two globular lobes.

Female on a separate tree, *Cal.* inferior, of one leaf, undivided or two-lobed. *Cor.* either wanting, or of four concave, roundish petals, closely embracing the germen. *Pist.* Germen ovate, of four cells; style short, thread-shaped; stigmas two, awl-shaped, spreading. *Peric.* Berry nearly globular, corrugated, of one cell. *Seeds* from one to four, roundish, with a brittle skin.

Ess. Ch. Male, Calyx none. Petals four.

Female, Calyx of one leaf. Petals four, or none. Stigmas two, awl-shaped. Berry superior. Seeds one to four.

Obs. Nothing can be more obscure or uncertain than the history of this genus, nor do we feel, by any means, confident that the plants assembled under it agree in natural, or essential, characters. We must content ourselves with giving the best account of them in our power, after having so far new-modelled the generic character as to avoid palpable contradictions.

1. *T. americana*. Ramoon Tree of Jamaica, or West Indian Trophis. Linn. Sp. Pl. 1451. Am. Acad. v. 5. 410. Willd. n. 1. Ait. n. 1. Swartz Obs. 372. (*T. foliis oblongo-ovatis glabris alternis, floribus masculinis spicatis ad alas*; Browne Jam. 357. t. 37. f. 1. Bucephalon racemosum; Linn. Sp. Pl. 1661. B. fructu racemoso rubro; Plum. Ic. 55. t. 67. f. 1.)—Thorns none. Leaves ovate, pointed, entire, smooth. Berry oval, furrowed, with a simple point, and solitary seed.—Native of dry exposed situations in the West Indies, flowering in spring. Swartz. A tree, about twenty feet high. Leaves alternate, on shortish furrowed stalks; rounded at the base; about four inches long, with one rib and several transverse interbranching reticulated veins. Spikes axillary, stalked, solitary, many-flowered, much shorter than the leaves, somewhat downy, pale; the female ones shortest. Berries spiced, sessile, the size of large grapes, oval, with four furrows, and of a pleasant flavour. Swartz says, the trunk and branches, when wounded, discharge a very white, viscid, milky juice. He, as well as Browne, assert the foliage and young shoots to afford an agreeable wholesome fodder for all sorts of cattle.

2. *T. laurifolia*. Laurel-leaved Trophis. Willd. n. 2.—Thorns none. Leaves elliptic-oblong, acute at each end, smooth, entire. Berry with two horns, and two or four seeds.—Native of Quito and New Granada. A tree, with thick, nearly round, branches. Leaves alternate, stalked, three inches or more in length, tapering at each end, coriaceous, smooth on both sides; shining above; pale beneath. Clusters axillary, the length of the footstalks. Fruit globose, crowned with two distant, awl-shaped, inflexed horns, rather longer than the fruit itself. Seeds obovate; two only, according to Willdenow; four in a drawing sent by Mutis to Linnæus, which the latter has marked *Bucephalon*, and which answers so exactly to Willdenow's description of the plant gathered in Quito by Humboldt and Bonpland, that we can have no doubt of its being done from the same species. In contemplating Willdenow's specific characters

of this and the foregoing, we cannot help thinking that he took for the fruit of *T. americana*, the nut of *Trapa bicornis*, (see TRAPA,) which Burmann has subjoined to Plumier's t. 67.

3. *T. aspera*. Rough-leaved Trophis. Retz. Obs. fasc. 5. 30. Willd. Sp. Pl. n. 3. Ait. n. 2. — Thorns none. Leaves obovate, unequally ferrated, very rough on both sides. Petals four in all the flowers.—Native of woods and thickets at Tranquebar, flowering in April, from whence we received specimens from the Rev. Dr. Rottler, in 1799. Branches stout, round, subdivided, leafy, without thorns or prickles; slightly downy or hairy when young, and of a rusty hue. Leaves acute, an inch long, on very short stalks; strongly veined; ferrated beyond the middle; wedge-shaped and entire at the base; rough on both sides like a file, with minute callous warts: hence they serve to polish fine cabinet-work. Male flowers six or eight, in axillary, solitary, globose, stalked heads, sometimes accompanied by a small rusty bractea, in the middle, or at the base, of the stalk. Perianth none. Petals four, ovate, obtuse, concave. Stamens four, thread-shaped, longer than the corolla, with ovate, furrowed anthers. Female flowers two or three together, axillary, on stalks like that of the male heads. Calyx deeply divided into two rounded, concave, permanent segments, much shorter than the corolla. Petals four, ovate, or nearly orbicular, concave, downy, closely investing the germen, permanent. Germen ovate. Style very short. Stigmas long and slender. Berry orange-coloured, smooth, somewhat compressed, with a small portion of pulp. Seeds one or two, globular, the size of a pea.

4. *T. spinosa*. Thorny Trophis. Willd. n. 4. (Cudranus javanus; Rumph. Amboin. v. 5. 22. t. 15. f. 2.)—Branches thorny. Leaves elliptical, entire, smooth.—Native of Java. Branches round, greyish-brown, armed with axillary solitary thorns, which are incurved when young, but become subsequently straight. Leaves stalked, larger than the last, and very smooth on both sides; paler beneath. Female flowers two or three together, lateral, stalked. Male ones not observed. The wood is used to dye yellow, and, with the addition of indigo, green. The berries are described by Rumphius about the size of a strawberry, with several seeds, and of a yellowish colour. By his account also, it should seem that this fruit is invested with a permanent hardened corolla, evincing the generic affinity of the present species to the last; though their belonging to *Trophis* must, for the present, remain very doubtful.

TROPHONIUS, Oracle of, in *Ancient Mythology*, a famous oracle in Bœotia, which was consulted with greater ceremony than those of any deity, and subsisted long after all those of Greece ceased. Trophonius, from whom the oracle took its name, was the son of Erginus, king of the Orchomenians, who, as well as his brother, were famous architects, and built the temple of Apollo at Delphi. The tomb of Trophonius had been altogether disregarded and forgotten, when the Bœotians, on occasion of a great drought, consulting the oracle of Apollo, were directed to have recourse to Trophonius at Lebadea. They pursued the direction of the oracle, and obtained an answer, that suggested the means of removing their calamity. In consequence of this event, they consecrated to Trophonius the wood in which he was interred, and in this wood erected a temple to him, with his statue executed by Praxiteles. The oracle of Trophonius was upon a mountain, within an enclosure of white stones, upon which are elevated obelisks of brass. In this enclosure there was a cavern, in the form of an oven, cut out of the mountain by human art and labour. Within this was another small cavern, with a very

straight entrance, into which those who consulted the oracle were to pass, with a variety of ceremonies.

TROPHY, TROPÆUM, among the *Ancients*, a pile or heap of arms of a vanquished enemy, raised by the conqueror in the most eminent part of the field of battle.

The word is formed from the Latin *trophæum*, or *tropæum*, which Vossius deduces from the Greek τροπῆ, the flight of an enemy.

The word is also used for an artificial representation of such a pile in marble, stone, or other matter. Such were the trophies of Marius and Sylla, in the Capitol, &c.

The ancient trophies consist of Greek and Roman arms; and the modern ones of arms of the various nations now in use: as in those insulated ones near Blenheim, in the Fauxbourg S. Antoine, and in the castle of Versailles. Some are done in basso-relievo; as those of the Trajan column, and the Attic of the court of the Louvre. The form of these trophies cannot be better described than in Virgil's second Æneid. Of those which Marius raised after the Cimbric war, still remaining at Rome, Fabricius has given the following account. They are two trunks of marble hung round with spoils; one of them is covered with a scaly corselet, with shields and other military ornaments. Just before it is set a young man in the posture of a captive, with his hands tied behind him; and all round were winged images of victory. The other is set out with the common military garb; having a shield of an unequal round, and two helmets, one open and adorned with crests, the other close, without crests. On the same trophy is the shape of a soldier's coat, with several other designs, which, by reason of the decay of the marble, are not discovered without great difficulty. These two trophies now adorn the front of the Capitol.

Trophies are likewise frequently exhibited on medals of the emperors, struck on occasion of victories; wherein, besides arms and spoils, are frequently seen one or two captives by the sides of the trophy.

Trophies, M. Vaillant observes, were, originally, nothing but trunks of trees, which the victor planted on the most eminent part of the conquered province, and hung them with the spoils of the enemy, to perpetuate the memory of the defeat.

TROPHY, in *Architecture*, an ornament which represents the trunk of a tree, charged or encompassed all round about with arms or military weapons, both offensive and defensive.

TROPHY-Money, a duty paid annually by the housekeepers, in the several counties of England, towards providing harness, drums, colours, &c. for the militia.

TROPIANA, in *Ancient Geography*, a town of Italy, in Calabria.

TROPICS, TROPICI, in *Astronomy*, two immoveable circles of the sphere, drawn through the solstitial points, parallel to the equator.

Such are the circles ME and NL, *Plate XVI. Astronomy, fig. 140.*

The tropics may be defined, two circles parallel to the equator, at such distance from it, as is equal to the sun's greatest recess from the equator towards the poles; or to the sun's greatest declination; or the obliquity of the ecliptic.

Of the two tropics, that drawn through the beginning of Cancer E, is called the *tropic of Cancer*. And that through the beginning of Capricorn, the *tropic of Capricorn*.

They have their name from the Greek τροπή, turn, conversion; as being the limits of the sun's way, or declination towards

towards north and south; so that when the sun is arrived at either of them, he turns the other way.

Hence, 1. Since the declination of the ecliptic is the arc EA, or LD; EN will be the distance of the tropics; which is double the greatest declination.

2. Wherefore, if the sun's meridian altitude be observed, both in the winter and summer solstice, and the latter be subtracted from the former; the remainder will be the distance of the tropics; half of which is the greatest declination of the ecliptic.

TROPICS, in *Geography*, are two lesser circles of the globe, drawn parallel to the equator, through the beginnings of Cancer and Capricorn.

These tropics are the planes of the celestial tropics, and at the distance of $23^{\circ} 29'$ from the equator, which is the sun's greatest declination.

TROPIC-BIRD, in *Ornithology*, a species of the phaeton, called *lepturus* by Brisson, on account of the slenderness of its tail. See PHAETON.

TROPIC KEYS, in *Geography*, small islands or rocks among the Virgin islands, in the West Indies, between Great Passage island and Porto Rico.

TROPICAL WINDS. See TRADE-WINDS and WIND.

TROPICAL Year. See YEAR.

TROPINO, in *Geography*, an ostrog of Russia, in the government of Tobolsk, on the river Piazida. N. lat. $72^{\circ} 36'$. E. long. $90^{\circ} 14'$.

TROPISTS, or TROPICI, the name of a sect. St. Athanasius, in his letter to Serapion, gives this appellation to the Macedonians, who were also called Pneumatomachi in the East, and Patripassians in the West.

The reason of the name Tropist was, that they explained the scripture altogether by tropes and figures of speech.

The Romanists also gave the appellation Tropists to those of the reformed religion; in regard to their construing the words of the eucharist figuratively.

TROPITES, TROPITÆ, a sect who, according to Philastrius, maintained that the Word was turned or converted into flesh, or into man.

This opinion they founded on that passage of St. John, *misunderstood*, *The Word was made flesh*; as if it imported, that the Word was converted into flesh; and not that he was clothed with our flesh and our nature.

TROPPEAU, or OPPAU, in *Geography*, a principality of Silesia, bounded on the N. by the principality of Oppeln, on the E. by Ratibor and Teschen, on the S. and W. by Moravia. The soil is good for corn and pasture, and abounds in fruit. It contains eleven cities or towns. The principality of Troppau once formed a part of Moravia, and with that marquissate came to Bohemia. It is now divided between the house of Austria and the king of Prussia.

TROPPEAU, or *Oppau*, a city of Silesia, and capital of the principality so called. It is situated in a fruitful country on the river Oppa, being walled, and containing an ancient palace of the princes, with three parochial churches, a college, three convents of monks, a nunnery, and a commandery of the order of St. John; besides which, it is also the seat of the regency for the Bohemian part of Silesia. In 1758, the greatest part of this town was destroyed by fire. It belongs to Austria; 45 miles S. of Oppeln. N. lat. $49^{\circ} 50'$. E. long. $18^{\circ} 30'$.

TROPLOWITZ, a town of Silesia, in the principality of Troppau; 70 miles N.N.W. of Troppau. N. lat. $50^{\circ} 1'$. E. long. $17^{\circ} 31'$.

TROQUES, a bay on the S.E. part of lake Huron.

TROSA, a sea-port of Sweden, in Sudermanland, on the Baltic; 18 miles S.W. of Stockholm.

TROSBURG, a town of Upper Bavaria; 13 miles E. of Wasserburg.

TROSSACHS, a tract of rugged rocks or mountains of stupendous height, situated about 10 miles W. from Callander, in the shire of Perth, Scotland, and accessible by a carriage-road. They exhibit an assemblage of wildness and rude grandeur, which fills the mind with the most sublime conceptions. It seems as if a vast mountain had been torn in pieces, and frittered down by a convulsion of the earth, and the huge fragments of rocks, woods, and hills, scattered in confusion for two miles on the sides of Loch Catherine. A huge column of these rocks was some years ago torn with thunder, and lies in very large blocks near the road. Where there is any soil their sides are covered with aged birch-trees. The sensible horizon is bounded by these trees on the summit of every hill. On the north side, the road is cut in some places through the solid rock, which rises upwards of 200 feet perpendicular above the lake: at others the road is at the foot of lofty cliffs, and trees are growing where no earth is to be found.—*Beauties of Scotland*, vol. iv. Perthshire. Gazetteer of Scotland, 1806.

TROSSULI, among the Romans, a name given by some to the guards that attended the kings of Rome, otherwise called *celereres*.

TROSSULUM, in *Ancient Geography*, a town of Italy, in Etruria, in the vicinity of the country of the Volsci, according to Pliny.

TROT, in the *Manege*, one of the natural paces of a horse, performed with two legs in the air, and two on the ground, at the same time, crosswise, and continuing so alternately, to raise the hind-leg of one side, and the fore-leg of the other side at once; leaving the other hind and fore-leg upon the ground till the former come down.

This action of his legs is the same as when he walks, except that in the trot his motions are more quick.

In this motion, the nearer the horse takes his limbs from the ground, the opener, the evener, and the shorter his trot will be. If he takes up his feet slovenly, it is a sign of stumbling and lameness; if he tread narrow, or cross, it betokens interfering or falling; if he tread long, it shews over-reaching; if he steps uneven, he indicates toil and weariness.

Three qualities are essentially necessary to make the trot useful. It ought to be extended, supple, and even or equal; these three qualities mutually depend upon each other; so that you cannot pass to the supple trot, without having first worked upon the extended trot; and you can never arrive at the even and equal trot, without having practised the supple. The *extended* trot is that in which the horse trots out without retaining himself, being quite straight, and going directly forwards; and this, consequently, is the kind of trot with which you must begin. The *supple* trot is that in which the horse, at every motion he makes, bends and plays all his joints, *viz.* those of his shoulders, his knees and feet, which no colts, or raw horses, can execute, who have not had their limbs suppled by exercise, and who always trot with a surprising stiffness and awkwardness, without the least spring or play in their joints. The *even or equal* trot is that in which the horse makes all his limbs and joints move so equally and exactly, and his legs never cover more ground one than the other, nor at one time more than another. To do this, the horse must necessarily unite and collect all his strength, and, if the expression may be allowed, distribute it equally through all his joints. To go from the extended trot to the supple, you must gently and by degrees hold in your horse; and when by exercise he has attained sufficient ease and suppleness to manage

manage his limbs readily, you must insensibly hold him in still more and more, and by degrees you will lead him to the equal trot. All horses that are inclined to be ramingue should be kept to the extended trot. A horse of a sluggish and cold disposition, which has, nevertheless, strength and bottom, should likewise be put to this trot: as he grows animated, and begins to go free, keep him together by little and little, in order to lead him insensibly to the supple trot; but if, while you keep him together, you perceive that he slackens his action and retains himself, give him the aids briskly, and push him forward, keeping him, nevertheless, gently in hand: by this means he will be taught to trot freely and equally at the same time.

The only proof, or rather the most certain sign of your horse's trotting well is, that when he is in his trot, and you begin to push him a little, he offers to gallop. The principal effects of a trot are to make a horse light and active, and to give him a just appui.

The manner of trotting a colt who has never been backed is as follows: put a plain snaffle in his mouth; fit a cavesson to his nose, to the ring of which tie a longe of a reasonable length. Let a groom hold this longe, who, having got at some distance from the colt, must stand still in the middle of the circle which the horse will make. Let another follow him with a long whip or chambriere in his hand. The colt, being alarmed, will be forced to go forward, and to turn within the length of the cord; the groom must hold it tight in his hand; by this means he will draw *in*, or towards the centre, the head of the colt, and his croupe will of consequence be without the circle. See FOAL, and *Backing of a Horse*.

In working a young horse after this manner, do not press or hurry him. Let him walk first, and afterwards put him to the trot. If you neglect this method, his legs will be embarrassed; he will lean on one side, and be more upon one haunch than the other; the inner fore-foot will strike against the outer one, and the pain which this will occasion will drive him to seek some means of defence, and make him disobedient. If he refuses to trot, the person who holds the chambriere will animate him, by trotting him, or striking the ground with it. If he offers to gallop instead of trotting, the groom must shake or jerk the cord that is tied to the cavesson, and he will fall into his trot. Berenger's Art of Horsemanship, vol. i. ch. 4.

TROTHY, in *Geography*, a river of England, in the county of Monmouth, which runs into the Wye, near Monmouth.

TROTZA, a river of Russia, which runs into the Kama, 16 miles N. of Kofa, in the government of Viatka.

TROU, LE, a settlement in the N. part of Hispaniola. N. lat. 19° 35'. W. long. 72°.

TROUBADOURS, a name given to the ancient poets of Provence, who wrote, set, and sung their own verses. See *PROVENÇAL Poets*.

Some will have the word borrowed from *trouver*, to find, by reason of their inventions, whence they are called *trouverres*; though others take them to have been called *trombadours*; by reason they sung their poems to an instrument called a *troupe* or *trumpe*.

The poetry of the troubadours consisted in sonnets, pastorals, songs, *syrventes*, or satires, which were much to their taste; and in *tensons*, which were love-disputes.

Jean De Notre Dame, commonly called Nostradamus, a procureur in the parliament of Provence, wrote an ample discourse of these poets. He makes their number seventy-six.

Pasquier tells us, he had an extract of an ancient book,

belonging to cardinal Bembo, entitled "Los Noms daquels qui firent Tensons & Syrventes," which made their number ninety-six; among which was an emperor, *viz.* Frederic I. and two kings, *viz.* Richard I. of England, and a king of Arragon; with a dauphin, several counts, &c.: not that all these had composed entire works in Provençal; some of them had not brought forth any thing beyond epigrams.

Petrarch speaks, with applause, of several troubadours in the fourth chapter of the Triumph of Love. The Italian poets are said to have borrowed their best pieces from the troubadours. Pasquier declares expressly, that Dante and Petrarch are, indeed, the fountains of Italian poetry; but fountains which have their sources in the Provençal poetry.

Bouche, in his History of Provence, relates that, about the middle of the twelfth century, the troubadours began to be esteemed throughout Europe; and that their credit and poetry were at the highest about the middle of the fourteenth. So that they flourished in Europe about two hundred and fifty years, *viz.* from 1120 or 1130 till the year 1382. He adds, that it was in Provence that Petrarch learned the art of rhyming, which he afterwards practised, and taught in Italy.

Strolling musicians, under the appellation of *Jongleurs*, (which see,) abounded in France so early as the time of Charlemagne, who forbids their admission into convents; and in the first capitulary, of Aix-la-Chapelle, this prince speaks of them as persons branded with infamy. They continued, however, to amuse the great in private, as well as the people in public, as a distinct body of men, till the troubadours introduced poetry into France, in the dialect of that country. Their licentiousness was frequently repressed, and their conduct regulated, by the police; and during the reign of Philip Augustus, the troubadours and minstrels, or *jongleurs*, were involved in the same disgrace, and for some time banished the kingdom; which left such a stigma upon their order, as no efforts of genius, or austerity of manners, could entirely efface, though they were afterwards recalled, and in some degree restored to public favour.

It is observed by a late elegant French writer, that though the proscription of music and poetry, and the kind of inquisition which Philip established against the *jongleurs* in France, may have originated from the laudable intention of repressing those disorders, which the abuse of their profession had occasioned; yet, if he had reflected that the fate of letters was at that time in the hands of the troubadours, and that among every people approaching towards civilization, the progress of virtue is generally proportioned to the cultivation of arts and literature, he would have inflicted a less ignominious punishment on the objects of his displeasure; for such is the empire of prejudice, that the anathema it pronounces against the abuse of a profession remains in full force, even after the reformation of those who exercise it. This author ventures to pronounce the *jongleurs*, or troubadours and minstrels, notwithstanding the contempt with which they are named at present, to have been the fathers of literature in France: they, says he, banished scholastic quarrels and ill-breeding, and polished the manners, established the rules of politeness, enlivened the conversation, and purified the gallantry of its inhabitants. That urbanity, continues he, which distinguishes us from other people, was the fruit of their songs; and if it is not from them we derive our virtues, they at least taught us how to render them amiable. *Tableau Historique de Gens des Lettres*, par l'Abbé de Longchamps, tom. v. cited by Dr. Burney in his History of Music, vol. ii. p. 267.

Mr. T. Warton (*Hist. of English Poetry*) is of opinion that there were two sorts of French troubadours who have not been sufficiently distinguished. If we diligently examine their history, we shall find that the poetry of the first troubadours consisted, as we have already intimated, in fables, moral fables, allegories, and sentimental sonnets. So early as the year 1180, a tribunal called the "Court of Love," was instituted both in Provence and Picardy, at which questions in gallantry were decided. This institution furnished ample matter for the poets, who threw the claims and arguments of the different parties into verse, in a style that afterwards led the way to the spiritual conversations of Cyrus and Clelia. Fontenelle does not scruple to acknowledge, that gallantry was the parent of French poetry. But to sing romantic and chivalrous adventures was a very different task, and required very different talents. The troubadours, therefore, who composed metrical romances form a different species, and ought always to be considered separately. And this latter class seems to have commenced at a later period, not till after the crusades had effected a great change in the manners and ideas of the western world. In the mean time, as Warton conjectures, the art of the troubadours, commonly called the "Gay Science," was first communicated from France to the Italians, and afterwards to the Spaniards. If this be true, it is at the same time highly probable, as the Spaniards had their "Juglares," or convivial bards, very early, because from long connection they were intimately acquainted with the fictions of the Arabians, and were naturally fond of chivalry, that the troubadours of Provence in great measure caught this turn of fabling from Spain. The communication, without mentioning any other obvious means of intercourse, in an affair of this nature, was easy through the ports of Toulon and Marseilles, by which the two nations carried on from early times a constant commerce. Even the French critics themselves universally allow, that the Spaniards, having learned rhyme from the Arabians, through this very channel conveyed it to Provence. Tasso preferred "Amadis de Gaul," a romance originally written in Spain by Vasco Lobeyra, before the year 1300, to the most celebrated pieces of the Provençal poets. The early universality of the French language very much contributed to facilitate the circulation of the poetry of the troubadours in other countries; and thus they contributed in a very considerable degree to the revival and diffusion of literature in Europe. See *JONGLEURS*, *MINSTREL*, *MYSTERY*, *PROVENÇAL Poets*, *ROMANCE*.

TROUBLES, in *Geology*. See *COAL*.

TROVE, in *Law*. See *TREASURE-Trove*.

TROVER, an action which a man hath against one that, having found any of his goods, refuseth to deliver them upon demand, but converts them to his own use; from which finding and converting, it is called an action of *trover* and *conversion*.

Actions and detinue are frequently turned into actions upon the case, *sur trover* and *conversion*.

The injury in this case lies in the conversion: and, therefore, the fact of the finding, or trover, is now totally immaterial; for the plaintiff needs only suggest (as words of form) that he lost such goods, and that the defendant found them; and if he proves that the goods are his property, and that the defendant had them in his possession, it is sufficient. But a conversion must be fully proved; and then in this action the plaintiff shall recover damages equal to the value of the thing converted, but not the thing itself; which nothing will recover but an action of detinue or replevin. See *RESTITUTION of stolen Goods*.

TROUGH, a hollow wooden vessel for kneading dough

in, or to beat apples in for cyder; also a piece of the trunk of a tree made hollow, to feed swine in; or an open pipe or channel, made of boards, for the conveyance of water.

TROUGH of the Sea, is the hollow cavity made between two waves, or billows, in a rolling sea.

When a ship lies down there, they say, she lies in the trough of the sea; in which case she rolls heaviest, because the setting of the sea is always produced by the wind, and, consequently, the waves, and the trough between them, will be at right angles with the direction of the wind.

TROUP HEAD, in *Geography*, a cape of Scotland, on the north coast of the county of Bamff; 10 miles W. of Kinnaird's Point. N. lat. 57° 39'. W. long. 2° 11'.

TROUPSBURGH, a township of New York, in the United States, situated in the S.W. corner of Steuben county, 25 miles S.W. of Bath village, erected in 1808, from the S. part of Canisteo and a small part of Addison, and extended to Allegany county in 1811; bounded N. by Canisteo, E. by Addison, formerly Middletown, S. by the state of Pennsylvania, and W. by Allegany county. It is 18 miles long E. and W., and about 10 miles wide. The population in 1810 consisted of 292 persons and 36 senatorial electors.

TROUS de Loup, in *Field Fortification*, are round holes, about six feet deep, and pointed at the bottom, with a stake placed in the middle. They are frequently dug round a redoubt, to obstruct the enemy's approach. At top they are circular, and about four feet and a half in diameter.

TROUSSEQUEUE, in the *Manege*. See *DOCK*.

TROUSSEQUIN, a piece of wood, cut archwise, raised above the hinder bow of a great saddle, and serving to keep the bolsters firm.

TROUT, *Salmo fario* of Linnæus, in *Ichthyology*, a very valuable river-fish. See *SALMO Fario*.

The colours of the trout, and its spots, vary greatly in different waters, and in different seasons; yet each may be reduced to one species. In Llyndivi, a lake in South Wales, are trouts called *coch y dail*, mentioned by Pennant. See *SALMO Fario*.

In Lough Neagh, in Ireland, are also trouts called *buddaghs*, some of which weigh thirty pounds; and others of a much superior size are taken in Hulfe-water, a lake in Cumberland, supposed to be the same with the trouts of the lake of Geneva. In the river Eynion, not far from Machynlleth in North Wales, and in one of the Snowdon lakes, is found a variety of trout, naturally deformed, having a strange crookedness near the tail.

The Hon. Mr. Daines Barrington suggests, that *gillaroo*, the name given to certain trouts in the Irish lakes, (see *SALMO Fario*,) may be either a corruption of Killaloe, the name of a town near which these trouts are caught, or formed of the Welsh *cylla*, q. d. *stomach*, and the Irish *ruadh*, q. d. *strong*; so that *gillaroo* may be the same as strong stomach. From the observations both of Dr. Watson and Mr. J. Hunter, there is no reason for considering the stomach of these trouts as gizzards, but as true stomachs. That of the English trout is of the same kind with the stomach of the *gillaroo* trout, but its coat is not so thick by two-thirds: and, therefore, the difference in the thickness of the stomach, which may be occasioned by the nature of the waters, or adapted to the purposes of comminuting a greater quantity of shell-fish than the stomachs of our trouts, does not warrant its being classed as a distinct species. The stomach even of the *gillaroo* trout can possess scarcely any power of grinding, as the whole cavity is lined with a fine villous coat, the internal surface of which appears every where to be digestive, and by no means fitted for mastication.

tication. These stomachs are sometimes served up at table in Ireland, under the name of gizzards. See on this subject, Phil. Trans. vol. lxiv. part i. p. 116. 121. 310.

Trouts are a very voracious fish, and afford excellent diversion to the angler (see *Trout-Fishing*): they shift their quarters to spawn, and, like a salmon, make up towards the heads of rivers to deposit their roes. The under jaw of the trout is subject, at certain times, to the same curvature as that of the salmon.

Mr. Pennant has described a species that migrates out of the sea into the river Esk, in Cumberland, from July to September, and called from its colour the *whiting*. When dressed, its flesh is red, and most delicious eating. On their first appearance from the salt-water, they have the salmon-like adhesion to them. They have both melt and spawn, but no fry has as yet been observed. The Scots call this fish *phinocs*; they never exceed a foot in length; the upper jaw is a little longer than the lower; in the first are two rows of teeth, in the last one; and on the tongue are six teeth; the back is straight; the whole body of an elegant form; the lateral line straight; the colour between that and the top of the back, dusky and silvery intermixed, beneath the line of an exquisite silvery whiteness; first dorsal fin spotted with black; the tail black and much forked; the first dorsal fin has eleven rays; the pectoral thirteen; the ventral nine, and anal nine. Pennant's Brit. Zool. vol. iii. p. 302.

TROUT, *Salmon*. See *SALMO Trutta*.

TROUT-*Fishing*. See *Trout-Fishing*.

TROUT-*Coloured*. A horse is said to be of this colour, when he is white, and speckled with spots of black, bay, or sorrel; especially about the head and neck.

TROUT *Creek*, in *Geography*, a southern branch of Salmon creek, in Franklin county, New York, on which are mills in Ezrville, Dickinson, and Constable.

TROUTBECK, a river of England, in Westmoreland, which runs into the Eden, 3 miles below Appleby.

TROW, a kind of boat, sometimes with square and upright head and stern.

TROWBRIDGE, in *Geography*, a considerable market and manufacturing town in the hundred of Melkham and county of Wilts, England; is situated at the distance of 28 miles N.W. from Salisbury, and 98 miles W. by S. from London. Neither the etymology of its name, nor the period of its origin, can be ascertained with accuracy; but as it is not mentioned in Domesday book, we may conclude that it had no existence when that work was compiled. The earliest notice of it in history occurs in the reign of king Stephen, about the year 1150, when it appears that Trowbridge castle was occupied by the partisans of the empress Maud, and was besieged and taken by Stephen; but whether there was any town at that era does not appear. It is certain, however, that the lordship of Trowbridge formed part of the estates of Henry, duke of Lancaster, whose daughter Blanche married John of Gaunt, son of Edward III. When Lancaster was constituted a county-palatine, this manor, as part of the duke's property, was recognized in the charters as one of the honors attached to it; and here it is probable the court of chancery for the duchy was held, as the rents for the same are paid at Trowbridge to this day. As the entire duchy of Lancaster was vested in the king in the reign of Henry VII., this town, as belonging thereto, became a royal demesne. In the next reign it was granted to Edward, earl of Hereford, afterwards duke of Somerset, at whose attainder it again reverted to the crown. It was restored to his son by queen Elizabeth, and continued the property of his collateral descendants till the reign of Charles I., when sir Francis Seymour was created baron Seymour of Trowbridge. It afterwards passed

to the family of Manners, by the marriage of lady Frances Seymour with John, marquis of Granby; and from him descended to the present duke of Rutland, who sold it in 1809 to Thomas Timbrell, esq.

Like the generality of manufacturing towns, Trowbridge is very irregularly built. None of the streets seem to have been formed on any regular plan, but have been constructed according as private interest or convenience suggested. Hence, though there are several handsome houses in the town, yet they appear to disadvantage from the narrowness of the streets, and the intermixture of old and mean buildings. The extent and importance of Trowbridge may be best determined by the parliamentary report of 1811, by which it appears to have then contained 1170 houses, and 6075 inhabitants. Of the latter, the greater part was engaged in the woollen manufacture, which was first established here in the early part of the reign of Henry VIII. Leland, who lived in that reign, gives the following account of this town. "From Bradeforde to Thorough-bridge, about a two mile by good corne, pasture, and wood, I enterid into the towne by a stone bridge of three arches. The towne standith on a rocky hille, and is very well buildyd of stone, and flourisheth by drapery. Of later tymes, one James Terumber, a very rich clothier, builded a notable faire house in this town, and gave it at his deth, with other landes, to the finding of two Cantuaric prestes yn Thorough-bridge church. This Terumber made also a little almshouse by Thorough-bridge church, and yn it be a six poore folkes, having a three-pence by the week towards their finding. Horton, a clothiar of Bradeforde, builded of late dayes dyvers fine houses in this town. Old Bayllie buildyd of late in this town; he was a rich clothiar; Baillie's fun now drapeth yn the town, and also a two miles out of it, at a place yn the way to Farley castel. One Alexandre is now a great clothiar in the towne." The cloths now principally manufactured here are superfine broad-cloths and kerseymeres: the weekly produce is estimated at ninety pieces of the former, and four hundred and ninety pieces of the latter. Trowbridge not being incorporated, its government is vested in the county magistrates, who hold the petty sessions for the Trowbridge division of the hundred alternately here and at Bradford. A court-leet and a court-baron are also annually held; in the former the constables, tything-men, and cornets of the market are appointed. The duty of the last-mentioned officers is to inspect the provisions brought to the market, and to see that the weights and measures accord with the proper standards. The market-day is Saturday; and a fair is held annually, at which considerable quantities of woollen goods, cattle, cheese, &c. are sold. In the market-place formerly stood a stone cross, which was taken down towards the end of the last century, on the pretence of its obstructing the communication of the High-street, and injuring its appearance. It is thus noticed by Leland: "There is a fair standing place for market-men to stand yn, in the harte of the towne, and this is made vñ square, and a pillar in the midle, as there is one made in Malmesbyri far fairer than this." The church of Trowbridge, though upwards of four hundred years old, is still characterized by the appellation of *New Church*, which implies that another must have previously existed here. By whom the new structure was raised is not distinctly recorded; but it appears probable, that a great part of the expence was incurred by James Terumber, the rich clothier mentioned by Leland, and the remainder by other benevolent individuals connected with the town. This opinion is founded on the contents of a deed of feoffment by Terumber, dated January 11, 1483, and preserved in the vestry-room; by which he directs that, out of his estates therein enumerated, ten marks should be paid

paid yearly to a priest to pray for his soul, and the souls of all other benefactors whose names should be comprised in a table hanging at the high altar. Considered in an architectural point of view, this church is deserving of notice. Leland styles it "lightsum and fair," and tells us that one Molines, "a man welle lernid," was parson there in his time. It is a spacious edifice, and consists of a nave, chancel, two side-aisles, with chapels attached, a north and south porch, and a large tower at the west end, surmounted by a taper spire. The nave and aisles are embattled, and are ornamented with crocketed pinnacles. Both porches are unusually lofty. The nave has a flat ceiled roof, highly decorated with flowers: it is separated from the aisles by five arches on each side, supported by clustered columns with ornamented capitals. Some of the windows contain fragments of painted glass, particularly the east windows of the chapels, which are large, and display seven dayes or lights, separated by mullions. The font is lofty, and covered with a profusion of tracery and panelling, with sculptural representations on shields, emblematical of the crucifixion. The living is a rectory, in the gift of the duke of Rutland, he having reserved the advowson when he sold the manor: the present rector is the Rev. Mr. Crabbe. This church is the only place of religious worship on the establishment in the town; but there is a chapel of ease dependent upon it at Staverton, a hamlet within the parish. Like most manufacturing towns, Trowbridge abounds with Dissenters, and consequently contains several meeting-houses. The charitable institutions in Trowbridge are an alms-house, and a school for the education of thirty boys. The former was founded by a person of the name of Yerbury. The school-house stands in the church-yard, near the spot where the alms-house erected and endowed by Ternmer was placed, which has been recently taken down, and the funds appropriated to the use of the parish poor generally. Of the castle no part is now standing; but its site is distinguishable by the remains of the moat and valla by which it was surrounded. It is more elevated than the town, and still retains, in the appellation Court-hill, a marked allusion to its ancient appropriation. As there are no data to determine by whom the castle was erected, so the period of its demolition is equally uncertain; but it must have occurred previous to the reign of Henry VIII., for Leland says of it, "The castell stode on the south side of the toun. It is now clene down. There was in it a seven gret toures whereof peaces of two yet stonde." The castle was formerly approached from the town by a drawbridge over the moat, which has given occasion to a plausible conjecture that the name Trowbridge is a corruption of Drawbridge, near which the retainers of the castle might probably have built their houses in the infancy of the town. This supposition derives some support from the fact, that some of the buildings adjoining Court-hill possess considerable marks of antiquity.

Among the distinguished natives of this town is George Keate, a writer of considerable eminence in the last century. He was descended from the ancient and opulent families of the Hungerfords and Seymours. He died June 27, 1797, aged 67.

About two miles to the south-east of Trowbridge is Rowd Ashton, the seat of Richard Godolphin Long, esq. one of the present representatives of the county of Wilts. The house is large and commodious, and has lately undergone considerable alterations and improvements, under the superintendance of Jeffrey Wyatt, esq. architect. The park is extensive and well wooded.—Beauties of England and Wales, vol. xv. Wiltshire, by John Britton, F.S.A. 1815.

TROWEL. See BRICK-Layer.

TROWEL, *Garden*, a tool of the trowel kind, which is

made of iron, in a hollow or scooped form, and is an useful implement in taking up numerous sorts of small plants and bulbous roots, and replanting them in pots, sowing in patches, and various other similar light works: it should be from six to twelve inches long in the plate, and half as broad, and fixed on a short handle, to hold with one hand. From its being hollowed femicircularly, it is remarkably handy in removing many sorts of small plants with a ball or lump of earth whole about their roots, so as not to feel their removal; lifting several sorts of bulbous flower-roots, after the flowering is past in summer; planting bulbs in patches or little clumps about the borders, as also for digging small patches in the borders for sowing hardy annual flower-seeds on; likewise for filling mould into small pots in planting any sort of plants, stirring the surface of the mould in pots, and fresh earthing them when necessary: it is also highly useful for filling in earth about plants in hot-beds, and under frames, or any small compartments where a spade cannot be readily introduced.

They should be had of different sizes to suit different purposes.

TROWERT ISLAND, in *Geography*, a small island in the East Indian sea, near the south coast of Java. N. lat. 7° 2'.

TROWERYN, a river of North Wales, which rises from a lake in Merionethshire, and runs into the Dee.

TROWLE, or TROLE, *the Bowl*, in *English Antiquity*, was a common phrase in drinking for passing the vessel about, as appears from several of our old catches.

TROWSERS, among *Sailors*, a sort of loose breeches of canvas, worn by seamen, &c.

TROXIMON, in *Botany*, from $\tau\rho\upsilon\chi\iota\mu\omicron\varsigma$, *eatable*, a name chosen by Gærtner, without much propriety, for this genus, which he very justly distinguished from TRAGOPOGON; see that article, as well as ARNOPOGON, thereunto subjoined.—Gærtner. v. 2. 360, no figure. "Perf. Syn. v. 2. 360." Pursh v. 2. 505.—Class and order, *Syngenesia Polygamia-equalis*. Nat. Ord. *Compositæ-semisfœculosæ*, Linn. *Cichoraceæ*, Juss.

Gen. Ch. *Common Calyx* simple, ovate, of numerous lanceolate equal scales, in two rows. *Cor.* compound, imbricated, uniform. Florets various in number, all perfect, of one petal, ligulate, longer than the calyx, abrupt, with five teeth. *Stam.* Filaments, in each floret, five, capillary; anthers united into a long furrowed tube. *Pist.* Germen, in each floret, oblong; style thread-shaped, the length of the stamens; stigmas two, revolute. *Peric.* none, except the permanent, finally spreading, calyx. *Seeds* solitary, oblong, slender; down sessile, capillary, roughish. *Recept.* naked, dotted.

Ess. Ch. *Receptacle* naked, dotted. *Calyx* of several leaves, in a double series. *Seed-down* simple, sessile.

Obs. We do not find the calyx ever "imbricated with unequal scales," as Gærtner says it sometimes is. Such a character belongs to *Sonchus*. Neither is it perfectly simple; for, as far as we can discern in every known species, the scales, or leaves, stand in a double row, or circle, the outer ones alternate with, and overlapping the inner, at their base. The simple seed-down essentially distinguishes this genus from *Tragopogon*, nor are the habits of the plants similar.

1. *T. glaucum*. *Glaucous Troximon*. Pursh n. 1. Curt. Mag. t. 1667. (*Tragopogon Dandelion*; Linn. Sp. Pl. 1111. Willd. Sp. Pl. v. 3. 1495. *Leontodon Dandelion*; Linn. Sp. Pl. ed. 1. 798. *L. foliis linearibus integris, caule erecto simplici*; Gron. Virg. ed. 1. 90.)—Stalks radical, single-flowered. Leaves linear-lanceolate, entire, smooth, glaucous on both sides. *Calyx-scales* somewhat beaked.

—Native

—Native of the banks of the Missouri. Biennial, with bright-yellow flowers. *Pursh*. Dr. Sims says perennial. —The original specimen was sent by Clayton from Virginia, in 1734, to Gronovius, who communicated it to Linnæus, inscribed “Dandelion with undivided leaves.” Hence the latter took his specific name, the meaning of which he probably did not investigate, and he might perhaps call it *Dandelion*! The name is, at any rate, as bad as can possibly be, and we are happy in getting rid of it, by discovering the plant to be Mr. Pursh’s first species of *Troximon*. Of this indeed neither this author, nor any one else, was aware; but though we have seen no specimen from Mr. Pursh, his specific character leaves no doubt in our mind, and Gartner originally suggested that this Linnæan *Tragopogon* was a *Troximon*. The leaves are radical, glaucous, very smooth, even, quite entire, four or five inches long, taper-pointed, with a solitary mid-rib, and some slight longitudinal veins. *Flower-stalks* half as long in our specimen, but they probably are incomplete; Gronovius says twice as long; they are simple, clothed in the upper part with prominent, tawny, glandular bristles, most crowded just under the flower, which is yellow, above an inch wide. *Calyx* smooth and glaucous, shorter than the corolla, its leaves folding over one another as described in our generic character, but of equal length, not truly imbricated. The point of each is pale, a little dilated and membranous, or, as Pursh says, *cuspidate*. *Seed-down* sessile and rough, not feathery. Gronovius rightly noted this circumstance. We can scarcely doubt the figure in Curtis’s Magazine being our plant, though a larger specimen. The roughness of the flower-stalk indeed is wanting, and the points of the calyx not shewn.

2. *T. lanatum*. Woolly *Troximon*. (*Tragopogon lanatus*; Linn. Sp. Pl. 1111. Willd. Sp. Pl. v. 3. 1495. *Leontodon lanatum*; Linn. Am. Acad. v. 4. 287; excluding the reference to Rauwolf, 117, not 217, which rather belongs to *SCORZONERA tuberosa*; see that article, n. 12.)—Leaves linear-lanceolate, undulated, clothed with shaggy hairs, as well as the radical flower-stalks and calyx.—Native of Palestine, from whence, if we mistake not, the Linnæan specimen was brought by Hasselquist. The root has a perennial aspect, its crown bearing several tufts of upright, narrow, sheathing leaves, three or four inches long, considerably undulated, entire, loosely clothed, on both sides, with long, soft, shaggy, woolly, or rather silky, hairs: the bases of the outer ones pale, dilated, membranous and smooth. *Flower-stalks* radical, solitary from the centre of each tuft of leaves, and rather exceeding them in height, angular, covered with similar hairs to those of the foliage. *Flowers* solitary, erect, yellow, nearly the size of the last, but with fewer *florets*. *Calyx* hardly so long as the corolla, very shaggy at the base, its leaves eight or ten, in two rows, lanceolate, equal, straight, hairy, somewhat membranous at the edges. We can just perceive, in the flowers, that the *seed-down* is simple and rough. Gartner has indicated the true genus of this species, as well as of the foregoing. It appears nearly related to *Scorzonera tuberosa*, a plant we have never seen; but whose pubescence is not described as at all like that before us; and the recurved or revolute points of its *calyx-scales*, which moreover are unequal, and truly imbricated, in Pallas’s figure, remove all ambiguity.

3. *T. virginicum*. Virginian Branching *Troximon*. Pursh n. 2. (*Tragopogon virginicum*; Linn. Sp. Pl. 1111. *Hyoseris prenanthoides*; Willd. Sp. Pl. v. 3. 1615. *H. amplexicaulis*; Michaux Boreal.-Amer. v. 2. 87.)—Smooth and glaucous. Stems erect, somewhat leafy, with several flowers.—In meadows and moist shady woods, from

Pennsylvania to Carolina, flowering in July and August. Root perennial. Herb about a foot high, with handsome yellow flowers. *Pursh*. The radical leaves are either ovate or lyrate, obtuse, wavy or toothed, tapering down into sheathing membranous *footstalks*, together with which they measure about four inches; those of the stem few, ovate-oblong, sessile, sheathing, the uppermost diminished to one or two *bractæas*, at the base of the long partial *flower-stalks*, three or four of which together compose a sort of *umbel*. *Flowers* erect. *Calyx* of eight or ten glaucous smooth leaves, half an inch in length. *Florets* twice as long, not very numerous. *Seeds* few, smooth. *Receptacle* small, dotted, naked.—Specimens from Kalm and others from the late Dr. Muhlenberg differ widely in their foliage, that of the former being deeply lyrate, the latter scarcely toothed; yet the plants are so alike in other respects, that we cannot, without further information, distinguish them as species.

4. *T. cuspidatum*. Pointed-scaled *Troximon*. Pursh 742. “Stalk radical, single-flowered; rather downy in the upper part. Leaves linear, downy and wavy in the margin. *Calyx-scales* imbricated, pointed, smooth.”—Found by Mr. Bradbury, in Upper Louisiana. Perennial. *Flowers* large, yellow. Resembles *T. glaucum*. *Pursh*. By the specific character, we should be inclined to suspect this might be the *Leontodon Dandelion* of Linnæus, our first species of *Troximon*, were not the size of the flowers against it.

TROY, or ILIUM, in *Ancient Geography*, a city of Troas, or Phrygia Minor (which see), rendered immortal by the inimitable poems of Homer and Virgil, was built by Tros, king of that country, who called it Troy from his own name, and Ilium from that of his son Ilius. It was seated on a rising ground near mount Ida, and about five miles from the shore. Of this city, there subsisted scarcely any remains in the time of Strabo; and most of the ancient as well as modern writers have confounded the old and new Ilium. The new city, built nearer the sea-coast, was reduced to a village in the time of Alexander the Great, and was remarkable for nothing but a temple of Minerva, which that prince visited, after having defeated Darius on the banks of the Granicus, and enriched with offerings, bestowing ample privileges on the place, and honouring it with the title of city. He likewise ordered the buildings to be repaired, and the whole city to be embellished by Lyfimaclus, one of his generals, who surrounded it with a wall of forty furlongs in circumference. It was again reduced to the condition of an inconsiderable village, when the Romans first entered Asia. As they pretended to be the genuine offspring of the ancient Trojans, no cost nor pains were spared to restore it to its ancient lustre, especially in the time of the Cæsars. Augustus sent thither a colony, embellished the city with many stately buildings, and enriched it with ample privileges and exemptions. Bellonius tells us, that in his time the walls were yet standing, with the ruinous monuments of their turrets; and that he spent four hours in compassing them, partly on horseback and partly on foot. He observed round the walls a great many marble tombs of exquisite workmanship, with their covers entire. Two of these were still remaining when M. Spon visited those places; who informs us, that they were in the style of the ancient Romans, and not unlike those that are to be seen at Arles; whence he concludes them to be the remains of that Troy which was rebuilt by the Romans. Bellonius likewise observed the ruins of three great towers, one on the top of a hill not far from the shore, another about the middle, and the third at the bottom, with a great many large cisterns to receive the rain-water. Spon observed on the south of the haven three columns lying among the briars, of which two were entire, and each of one single piece, being

thirty feet long; the third, which was broken in three places, was thirty-five feet in length, and four feet nine inches in diameter: they were all three full of granite. Le Brun speaks of great remains of a most noble structure, which he visited, at the distance of about five miles from the coast. The four gates of this great edifice, at that time entire, were about forty-five feet in height, and near them stood a wall of an extraordinary thickness, with fourteen gates of a competent size. The vestiges of this magnificent structure took up a hundred and thirty feet in length, and a hundred in breadth. Our author thinks, that these ruins may vie with any monuments of antiquity he ever saw. The harbour of Troy, so much spoken of by the ancients, is now quite choked up with sand; however, there are still to be seen fragments of columns, to which they fastened their ships and galleys; and, as these were placed round it, Spon thinks that the port was about a mile and a half in circumference.

The town of Ilium, or Troy, was fortified by Laomedon, the successor of Ilus, with walls of such uncommon strength, that, in the language and belief of the times, they were deemed the work of the gods. It is said that he was assisted by Apollo and Neptune, or that he carried on and accomplished this great work with the treasures that were consecrated to them and lodged in their temples, which he plundered. It is certain, however, that the guilt of Laomedon was believed to entail calamity on his unhappy descendants. His son Priam, who attained old age in the undisturbed possession of a throne, surrounded by a numerous family, beloved by his subjects, and respected by his neighbours, was destined to feel the sharpest pangs of human misery, in a long protracted war and siege, the causes of which are thus detailed by one of the modern historians of ancient Greece.

Hereditary feuds subsisted between the ancestors of Priam and those of Agamemnon, when the latter quitted their establishments in Asia, to seek new settlements in Greece. The insult offered to Ganymede, a beautiful Trojan youth, by the brutal fury of Tantalus, was retorted on Menelaus, the fourth in descent from this infamous prince, by the rape and detention of his queen, the celebrated Helen. Paris, the ill-fated son of Priam, was the author of this new injury. But resentment for the wrongs of his house formed not the only motive which engaged the youthful levity of Paris to dishonour the sister-in-law of Agamemnon. Helen was the daughter of Tyndareus, king of Sparta. The illustrious honours of her family were adorned by the generous magnanimity of her brothers, Castor and Polydeuces, whose exploits shone conspicuous in all the military expeditions of that gallant age. But the native lustre of Helen needed not the aid of foreign ornament. Even in the tender age of childhood, her opening charms had inflamed the heart of Theseus, the most admired and the most virtuous of the Grecian chiefs. The fame of her beauty increased with her ripening age, and her person became an object of eager contention among those who, by birth or merit, were entitled to aspire at the invaluable prize. Tyndareus, solicitous to prevent the violence of a second lover (for, agreeably to the manners of his age, Theseus had carried her off by force), bound the various suitors by oath to defend the honour of his daughter, and to secure the possession of her charms to the man who should be honoured with her choice. The princely mien and insinuating manners of Menelaus, were preferred to the more solid qualities of his numerous competitors. Having married the heiress of Tyndareus, he succeeded, in her right, to the Spartan throne. The graceful pair had not long enjoyed the honours of royalty, and the sweets of conjugal union, when their happiness was

interrupted by the arrival of the son of Priam, the handsomest man of his age, and singularly adorned with the frivolous accomplishments that often captivate the weakness of a female mind. Though a soldier of no great renown, Paris had strongly imbibed the romantic spirit of gallantry, which prevailed in the heroic ages, and was distinguished by an ardent passion for beauty, which, notwithstanding the general softness of his unwarlike character, prompted him to brave every danger in pursuit of his favourite object. Animated by the hope of beholding the inimitable model of what he most adored, he seized the opportunity afforded him by a voyage of Menelaus into Crete, visited the dominions of his hereditary enemies, and solicited the rites of hospitality at the Spartan court.

His person, his accomplishments, his address, and still more the voluntary hardships which he had endured for her sake, seduced the inconstant affections of the Grecian queen. Enamoured of the elegant stranger, she abandoned her country and her husband, and having transported her most valuable treasure within the Trojan walls, defied the resentment of Greece, and the vengeance of heaven.

It was now the time for Menelaus to crave the stipulated assistance of his ancient rivals. His demand was enforced by the authority of Agamemnon. At the summons of the two brothers, the confederates assembled at Ægium, the capital of Achaia; confirmed the obligation of their former promise; settled the proportion of troops to be raised by each prince; determined the time and place of their departure; and named Agamemnon, the most powerful among them, to the chief command, in an expedition which so deeply concerned the honour of his family.

Aulis, a sea-port of Bœotia, was appointed for the place of rendezvous and embarkation. Before the whole armada sailed from thence, Ulysses, king of Ithaca, and, what may seem extraordinary, the injured Menelaus, undertook a solemn embassy to Troy, in order to demand restitution and reparation; but returned highly disgusted with their reception and treatment. Some members of the Trojan council had the barbarity to propose putting them to death. Their just indignation increased the warlike ardour of their associates. But contrary winds long retarded their departure. The Trojans had time to strengthen their ramparts, to collect arms and provisions, and to summon the assistance of their distant allies. The martial spirit of the age, together with a sense of common danger, brought many powerful auxiliaries to Priam. His cause was defended by the hardy mountaineers, who covered the back of his kingdom; by the Carians, Lycians, and other nations of Asia Minor, extending from the mouth of the river Halys to the southern extremity of Cilicia; and by the Pelasgi, Thracians, and Præonians, fierce barbarians who inhabited the European side of the Hellespont and Propontis. Confiding, however, rather in their domestic strength, than in foreign assistance, the Trojans determined to defend their native shores against hostile invasion. The debarkation of the Greeks was purchased by much blood. Having effected a descent, they encamped on the Trojan plain, but lost the only opportunity which they enjoyed, during many years, of crushing at once the power of their enemies; who immediately shut themselves up within their impenetrable walls, leaving the city open only on the side of mount Ida, from which they received corn, cattle, and other necessary supplies.

Agamemnon, as there was reason to expect from the manners of his age, had been more industrious in collecting a great army, than provident in contriving means by which it might keep the field. The provisions, transported from Greece, were speedily consumed, while the operations of the siege

siege promised little hopes of success, the Greeks being unacquainted with any military engines fitted to make an impression on the Trojan walls. With such a numerous army, they might have converted the siege into a blockade; but scarcity of supplies compelled the greater part of them to quit the camp. The resource of ravaging the adjacent country soon exhausted itself. Many betook themselves to cultivating the rich vales of the Chersonesus, whose industrious inhabitants had recently been expelled, or destroyed, by the fierce incursions of the barbarous Thracians. Others had recourse to piracy, scoured the neighbouring seas, ravaged the unprotected coasts of the Hellepont and Ægean, and plundered or demolished such unfortified places as acknowledged the dominion, or assisted the arms of Troy. These ravages excited the rage of the Asiatics, and rendered them more hearty in the cause of their confederates. In this manner nine summers and winters elapsed, without affording the nearer prospect of a decision to the contest; but, in the tenth year of the war, the seeming misfortunes of the Greeks precipitated the downfall of the proud city of Priam. A dreadful pestilence invaded the camp of the besiegers, and long continued to rage with unabating fury. This calamity was followed by the well-known quarrel between Agamemnon and Achilles, which deprived the Grecian army of its principal strength and ornament. The Trojans derived new spirits from the misfortunes of their enemies; they ventured to abandon the protection of their walls, boldly assailed the Grecian camp, and risked several engagements, in most of which they were victorious. In the last of these, the beloved friend of Achilles was slain by the arm of Hector, the bravest and most generous of the Trojan race. This event, which was infinitely more dreadful than death to the affectionate ardour of the Grecian chief, stifled his hitherto inexorable resentment against the proud tyranny of Agamemnon. His return to the camp restored the declining fortune of the Greeks; and the indignant fury of his rage was quenched in the detested blood of Hector, whose patriotic valour had long been the firmest bulwark of his father's kingdom. The destruction of Troy soon followed the death of her darling hero. The city, whether taken by storm or by surprise, was set on fire in the night; most of the citizens perished by the sword, or were dragged into captivity; and only a miserable remnant escaped through the confused horror of raging flames and expiring kinsmen.

The burning of Troy happened eleven hundred and eighty-four years before the Christian era. Neither the city nor territory ever assumed, in any succeeding age, the dignity of independent government. The sea-coast was planted, eighty years after the Trojan war, by new colonies from Greece; and the inland parts submitted to the growing power of the Lydians, whose arms overpread and conquered all the finest provinces of Lesser Asia.

The Greeks had recovered possession of the admired beauty of Helen; they had taken complete vengeance on the family and nation of her unhappy seducer; but the misfortunes which were the natural consequence of the Trojan expedition, left them little reason to boast of their victory. Of five Bœotian commanders, only one remained, and the siege had been proportionably fatal to the leaders of other tribes, as well as to their warlike followers. Those who lived to divide the rich spoils of Troy, were impatient to set sail with their newly-acquired treasure, notwithstanding the threatening appearance of the skies. Many of them perished by shipwreck; the rest were long tossed on unknown seas; and when they expected to find in their native country the end of their calamities, they were exposed to suffer greater calamities there, than any which they had yet endured. The

thrones of several of the absent princes had been usurped by violence and ambition; the lands of various communities had been occupied by the invasion of hostile tribes; even the least unfortunate of those adventurers found their domains uncultivated, or their territories laid waste; their families torn by discord, or their cities shaken by sedition. And thus the most celebrated enterprise of combined Greece tended to plunge that delightful and once happy country into barbarism and misery. Gillies's Hist. of Anc. Greece, vol. i.

All the Roman writers assure us that Æneas settled in Italy, and there founded the kingdom of Alba. From him the Cæsars affected to derive their pedigree. Livy alone seems to betray some sort of doubt as to this particular, insinuating, with a great deal of reserve, that he has not sufficient grounds either to admit or reject the common opinion. But, notwithstanding the unanimous consent of the Latins, there are not wanting arguments of great weight, which the learned Bochart has carefully collected, to prove the arrival of Æneas in Italy to be a mere fable.

Dr. Gillies having carefully examined the evidence given by Bochart (Epist. num Æneas unquam fuit in Italia), and by Mr. Wood (Essay on the original Genius of Homer), to prove that the descendants of Æneas reigned in Troy, observes, that notwithstanding the learned ingenuity of a profound, and the plausible criticism of an elegant scholar, the matter seems still too doubtful to warrant contradicting the popular opinion. Some few writers, both ancient and modern, have regarded Homer's account of the siege of Troy as a mere fiction, or the result of a poetical imagination. Thus Dion Chrysostom (Orat. xi.) attempts to prove that the siege and destruction of Troy by the Greeks is altogether fabulous, and destitute of any foundation in truth. But his performance has been generally regarded as a mere *jeu d'esprit*, since the author elsewhere (περὶ ἀσκητικῆς, p. 225.) disproves what he endeavours to establish in the place before cited. Indeed the siege and capture of Troy are transactions so well attested, and form so remarkable an epocha in history, that they cannot be justly questioned. Nevertheless the learned Bryant, not long ago, published two pamphlets with a view of refuting the generally received opinions respecting the existence of Asiatic Troy, and the authenticity of the leading facts in the history of the Trojan war: but his arguments and conclusions have been examined, and, in our opinion, satisfactorily refuted, by Mr. G. Wakefield, in his "Letters to Jacob Bryant, Esq. concerning his Dissertation on the War of Troy;" and J. B. S. Morritt, esq. in his "Vindication of Homer, and of the ancient Poets and Historians, who have recorded the Siege and Fall of Troy;" as well as the testimony of Le Chevalier, and other modern travellers. See Olivier's Travels in the Ottoman Empire, &c.

TROY, *Epocha of the Destruction of*. See EPOCHÆ.

TROY, FRANCIS DE, in *Biography*, was born at Toulouse in 1645. He was the son of Nicholas de Troy, a painter of little celebrity, from whom he received the first rudiments of design; but he was sent to Paris when young, where he studied historical painting under Nicholas Loir, and became a member of the Academy in 1674. He afterwards attached himself to the more lucrative profession of portrait painting, and became celebrated in that line. He was sent by Louis XIV. to the court of Munich, to paint the portrait of Maria-Christiana of Bavaria, afterwards dauphiness of France. His own portrait is placed in the gallery of Florence. Among the historical pictures which he produced, one of the most renowned was painted for the church of St. Genevieve, in which the magistrates of Paris were represented invoking that saint. He died at Paris in 1730.

TROY, JOHN DE, was the son of Francis, and born at Paris in 1676. After receiving the instruction of his father in the art of painting until he had made considerable progress, he travelled to Italy, where he studied some years, and soon after his return to Paris he was made a member of the Academy. He was employed by Louis XIV., for whom he painted a series of cartoons for tapestry, representing the history of Esther; and several large allegorical subjects for the Hotel de Ville. The king appointed him director of the French Academy at Rome, where he resided great part of his life; and he acquitted himself in the administration of his office in a most respectable manner. His majesty conferred upon him the order of St. Michael, and honoured him with other marks of his particular esteem. He was not less distinguished as a painter of portraits than of history. He died in 1752, aged 76.

TROY, in *Geography*, a post-township, the capital of Renfelaer county, on the E. bank of the Hudson, six miles above Albany; bounded N. by Lansingburgh, E. by Brunswick, S. by Greenbush, W. by the Hudson, or the county of Albany. The flourishing village of Troy is in this township, from which it has its name. Along the river are extensive flats, and the river-hill is mostly arable. In the S. where the hills approach nearest the river, are some fine streams for mills, and falls of a great height. There are few places on the Hudson, of the same area, that combine more advantages for a populous town. The soil is good, and here are excellent facilities for water-works; and near the head of sloop-navigation on one of the best rivers in America. In 1810, the whole population was 3895, including 89 slaves, and the number of electors was 334.

The village of Troy is agreeably situated on a gravelly plain, on the E. bank of the Hudson, six miles N. of Albany; it is regularly laid out in streets and squares, and contains 660 houses and stores, five places of worship, two banks, the court-house and prison for the county, a market-house, and many other buildings. Many of the houses, though built of wood, are large and elegant, and those of brick form a considerable number of the whole. The streets are wide, with sufficient side-walks, but unpaved. River-street, the principal avenue, extends about a mile along the river, and receives all the other streets that run N. and S. as well as E. and W. in right lines, forming the rear space into perfect squares, and the straight streets are sixty feet wide. The manufactures are considerable, and trade is extensive, as it employs a great number of sloops, &c. on the Hudson. In wealth and trade Troy takes the third rank in the state, among its populous towns. The places of worship belong to the Presbyterians, Baptists, Episcopals, Quakers, and Methodists: and here are several school-houses, as well as two banks, with an aggregate capital of 850,000 dollars. The River-hill, that rises in the rear of Troy, is very appropriately called mount Ida, and its fine sides and summits present elegant sites for building that command an extensive view of Troy and the surrounding country. Troy was incorporated in 1801, and is governed by a president and several trustees.

TROY, a town of Massachusetts, in the county of Bristol, containing 1296 inhabitants.—Also, a town of Vermont, in the county of Orleans, containing 231 inhabitants.—Also, a town of the county of Athens, in the district of Ohio, containing 578 inhabitants.—Also, a township of Trumbull county, in the district of Ohio, containing 239 inhabitants.

TROY, White, White of Orleans, or Spanish White, is a name given to a preparation of chalk, which is finely powdered,

formed into cakes, and used in the arts. This chalk is found in great abundance at a village called Villeloup, about four leagues from Troyes in France. It is dug out of the earth in small lumps, and after having been exposed to the air, is bruised and reduced into a gross powder, which is passed through a sieve: when it is perfectly dry, it is diluted with soft water, and formed into a kind of paste, which, being well tempered, is ground very fine in a mill, and used by painters, gilders, &c.: the qualities that peculiarly recommend that substance are, its being very white, friable, and free from all mixture of adventitious earth and stone. The white of Orleans is prepared at Cavereau, a small village about nine leagues from Orleans, and is reckoned inferior in value to the former. Mem. Acad. Sc. 1754. Ephem. Troyennes, an. 1759.

The artificial Troy white, called also Spanish white, is chalk neutralized by the addition of water in which alum is dissolved, and afterwards washed over. It is used by some in water-colours as a white, and may be thus prepared: Take a pound of chalk, and soak it well in water; then wash over all the fine part; and having poured off the first water, add another quantity, in which two ounces of alum are dissolved. Let them stand for a day or two, stirring the chalk once in six or eight hours: wash the chalk again over, till it be rendered perfectly fine, and pour off as much of the water as can be separated from the chalk by that means, taking off the remainder of the dissolved alum, by several renewed quantities of fresh water. After the last water is poured off, put the chalk into a cullender-filtre, with a linen cloth over the paper; and, when the moisture has been sufficiently drained off from it, lay it out in lumps to dry on a proper board. Handm. to the Arts, vol. i. p. 137.

TROY Weight, anciently called *Trone Weight*. See **WEIGHT**.

TROY Pound. See **WEIGHT**.

TROYES, in *Geography*, a city of France, and capital of the department of the Aube, on the Seine: before the revolution the capital of Champagne, and the see of a bishop. It contained fourteen churches, four abbeys, ten convents, a college, and an hospital. The inhabitants carry on a considerable trade in linen, flax, hemp, cotton, stuffs, &c. The environs produce grain, legumes, and fruit in abundance; 18 posts N.N.W. of Dijon. N. lat. 48° 18'. E. long. 4° 10'.

TRSCHITZ, a town of Moravia, in the circle of Olmutz; 10 miles S.S.E. of Olmutz.

TRSEBON. See **WITTGENAU**.

TRSEMESCHNO, a town of the duchy of Warfaw; 10 miles S.E. of Gnesna.

TRUCE, **TREUGA**, a suspension of arms; or a cessation of hostilities between two parties at war, which does not terminate it, but merely suspends its operations.

The word, according to Menage, &c. comes from the Latin *treuga*, which signifies the same; and which Caseneuve derives further, from the German *traue*, or *treue*, which signifies trust.

A truce is either particular or universal: by the former, hostilities cease in particular places, as between a town and a besieging army; by the latter, they are to cease generally, and in all places between the belligerent powers. Particular truces may also admit of a distinction with regard to the acts of hostility, or to the persons; that is, it may be agreed to abstain for a time from certain hostilities, or two armies may conclude a truce, or suspension of arms, without respect to place. A general truce made for many years, differs from a peace in little else than in leaving the original question of the war undecided, as they found it.

Accordingly

Accordingly, truces are frequently concluded between princes, in order to come to a peace; and truces of many years serve in lieu of treaties of peace between princes, whose differences cannot be finally adjusted.

All truces and suspensions of arms are concluded by the authority of the sovereign, who consents to some of them in his own immediate person, and to others through the ministry of his generals and officers. The truce binds the contracting parties from the moment of its being concluded; but cannot have the force of a law with regard to subjects on both sides, till it has been solemnly proclaimed. A ship being on the open seas at the time of publishing the truce, meets with a ship of the enemy, and sinks her; as in this case there is no guilt, she is not liable to pay any damage. If she has made a capture of the vessel, all the obligation she lies under is to restore it, as not retainable by the truce.

If one of the contracting parties, or any person by his order, or with his consent only, commit any act contrary to the truce, it is an injury to the other contracting party; the truce is dissolved, and the party offended is entitled to take up arms, not only for renewing the operations of the war, but also for revenging the recent injury offered it.

Sometimes a penalty on the infractor of the truce is reciprocally stipulated, and then the truce is not immediately broken on the first infraction: if the party offending submits to the penalty, and repairs the damage, the truce subsists, and the party offended has nothing farther to claim. If an alternative has been settled, that in case of an infraction the delinquent shall suffer a certain penalty, or the truce be broken, the party injured may chuse whether he will demand the penalty, or make use of his right to take up arms again.

The time of the truce should be well specified in order to prevent any doubt or dispute from the moment of its beginning to its period. If no term has been specified for the commencement of the truce, as it binds the contracting parties immediately upon its conclusion, it concerns them to cause it to be published immediately, in order to the observance of it; for it becomes binding on the subjects only from the time of its proper publication; and it begins to take effect only from the moment of the first publication, unless the agreement be otherwise. The rules that concern a truce during its continuance are such as follow: Each party may do, within its own territories, what it has a right of doing in time of full peace: advantage is not to be taken of doing what could not be done during the hostilities, *e. g.* continuing the works of a siege, or repairing breaches, and introducing succours. Nothing is to be undertaken in contested places while the truce continues, but every thing is to be left as it was; *e. g.* if the enemy does not relinquish a port, town, or village, the truce forbids an invasion of it: subjects inclined to revolt against their prince are not to be entertained, much less incited to treason: persons or effects of enemies are not to be seized during the truce. Inter-course may be allowed during a truce. At the expiration of the truce the war is renewed without any fresh declaration. See Vattel's Law of Nations, book iii. ch. 16.

TRUCE of God, Treuga Dei, is a phrase famous in the histories of the eleventh century, when the disorders and licences of private wars between particular lords and families obliged the bishops of France to forbid such violences within certain times, under canonical pain.

Those intervals they called *treuga Dei, treve de Dieu*, *q. d. truce of God*, a phrase frequent in the councils since that time. The first regulation of this kind, was in a synod held

in the diocese of Elna in Rouffillon, anno 1072, where it was enacted, that, throughout that country, no person should attack his enemy from the hour of nones on Saturday, to that of prime on Monday, that Sunday might have its proper honour; that nobody should attack, at any time, a religious priest walking unarmed, nor any person going to church, or returning from the same, or walking with women; that nobody should attack a church, or any house within thirty paces around it. The whole under penalty of excommunication, which, at the end of three months, was converted into an anathema.

These quarrels had prevailed even in the time of Charlemagne, and much more after his death; so that the church found it necessary to interpose. The most early of these interpositions, now extant, is towards the end of the tenth century.

In 990, several bishops assembled in the south of France, and published regulations to restrain the violence and frequency of private wars, ordaining that the transgressor should be excluded from all Christian privileges during his life, and be denied Christian burial after his death. To the same purpose a council was held at Limoges, A.D. 994; and several other councils issued their decrees for restraining the evil. But the authority of councils was insufficient; and, therefore, a bishop of Aquitaine, A.D. 1032, pretended that an angel from heaven had appeared to him with a writing, enjoining men to cease from their hostilities, and be reconciled to each other. Accordingly, a general cessation took place, and lasted for seven years; and a resolution was formed, that no man should attack or molest his adversaries from the evening of Thursday in each week, to the morning of Monday in the week ensuing, the intervening days being peculiarly holy; our Saviour's passion having happened on one of them, and his resurrection on another. This sudden change was considered as miraculous, and the respite from hostilities subsequent to it was called the *truce of God*.

This from being a regulation in one kingdom became a general law in Christendom, and was confirmed by the authority of the pope, and the violators were subjected to the penalty of excommunication. The council of Touloujes in Rouffillon, A.D. 1041, issued an act, containing all the stipulations required by the truce of God. The nobles, however, disregarding the truce, pursued their quarrels without interruption. Toward the end of the twelfth century, a new revelation was pretended, and, in consequence of it, an association formed under the title of the "Brotherhood of God." At length Philip Augustus, or St. Louis, published an ordonnance, A.D. 1245, prohibiting any person to commence hostilities until forty days after the offence which caused the quarrel, and the transgressor was to be tried and punished by the judge as a traitor. This was called the *royal truce*, and the regulation was productive of good effects. This was farther enforced by an ordonnance of Philip the Fair, A.D. 1296. See Robertson's Hist of Charles V. vol. i. p. 335, &c. 8vo.

TRUCE, Breaking of. See PASSPORT.

TRUCE, Conservator of. See CONSERVATOR.

TRUCHMAN, DRAGOMAN, or Drogman, in the countries of the Levant, an interpreter.

TRUCHMENIANS, or ancient *Turkomans*, called by the Russians Terekmenian Tartars, are those tribes whose parent stock still nomadises on the eastern coasts of the Caspian, where their territory extends as far as the lake Aral and Persia. The Truchmenians, in particular, possess on the western side of the Caspian that part of the Caucasian mountains

mountains which stretches from that sea as far as the province Kakhety of the Georgian state. The generality of the districts have their own common princes; others form particular states, and some are under foreign sovereignty. In the former half of the 18th century a part of these hordes fell under the yoke of the Torgotan prince Ayuka, and on that occasion many Truchmenian families withdrew to the Tartars of Orenburg, Ufa, and Astrakhan. In the year 1770, the remainder of these people, who had not been before under the dominion of the Kalmuks, set themselves at liberty, and at present nomadise as free subjects of the Russian empire about the mouth of the Kuma. Their number is continually increasing by such as escape from the Kirghises, and are found though singly among the Tartars of Orenburg and Ufa, yet to no small amount. See TURKOMANS.

TRUCHTERSHEIM, in *Geography*, a town of France, in the department of the Lower Rhine; 7 miles W. of Straßburg.

TRUCKING, in *Commerce*. See PERMUTATION, EXCHANGE, and COMMERCE.

TRUCKS, in a *Ship*, pieces of wood of various shapes, and used for different purposes. *Carriage-trucks* are cylinders, the breadth or thickness of which is always equal to that of the side-pieces; but the height of the side-pieces and diameter of the trucks must always depend upon the height of the gun-ports above the deck. *Flag-staff-trucks* are circular flat pieces of elm, with a small sheave at least on each side. They are fixed by a mortise upon the upper end of flag-staffs, and are used to reeve the haliards. *Parral-trucks* are round balls of elm, or other wood, and have a hole through the middle, in which a rope is reeved, to form the parrals. *Seizing-trucks* are similar to parral-trucks, but have a score round the middle, to admit a seizing. They are used to lead ropes through. *Shroud-trucks* are short cylindrical pieces of elm, &c.; they have a hole through the middle, lengthways, a groove down the side the size of the shrouds, and a score round the middle to admit a seizing. They are seized to the shrouds to lead ropes through, that they may be more readily found. *Vane-trucks* are small ornamental pieces of wood like an acorn, &c. and are fixed on the uppermost point of the spindle, above the vane on the mast-head. Their use is to prevent the vane's unshipping.

TRUCKS, among *Gunners*, round pieces of wood, in form of wheels, fixed on the axle-trees of carriages, to move the ordnance at sea, and sometimes also at land. See CARRIAGE.

TRUCKS are also a very large kind of wheel-barrows, with high wheels moving on planks, used for conveying stuff down a slight declivity in digging canals.

TRUCK-BARROWS are used in rope-making of different sizes; they have three wheels, and are used to take hauls of yarn from the yarn-house, and remnants of yarn, coils of rope, &c. from the ground to the rope-house.

TRUDENAU, in *Geography*, a town of Pomerelia; 9 miles S.E. of Dantzick.

TRUE, something agreeable to the reality of things, or to truth.

In this sense we say, the true God, the true religion, true gold, &c. in opposition to false or pretended ones.

TRUE Love, in *Botany*. See Herb PARIS.

TRUE Love of Canada. See Herb PARIS of Canada.

TRUE Place of a Planet, or Star, in *Astronomy*. See PLACE.

TRUE Altitude, Anomaly, Asthma, Horizon, Proposition, Recovery, Ribs, and Suture. See the several articles.

TRUENTUS, TRONTO, or *Otronte*, in *Ancient Geography*, a river of Italy, in the southern part of Picenum, which passed by Afulcum. At its mouth was a fortified place called "Castrum Truentinum."

TRUFFLES, formed from *truffe*, or *truffe*, of the Latin *tuber*, or *tuberculum*, *tubera terræ*, in *Natural History*, a sort of subterraneous vegetable production, or a kind of mushroom, the characters of which are these: they are of a fungous fleshy structure, and are of a roundish figure, growing sometimes single, sometimes many together, and always remaining under ground. See TUBER.

Bradley calls them *under-ground edible mushrooms*, or *Spanish truffles*, and *under-ground deer's-balls*, or *mushrooms*.

The ancients, it is evident from their writings, were not acquainted with the sort of truffles which we have in use at present; they describe theirs to have been of a reddish colour, and smooth on the surface; we at present know this kind very well; it is common in Italy, and is called the wild truffle, and disregarded. They had indeed the white African truffle, sometimes brought to them, and held it in great esteem for its flavour. The Romans called it the Lybian *tuber*, and the Greeks the *Cyrenian misy*.

Avicenna recommends those truffles as the best, which were of a whitish colour within; and this not being a clear white, he expresses himself by a word which signifies fad-coloured, alluding to dusky-white sand, in common use at that time.

It is certain that the finest truffles were called by some authors by this epithet *arenosa*, with a very different meaning, only expressing that they were produced in sandy countries: the European truffles both then were, and now are, mostly produced in dry ground on the sides of hills; but the Lybian were produced only in the burning sands of that country, and these were therefore called *sand-truffles*. Serapio tells us, that the best of all truffles were those produced in sand; and Martial alludes to these, where he describes the finest truffles as breaking the surface of the earth into cracks, and by that means directing people where to search for them. To which purpose Leo Africanus says of the Lybian truffle, that the places where they are may be known by the earth's being raised into hillocks, and breaking into numerous cracks.

The truffle is most abundantly produced in dry fields of a reddish loamy earth, not too poor, according to Pliny, chiefly after rains and thunders in autumn; and they are found to flourish most near the roots of elms, the ilex, and some other trees. They do not well bear the severity of hard winters, but are usually scarce all the season after such. The smallest are found about the bigness of a pea, reddish without and whitish within, and they grow from this size sometimes to a pound weight, but such are not common; what are taken up in the spring are distinguished by their white colour and insipidity to the taste, and are commonly called white truffles: those taken up in autumn are of a variegated colour within, and are called marble truffles; the inner substance having swelled extremely and changed colour, and the white part now remaining only in form of a number of pipes or tubules, which seem in many places to run to the extremity, and terminate in the chaps and wrinkles of the back. The greyish substance, which is wrapped up among these tubules, when examined by the microscope, appears to be a transparent parenchyma, composed of little bladders or hollow vessels, in the midst of which may be seen small round bodies, which are unquestionably the seeds of the truffle.

What confirms the opinion of their coming from seed is, that there have been truffles discovered in England, and this, at first, only in Northamptonshire, and even only in one place of it, *viz.* Rushton, a place stocked with trees formerly brought from Languedoc; and it is only since then, that any truffles have been there observed; whence it is concluded, that the seed of these truffles was brought from France among the roots of the trees brought thence.

These English truffles were first discovered by Dr. Hatton. Dr. Tancred Robinson assures us, they are the true French truffles, the Italian *tartuffi*, or *tartuffole*, and the Spanish *turmos de tierra*, being not before noted by Mr. Ray as ever known on English ground: indeed he adds, that he has seen them thrice as large at Florence, Rome, &c.

Those observed in England are all included in a studded bark or coat, and the inner substance is of the consistence of the fleshy part of a young chestnut, of a paste-colour, a rank or hircine smell, and unfavoury.

When the truffles are arrived at such a degree of maturity as to yield seeds, which is generally in August, they are of a fine high flavour and agreeable smell; and the heat and rains at this season greatly promoting their growth, has been the occasion of the old error, that thunder produced them; after this they continue good till the middle of winter, and sometimes even till March; but those gathered from this time till the end of July are small, and only white, never marbled, nor of their high taste.

If the truffles are not taken up when fully ripe, they always rot and burst; whence it is plain, that they are an annual plant, which lives no longer than till they have perfected their seeds. And if the place where the old ones have rotted and burst be examined, the seeds will be found after some time to have vegetated, and a great number of young truffles to be produced in the place: these, if not destroyed by the frosts, are what in the ensuing spring furnish the younger white truffles.

The truffle is very apt to be pierced and eaten within by a worm, and this, though a damage to the particular truffle, is of some service to the people who make it their business to seek for them: for this worm, after a proper time passed in that state, changes into a chrysalis state in the body of the truffle; whence he soon after comes out, in the shape of a beautiful violet-coloured fly; and wherever these flies are found, they are an indication that there are beds of truffles near, as they are never bred in any other root.

These communicate a bitterness to the whole truffle, and make it unfit for the table; though if the whole be carefully searched into, the part eaten by the worm, and the hole by which it made its way in, will be found to be in reality the only bitter parts, and the rest of the truffle, when these are cut out, as good as ever: but, besides these destroyers, the microscope usually discovers on the surface of the truffle a multitude of other devourers, which are small animalcules, continually eating, and searching the cracks of the bark, as the places where the pulp is most easily come at; these somewhat resemble mites.

The earth that produces truffles rarely affords any other plants, these taking up all the nourishment it can afford: the earth all about them smells so very strongly of them, that they are easily found out by it, by the animals which carry their noses near the ground: and those who sought after them soon found the way of using hogs to search them out; but these being a sort of unmanageable animals, dogs were found which would supply their place with more certainty, and much less trouble. Mem. Acad. Scien. Paris, an.

1711.

By a chemical analysis, truffles are found to abound in a
Vol. XXXVI.

volatile alkali salt, mixed with oil, upon which their smell, &c. depend. They never rise out of the ground, but are found, usually, half a foot beneath the surface of it.

Dr. Hatton has observed several little fibres issuing out of some truffles, and insinuating themselves within the soil, which, in all probability, do the office of roots. The truffles grow tolerably globular, as receiving their nourishment all around them; which they suck in through the pores of their bark or rind.

They are tenderest and best in the spring, though easiest found in autumn; the wet swelling them, and the thunder and lightning disposing them to send forth their scent, so alluring to the swine: hence some of the ancients called them *ceranina*, *q. d. thunder-roots*.

The ancients were exceedingly divided as to the use of truffles; some affirming them to be wholesome food, and others pernicious: Avicenna, particularly, will have them to cause apoplexies. For my own part, says M. Lemery, I am of opinion, they have both good and evil effects: they restore and strengthen the stomach, promote the semen, &c.; but when used too freely, they attenuate and divide the juices immoderately, and, by some volatile and exalted principles, occasion great fermentations, &c. though the pepper and salt, with which they are ordinarily eaten, do doubtless contribute greatly to those effects: their rich taste is owing to their not putting forth any stalk; in effect, their principles being united, and, as it were, concentrated into a little bulb, must yield a richer and more delicious flavour than if the juices were dispersed by vegetation through the several parts of the common plant. Some roast truffles under ashes; and others mix them in fauces.

In Italy, France, England, &c. they eat them as a great dainty, either in fried slices, with oil, salt, and pepper, or boiled thoroughly in their own broth. The hogs are exceedingly fond of them, and are frequently the means of discovering the places where they are; whence the common people call them *swine-bread*. See Misy and Upton.

TRUFFLE-Worms, a species of fly-worm which is found in truffles, and lives in and feeds on them, till the time it undergoes the common metamorphosis of these creatures, for the production of a fly, like that from the egg of which it was hatched.

They are very small, and have two brown spots, easily distinguishable near their hinder end, which are the two posterior stigmata. They are all over white, and very transparent; and one may very easily distinguish the two black stocks of their two hooks, with which they tear the substance of the truffle, as the other species do their food: when they have arrived at their full growth, which is usually in a few days, then they leave the truffle, and go to seek some proper place, where they may rest during the time of their transformation; they enter the earth for this purpose, and twelve hours after they have gone into it they are transformed into an egg-shaped shell, of a chestnut-brown, of the same sort with that of the blue flesh-fly.

These are the worms in a manner peculiar to the truffles; but, beside these, they often furnish nourishment to another species, very common in mushrooms of the ordinary eatable kind, and which has a yellow body, and a black crustaceous head. Reaumur's Hist. Inf. vol. iv. p. 374.

TRUFTLORN, in *Geography*, a town of Bavaria; 13 miles S.S.W. of Vilshofen.

TRUG, or *Trug-Corn*, *Truga Frumenti*, in our *Ancient Customs*, denotes a measure of wheat. "Tres trug frumenti vel avenæ faciunt two bushels, inter præbendam de Hunderton ecclesia Heref." MS. de Temp. E. III.

At Lempster, the vicar has *trug-corn* allowed him for officiating

officiating at some chapels of ease; as Stoke and Dockley, within that parish.

TRUG is also a country word for a milk-tray, or hod to carry mortar in.

TRUHTCHEVSK, in *Geography*, a town of Russia, in the government of Orel, on the Desna; 80 miles W.S.W. of Orel. N. lat. $52^{\circ} 35'$. E. long. $33^{\circ} 34'$.

TRULLIZATION, in the *Ancient Architecture*, the art of laying on strata or layers of mortar, gypsum, or the like, with the trowel, in the inside of vaults, ceilings, &c.

TRULLO, in *Geography*, a small island on the east side of the gulf of Bothnia. N. lat. $63^{\circ} 54'$. E. long. 23° .

TRULLUM, a barbarous word, formed from *trulla*, *cap*, and signifying *dome*; chiefly used in the phrase, *council in trullo*.

This was a council assembled, in the year 692, against the Monothelites, in the dome of the palace of Constantinople, called *trullum*; the name of which it has retained. It was also called the *quinisextum*.

The trullum was properly a hall in the palace of the emperors of Constantinople, where they usually consulted of matters of state. This council, held in *trullo*, was the sixth œcumenical or general council.

TRUMAU, in *Geography*, a town of Austria; 5 miles E. of Baden.

TRUMBULL, a county of the district of Ohio, bordering on lake Erie, and containing 19 townships and 8671 inhabitants.—Also, a post-town of Connecticut, in the county of Fairfield, containing 1241 inhabitants; 165 miles N.E. of Philadelphia.

TRUMENAU, a town of Prussia, in Oberland; 16 miles S.E. of Marienwerder.

TRUMIAN, a town of Hindoostan, in Marawar; 40 miles S.W. of Tanjore. N. lat. $10^{\circ} 15'$. E. long. $78^{\circ} 45'$.

TRUMPE, in *Ichthyology*, a name given by some of the English writers to that species of whale, called by the generality of authors *cete*, and *balæna major*. This is the *physeter microps* of Linnæus, or blunt-headed cachalot. The Dutch call it the pot-whale fish.

TRUMPET, a musical instrument, the most noble of all portable ones of the wind-kind; used chiefly in war, among the cavalry, to direct them in the service. Each troop of cavalry has one. The cords of the trumpet are of crimson, mixed with the colours of the facings of the regiment.

The word is formed from the French *trompette*. Menage derives it from the Greek *σφοδρος*, *turbo*, a shell anciently used for a trumpet. Du-Cange derives it from the corrupt Latin *trumpa*, or the Italian *tromba*, or *trombetta*; others from the Celtic *trompill*, which signifies the same. It is usually made of brass, sometimes of silver, iron, tin, and even wood. Moses, we read, made two of silver, to be used by the priests (Numb. x.); and Solomon made two hundred like those of Moses, as we are informed by Josephus (lib. viii.); which shews abundantly the antiquity of that instrument.

As to the invention of the trumpet, some Greek historians ascribe it to the Tyrrhenians; but others, with greater probability, to the Egyptians, from whom it might have been transmitted to the Israelites. The trumpet was not in use among the Greeks at the time of the Trojan war; though it was in common use in the time of Homer. According to Potter (Arch. Græc. vol. ii. cap. 9.), before the invention of trumpets, the first signals of battle in primitive wars were lighted torches; to these succeeded shells of fishes, which were sounded like trumpets. And when the trumpet became common in military use, it may well be imagined

to have served at first only as a rough and noisy signal of battle, like that at present in Abyssinia and New Zealand, and perhaps with only one found. But even when more notes were produced from it, so noisy an instrument must have been an unfit accompaniment for the voice and poetry; so that it is probable the trumpet was the first solo instrument in use among the ancients.

In the 96th Olympiad, before Christ 396, a prize was instituted at the Olympic games for the best performer on the trumpet; and the first person who gained the prize was Timæus of Elis; and Herodotus of Megara, a famous trumpeter, who lived about the 120th Olympiad, or 300 years before Christ, was victor at the different games of Greece no less than ten, or, as some say, fifteen several times. These performers on the trumpet appear to have been heralds and public criers, who not only gave the signals at the games for the combatants to engage, and announced their success, but proclaimed peace and war, and sounded signals of sacrifice and silence, at religious ceremonies. Burney's Hist. of Mus. vol. i. p. 376.

Among the Romans, there were various instruments of the trumpet kind; as the *tuba*, *cornua*, *buccina*, and *lituus*. The tuba is supposed to have been exactly like our trumpet, widening gradually in a direct line to the orifice; the cornua was bended almost round; and the buccina was somewhat less; the lituus, which was almost straight, but crooked at the extremity, in the form of the augural staff, whence its name, was a species of clarion, or octave trumpet, made of metal, and extremely loud and shrill, used for horse, as the straight trumpet was for foot. Horace distinguishes it from the tuba or trumpet. See LITUUS.

The tuba, or long trumpet, called by the Hebrews the *trumpet of the jubilee*, may be seen in several pieces of ancient sculpture at Rome, particularly on the arch of Titus, on Trajan's pillar, and in a basso-relievo at the Capitol, representing the triumph of Marcus Aurelius.

The modern trumpet consists of a mouth-piece, near an inch broad, though the bottom be only one-third so much. The pieces which convey the wind are called the *branches*; the two places where it is bent, *potences*; and the canal between the second bend and the extremity, the *pavilion*: the places where the branches take a sunder, or are soldered, the *knots*; which are five in number, and cover the joints.

If an ellipsis (says Dr. Young, Lecture xxxi.) be prolonged without limit, it will become a parabola: hence a parabola is the proper form of the section of a tube, calculated for collecting a sound which proceeds from a great distance, into a single point, or for carrying a sound nearly in parallel directions to a very distant place. It appears, therefore, that a parabolic conoid is the best form for a hearing-trumpet, and for a speaking-trumpet; but for both purposes the parabola ought to be much elongated, and to consist of a portion of the conoid remote from the vertex; for it is requisite, in order to avoid confusion, that the sound should enter the ear in directions confined within certain limits: the voice proceeds also from the mouth without any very considerable divergence, so that the parts of the curve behind the focus would in both cases be wholly useless. A trumpet of such a shape does not very materially differ from a part of a cone; and conical instruments are found to answer sufficiently well for practice. It appears, however, unnecessary to suppose, as Mr. Lambert has done, that they differ essentially in principle from parabolic trumpets. It is not yet perfectly decided whether or not a speaking-trumpet has any immediate effect in strengthening the voice, independently of the reflection of sound.

When

TRUMPET.

When the found of the trumpet is well managed, it is of a great compass. Indeed its extent is not strictly determinable; since it reaches as high as the strength of the breath can force it. A good breath will carry it beyond four

octaves, which is the limit of the usual keys of spinnets and organs.

The usual sounds of the trumpet are represented by the following musical notes.

Here the loudest found being denoted by 1, the pitch of the rest, or the number of their respective vibrations, during the time that C vibrates once, will be expressed by the numbers denoting the order of their sounds, 2, 3, 4, 5, &c. The sounds expressed by the musical numbers, that is, by 2, 3, 5, and their composites, which are 4, 6, 8, 9, 10, 12, 15, 16, are all perfectly in tune; but the sounds expressed by numbers not musical, as 7, 11, 13, 14, are false. Three of these, *viz.* B \flat , its octave, and A, distinguished by *f* placed over them, are too flat; and the remaining note F, marked with an S, is too sharp. See *MUSICAL Numbers*.

The reason of which is, that B \flat ought to be a tone major below C: that is, its pitch to that of C will be as 8 to 9; but the proportion given by the trumpet is as 7 to 8; which being a less proportion than that of 8 to 9, it follows that B \flat will be too flat. The same holds true of its octave. And A being a tone minor above G, it ought to be to G as 10 to 9: but in the trumpet, it is to G as 13 to 12; which being less than the proportion of 10 to 9, it follows that A will be too flat. On the other hand, F ought to be a semitone major above E; that is, F ought to be to E as 16 to 15; but in the trumpet, F is to E as 11 to 10; which being a greater proportion than that of 16 to 15, it follows that F is too high or too sharp.

This system of trumpet-notes is an effectual confutation of those who are for introducing 7, 11, 13, and other primes into music.

In war there are eight principal manners of founding the trumpet: the first, called the *cavalquet*, used when an army approaches a city, or passes through it in a march. The second the *bout-felle*, used when the army is to decamp, or march; at which time the drums beat a *general*, when the troopers boot, saddle, and get ready. The third is when they found to horse, when the *assembly* begins to beat, on which the troopers mount; and then to the standard. The fourth is the *charge*, in the day of battle. The fifth the *watch*. The sixth is called the *double cavalquet*. The seventh the *chamade*: and the eighth the *retreat*. Besides these, there are various flourishes, voluntaries, &c. used in rejoicings.

There are also people who blow the trumpet so softly, and draw so delicate a found from it, that it is used not only in church-music, but even in chamber-music; and it is on this account, that, in the Italian and German music, we frequently find parts entitled *tromba prima*, or Ia, first trumpet; *tromba IIa*, *segonda* IIIa, *terza*, second, third trumpet, &c. as being intended to be played with trumpets.

There are two very great defects in the trumpet, observed by Mr. Roberts, in the Philosophical Transactions for 1692, N $^{\circ}$ 195. The first is, that it will only perform certain notes within its compass, commonly called *trumpet-notes*; the second, that though its ordinary compass is from double C-fa-ut to C-fol-fa in alt., yet there are four notes, the 7th,

11th, 13th, and 14th, in this progression, *viz.* B \flat , *f*, *a a*, and *b b*, which are not exact in tune. The same defects are found in the trumpet-marine; and the reason is the same in both. Phil. Trans. Abr. vol. i. p. 607.

TRUMPET-Marine, is a musical instrument, consisting of three tables, which form its triangular body. It has a very long neck with one single string, very thick, mounted on a bridge, which is firm on one side, but tremulous on the other. It is struck by a bow with one hand, and with the other the string is pressed or stopped on the neck by the thumb. *Plate XXIV. Miscellany, fig. 4.*

It is the trembling of the bridge, when struck, that makes it imitate the found of a trumpet, which it does to that perfection, that it is scarcely possible to distinguish the one from the other. And this is what has given it the denomination of trumpet-marine, though, in propriety, it be a kind of monochord. Of the six divisions marked in the neck of the instrument; the first makes a fifth with the open chord, the second an octave, and so on for the rest, corresponding with the intervals of the military trumpet.

The trumpet-marine has the same defects with the trumpet, *viz.* that it performs none but trumpet-notes, and some of those either too flat or too sharp. This Mr. Fr. Roberts (*ubi supra*) accounts for, only premising the common observation of two unison strings; that if one be struck, the other will move: the impulses made on the air by one string setting another in motion, which lies in a disposition to have its vibrations synchronous to them; to which it may be added, that a string will move, not only at the striking of an unison, but also of that of an 8th or 12th; there being no contrariety in the motions to hinder each other.

Now in the trumpet-marine you do not stop close, as in other instruments, but touch the string gently with your thumb, by which there is a mutual concurrence of the upper and lower part of the string to produce the found. Hence it is concluded, that the trumpet-marine yields no musical found, but when the stop makes the upper part of the string an aliquot part of the remainder, and consequently of the whole; otherwise the vibrations of the parts will stop one another, and make a found suitable to their motion, altogether confused. Now the aliquot parts, he shews, are the very stops which produce the trumpet-notes.

TRUMPET, *Harmonical*, is an instrument which imitates the found of a trumpet, and which resembles it in every thing, excepting that it is longer, and consists of more branches. It is usually called a *jackbut*.

TRUMPET, *Lifflening or Hearing*, is an instrument invented by Joseph Landini, to assist the ear in hearing of persons who speak at a great distance, without the assistance of any speaking-trumpet.

Instruments of this kind, represented in *Plate XXIV. Miscellany, figs. 5. and 6.* are formed of hollow conical tubes from eight to sixteen inches in length, with a wide mouth from about two to four inches in diameter, and terminating in a small canal,

canal, whose aperture is not above one-fourth of an inch in diameter, which is applied to the ear. These tubes are often bent in a manner somewhat resembling the letter C, except that in general the small end is bent much less than the other. The construction of these instruments evidently shews how they contribute to assist the hearing; for the weak and languid pulses of the air being received by the large end of the tube, and reflected several times from its sides in passing to the small end, are condensed, and entering the ear in this condensed state, strike the tympanum with a greater force than they could have done without the intervention of the tube: the sound is louder, but less distinct. Hence it appears, that a speaking-trumpet may be applied to the purpose of a hearing-trumpet, by turning the wide end towards the sound, and putting the ear to the narrow end.

TRUMPET, *Speaking*, is a tube from six to fifteen feet long, made of copper or of tinned iron-plates, perfectly straight, and with a very large aperture; the mouth-piece being big enough to receive both lips. The edge of the narrow end is generally covered with leather or cloth, in order that it may more effectually prevent the passage of any air between the trumpet and the face of the speaker.

The mouth being applied to it, carries the voice to a very great distance, so that it may be heard distinctly a mile, or more; hence its use at sea. A person who is not in the direction of the trumpet will hear the sound of it both weaker and less distinct, in proportion as he is more or less distant from the direction of the sound; which is the direction straight before the trumpet.

The words which are spoken through a speaking-trumpet may be heard much farther and louder, but not so distinctly, as without the trumpet.

A speaking-trumpet has also been applied to the mouth of a gun or pistol, by which means the explosion has been rendered audible at a vast distance. Such contrivances may be used as signals in certain cases.

The invention of this trumpet is held to be modern, and is commonly ascribed to sir Samuel Moreland, who called it the *tuba Stentorophonica*.

Of this instrument an account was published at London in 1671, in a work entitled "Tuba Stentoro-phonica," in which the author relates several experiments made by him with this instrument; the result of which was, that a speaking-trumpet constructed by him, five feet six inches long, twenty-one inches diameter at the greater end, and two inches at the smaller, being tried at Deal castle, was heard at the distance of three miles, the wind blowing from the shore.

But Ath. Kircher seems to have a better title to the invention; for it is certain he had such an instrument before ever sir S. Moreland thought of his.

Kircher, in his "Phonurgia Nova," published in 1673, says, that the tromba, published last year in England, he invented twenty-four years before, and published in his *Mufurgia*: he adds, that Jac. Albanus Ghibbifus, and Fr. Eschinardus, ascribe it to him; and that G. Scottus testifies of him, that he had such an instrument in his chamber in the Roman college, with which he could call to, and receive answers from the porter.

Indeed, considering how famed Alexander the Great's tube was, with which he used to speak to his army, and which might be distinctly heard a hundred stadia or furlongs, it is somewhat strange the moderns should pretend to the invention; the Stentorophonic horn, or tube of Alexander, of which there is a figure preserved in the Vatican,

being almost the same with that now in use. See STENTOROPHONIC.

The principle upon which this instrument is constructed is obvious; for as sound is stronger in proportion to the density of the air, it must follow, that the voice passing through a tube or trumpet, must be greatly augmented by the constant reflection and agitation of the air through the length of the tube, by which it is condensed, and its action on the external air greatly increased at its exit from the tube.

In a speaking-trumpet, the sound in one direction is supposed to be increased, not so much by its being prevented to spread all round, as by the reflection from the sides of the trumpet. But as the real action of the instrument, or the true motion of the air through it, is not clearly understood; different persons, according to their particular conceptions of the case, have recommended peculiar shapes for the construction of such trumpets: some having recommended a conical shape, others that which is formed by the rotation of certain curves round their axes; others, again, have recommended an enlargement or two of the cavity in the length of the trumpet, &c. That which has been more commonly recommended as the best figure for such trumpets, is generated by the rotation of a parabola about a line parallel to the axis.

In order to estimate the effect of this instrument, let us suppose A B (*Plate XXIV. Miscellany, fig. 7.*) to be such a length of tube as admits one reflection of the sound, emitted by the speaker, from the side B B; let A F be another length, in which the sound or voice is reflected five times by the sides, *viz.* in B, C, D, E, and F: the sound striking the metal tube in B is the same as that at F; but the number of parts forming the periphery of the circle in B is to that in F, as the diameter B B is to the diameter F F; and therefore the intensities with which the parts of the metal will be moved in these peripheries, will be in the inverse ratio of the peripheries, or of the diameters B B, F F. But the parts of the metal move the air contained within the peripheries of the circle, or constituting their respective areas, which are as the squares of the diameters: *i. e.* the air agitated in B is to that agitated in F, as B B² to F F²; and consequently, the intensity of the same sound in the tube of the length A B, is to that in the length A F, as B B² to F F²; and the inverse ratio of the diameter B to F: or, the intensity in A B is to that in A F :: F F × B B² : B B × F F²; *i. e.* dividing the last ratio by B B × F F :: B B : F F. But the intensity of the sound increases the more frequently it is reflected from the sides: let then the number of reflections of the sound in B be *n*, in F it will be *5 n*, and therefore the whole intensity of the sound in B is to that in F as *n* × B B to *5 n* × F F. Consequently, the longer the tube the more numerous will be the reflections, and the greater will be the increase of the sound, and the farther may it be heard.

A man, speaking through a tube four feet in length, may be understood at the distance of 500 geometrical paces; with a tube of 16 $\frac{1}{2}$ feet, at the distance of 1800 paces; and with a tube 24 feet long, at a greater distance than 2500 geometrical paces.

The sound will be also heightened by having the remoter aperture of the tube wide, more than if it were narrow. However, the effect of the tube in magnifying sound, either for speaking or hearing, depends principally upon its length: nevertheless some advantage may be derived from its particular form and shape.

Some have proposed the figure which is made by the revolution of a parabola about its axis, as the best; where the mouth-piece is placed in the focus of the parabola, and conse-

consequently the sonorous rays will be reflected parallel to the axis of the tube. But Mr. Martin observes, that this parallel reflection is by no means essential to the magnifying of sound; on the contrary, it prevents the infinite number of reflections and reciprocations of sound, in which, according to Sir I. Newton, its augmentation principally consists: the augmentation of the impetus of the pulses of air being proportional to the number of repercussions from the sides of the tube, and therefore to its length, and to such a figure as is most productive of them. Hence he infers, that the parabolic trumpet is the most unfit of any for this purpose.

He observes, that there is one thing more which contributes to the augmentation of the agitations of air in the tube; viz. the proportion which the several portions of air bear to each other when divided by transverse sections, at very small, but equal distances, from one end of the tube to the other.

Thus, let those several divisions be made at the points *a, b, c, d, e, &c.* (fig. 8.) in which let the right lines *ak, bl, cm, dn, &c.* be taken in geometrical proportion. Then will the portions of air contained between *B* and *a, a* and *b, b* and *c, c* and *d, &c.* be very nearly in the same proportion, as being in the same ratio with their bases, when the points of division are indefinitely near together. But it is known, that when any quantity of motion is communicated to a series of elastic bodies, it will receive the greatest augmentation when those bodies are in geometrical proportion. Therefore, since the force of the voice is impressed upon, and gradually propagated through a series of elastic portions of air in a geometrical ratio to each other, it easily receives the greatest augmentation possible.

And since by construction $Ba = ab = bc = cd, &c.$ and $ak : bl :: bl : cm :: cm : dn, &c.$ the points *k, l, m, n, o, p, q, r, s, A,* will form the logarithmic or logistic curve: whence Mr. Martin concludes, that a trumpet formed by the revolution of this curve about its axis, will augment the sound in a greater degree than any other figured tube whatever.

Cassegrain also is of opinion, that an hyperbola, having the axis of the tube for an asymptote, is the best figure for this instrument. Muschenb. Int. ad Phil. Nat. tom. ii. p. 296, 4to. Martin's Phil. Brit. vol. ii. p. 248, 3d edit.

For other constructions of speaking trumpets by Mr. Conyers, see Phil. Trans. N^o 141. for 1678.

TRUMPETS, *Feast of*, in *Ecclesiastical History*, one of the menstrual feasts among the Jews, kept with greater solemnity than the rest, on the first day of the month Tisri. (Numb. xxix. 1—6. Levit. xxiii. 24, 25.) The day of this feast was the new-year's day of the Jews, in which the people were solemnly called to rejoice in a grateful remembrance of God's benefits to them through the last year, which might be intended by blowing the trumpets, as well as to implore his blessing upon them for the ensuing year, which was partly the intention of the sacrifices offered on this day.

The modern Jews have a notion, which they derive from the Mishna, that on this day God judges all mankind; and therefore, according to Basnage, their zealots spend, some a whole month, others four days, and especially the eve of this feast, in confessing their sins, beating their breasts, and some in lashing their bare backs, by way of penance, in order to procure a favourable judgment on this decisive day.

TRUMPET-Fish, *Scolopax*, in *Ichthyology*, a fish called also the *bellows-fish*. In the Linnæan system it is a species of

the *centrifcus*; but in the Artedian, a species of *balistes*. Pliny calls it *ferra*. See *CENTRISCUS Scolopax*.

TRUMPET-Flower, in *Botany*. See *BIGNONIA* and *LONICERA*.

TRUMPET-Honeyfuckle. See *LONICERA*.

TRUMPET-Shell, or *Whelk*, *Buccinum*, in *Natural History*, the name of a large genus of shells, the characters of which are these: they are univalve shells of the form of a trumpet, according to old pictures, with a wide belly, and a large, broad, and elongated mouth; they have a distinct and regular tail, usually long, though sometimes short; they have a crooked beak, and the clavicle is often elevated, though sometimes depressed and contabulated. In the Linnæan system, the characters of this genus are, that its animal is a slug, the shell univalve, spiral, and gibbous, the aperture oval, ending in a short canal or gutter. Linnæus enumerates fifty-one species. See *CONCHOLOGY*.

The family of the buccina, when examined ever so strictly, is very large; but according to the general custom of authors, of confounding together several genera under the name, it is usually made to appear much larger than it really is. Lister has made it comprehend a vast number of shells, by confounding it with the families of the *murex* and *purpura*.

It is not indeed peculiar to this author, to have confounded these genera: those who went before him have done the same; and Pliny has comprised the buccinum, murex, and purpura, under the general name *ceryx*.

To avoid the general confusion, which arises from not distinguishing the families of the buccinum, murex, purpura, and vis, or screw-shell, it will be proper to observe, that there are regular characters, which distinguish them all, one from another: the characters are these: the buccinum differs from the purpura, in that it has a very long mouth of an oval figure, and has an elevated head; whereas the purpura has a round mouth, and a head somewhat flattened; the tail of the purpura is also usually furrowed, and is shorter than that of the buccinums.

The buccinum differs also from the murex in having a longer tail, by the smoothness and variety of colours of its coat, and by having a larger mouth less furnished with teeth; the murex having a smaller and longer-shaped mouth, its surface covered with points or spires, and several teeth.

It is easier to distinguish the buccinum from the screw-shell, as this is always more long and slender than the buccinum; it has also a flat mouth, and has rarely any tail.

The most singular species of the buccinum class, is one that has its mouth turned the contrary way to all other shells: this has been thence called by authors, the *unique* and the *fans pareille*.

The buccina generate in the warm months, and some species of them are seen very frequently remaining in pairs together, upon the rocks deserted by the tide on that occasion. These have been thence supposed to be of a different genus, and have been called *buccina littoralis*; they are usually found in copulation early in the morning. Rumphius de Test. Aldrovand. de Test. lib. iii. cap. 231. Lister, Hist. Animal. Angl. p. 158.

The species of the buccina being very numerous, they are arranged under several distinct heads, according to certain obvious distinctions, and are as follow: of the buccina, with long distinct tails and oblong mouths, there are thirteen species; of those with a short tail and a wide mouth, there are twelve species; of those with long erect clavicles, there are

are eleven species; and of those with less erect clavicles, and crooked rostra, there are also eleven species.

It appears from the writings of the ancients, that the famous purple dye, which they obtained from a shell-fish, was not peculiar to any one species; but was found in several of the smaller kinds of buccina; some of which they called *murices*, from the hollow spines, or long and slender processes, which run in different directions from their shells. See PURPURA.

M. Reaumur, when on the coasts of Poitou, found certain eggs of fishes arranged in regular order, and in great numbers, on the rocks and salted banks, which had the same property with the purple-dyeing liquor of the buccinum; it is not yet known to what particular fish they belong, or what uses they may hereafter be brought to serve. Mem. Acad. Par. 1711.

Pliny seems to derive the name buccinum from *buccina*, a kind of musical instrument; but it is more probable that instrument took its name from the shell to which it bore resemblance, and of which it might probably have been anciently made. Plin. Hist. Nat. lib. ix. cap. 36. Phil. Trans. N^o 282. p. 1277.

Buccinum lapidosum is a figured stone, shaped like the former, and probably only a petrification of the shell above-mentioned.

Ray speaks of a buccinum which was not only petrified, but after petrification was converted into a pyrites.

TRUMPETER, in *Ornithology*, a name given in England to a particular species of pigeon, called by Moore the *columba tibicen*.

This species is of the middle size of the common pigeon, and made considerably like it; but it is pearly-eyed; is of a mottled black, is feathered down the legs and feet, and is turn-crowned like the nun, and some of the other species; sometimes like the finnikin, but much larger: this seems to be the best sort, as being the most melodious. The best character to know them by, is a tuft of feathers growing at the root of the beak; and the larger this tuft is, the more they are esteemed; the reason of their name is, that they imitate in their cooing the sound of the trumpet; but to be often entertained with their melody, it is necessary to feed them frequently with hemp-feed. Moore's Columbarium, p. 45.

Trumpeter is also a name given by Mr. Pennant to the *psophia* of Linnæus; because it makes a strong noise with its mouth, which it answers by a different noise from its belly, as if it came from the anus.

TRUMPETER, in a *Man of War*, one whose office is always to attend the captain's command, and be ready at the entertainment of strangers. In the time of an engagement his proper station is on the poop.

TRUN, in *Geography*, a town of France, in the department of the Orne; 7 miles N.N.E. of Argentan.

TRUNCATED LEAF, among *Botanists*. See LEAF.

TRUNCATED Pyramid, or Cone, is one whose top or vertex is cut off by a plane parallel to its base. See PYRAMID and CONE.

The word is formed of the Latin *truncare*, to cut off a part from the whole; whence also *truncus*, *truncheon*, &c. In *Heraldry*, they say *trunked*.

A truncated cone, or the frustum of that body, is sometimes also called a *curty-cone*. See FRUSTUM. See also GAUGING.

TRUNCATED Roof. See ROOF.

TRUNCHEON, of the French *troncon*, and the Latin *truncus*, a battoon; or a kind of short staff used by kings,

generals, and great officers, as a mark of their command. See BATTOON.

In our military language, it denotes a staff of command borne by a general officer.

TRUNCHEONS, *Columas in*. See COLUMN.

TRUNDLE, in *Rural Economy*, a sort of small framed contrivance with two handles at one end, and two low wheels at the other, which is trundled before the person using it. It is found convenient in conveying many sorts of weighty matters that are in small bulks.

TRUNDLE-Shot, is an iron shot about seventeen inches long, sharp-pointed at both ends, with a round bowl of lead cast upon it, about an hand-breadth from each end.

TRUNGIBIN, in *Natural History*, a name given by Rauwolf, Tournefort, and others, to a sort of manna collected from the *albagi maurorum*, as the common manna is from the ash; and used in the eastern parts of the world as a purge. It is what we call the *manna Persicum*, and though in itself a very fine and clean kind of manna, yet it is usually so carelessly collected, and mixed with so much filth, that it requires to be given in three times the dose of our's in order to purge. The name seems very evidently to be a corruption of *tereniabin* or *terenjabin* of the Arabians, which was the word used by all their authors to express the *manna Persicum*.

TRUNK, a strong chest or box of a roundish form, at least on the upper side.

TRUNK, in *Anatomy*, is used for the busto of the human body, exclusive of the head and limbs.

The trunk is divided into three parts; viz. one common, called the *spine*, and two proper, viz. the *thorax* or *breast*, and the *pelvis*; which see respectively.

TRUNK, *Truncus*, is also used for the main body of an artery or vein, in contradistinction to the branches and ramifications of it.

The word is particularly applied to certain parts of the aorta and cava,

TRUNK, in *Architecture*, is used for the fust or shaft of a column. Also for that part of the pedestal between the base and the cornice, otherwise called the *dye*.

TRUNK, in *Gardening* and *Planting*, the common name of the boll, body, or principal stem in all plants of the tree-kind, and of the stalk in those of all the other sorts. It is that part which rises immediately from the root, and is properly the stock or chief body of the plant or vegetable from the root of which it proceeds, and which ramifies itself into the various boughs, branches, buds, leaves, flowers, and fruit which contribute to it, and are the production of it.

The trunks of most trees, and some other kinds of plants, are of a hard ligneous nature, but in others soft, and in the former are constituted of several different original parts, such as an outermost coat or thin layer of hard matter of a fibrous quality, the fibres crossing each other in all directions; and the texture of which in some cases is so very thin and clear, that the direction or net-work of them can be seen by holding the substance up against the light. The use of this finely woven tunic or coat is that of defending the true bark of the trunk, or the layer which lies immediately below or underneath it, from the action and injurious effects of the atmospheric air; the protecting and keeping open, by its callous nature, the fine pores of the exhaling and inhaling systems of vessels; the modifying the various impressions which are made by external objects upon the plant or vegetable; the securing and giving protection to the extreme ramifications of the aerial or aqueous vessels; and the covering of

TRUNK.

of the cellular substance, in which the several fluids of it are elaborated and prepared.

A true and somewhat inner bark is situated next to the above in the trunk of the tree, and is of a hard texture, but adhering only loosely in trees to the covering which lies below it. In tender plants this covering is often of a soft pulpy nature, and has the denomination of skin.

A still more inner layer, which is often called *liber*, forms a third part or covering of the trunk in trees, which is of a membranous and flexile nature, being sometimes altogether separable from the true bark above it, and the white lamina which lies below it. This and the former coat of the trunks in trees are formed of different lamina, as is evident from macerating them in water, by which the cellular substance is destroyed, and the laminated appearance becomes fully displayed. These seem to be parts which are very essential to the life of the plant or vegetable, as in them the chief or principal functions of it are carried on; such, for instance, as those of nutrition, digestion, secretion, and some others. This is plainly proved and shewn to be the case, by those trees which have hollow or rotten trunks, the insides being wholly destroyed, and by such plants as are kept in vigour by the perfectly good state of their barks, although the internal parts of their trunks or stalks are wholly rotten and destroyed.

The next part, lamina, or coat, which affords a covering or portion to the trunks in trees, is that which has the title of alburnum or sapwood commonly given to it, and which is situated immediately upon the ligneous or woody part, being mostly composed of a rather soft white substance that is scarcely perceptible in some sorts of trees, but which in others is hard and perfectly visible, as in those of the oak, elm, and some other kinds. This coat or part forms an imperfect sort of wood in the trunk, not having yet put on the consistence which is proper for perfect wood, the former of which must be arrived at before the latter can be put on. The hardness and solidity of this part of the trunk are somewhat in proportion to the vigour of growth in the particular tree or plant.

The succeeding or ligneous part, is that which is composed of a compact fibrous substance, disposed in concentric layers, and which surrounds the middle or pithy part of the trunks. It seems as if it were constituted or made up of a congeries or collection of dried vascular parts; and in plants of the annual and biennial kinds commonly receives the denomination of flesh.

The last, middle, or pithy part of the trunks of trees or plants, is that which is situated in and runs through the hearts of them, and which is of a soft vascular nature, differing from that of the cellular textured kind in the perfect whiteness of its colour. It is in the greatest abundance while the trees or plants are in their young state of growth, diminishing in quantity as they advance in age and size, and at length not infrequently wholly disappearing. Hence it is obviously necessary to them in the beginning of their lives and growths, but not for the continuance of them. It has been suggested as probable, that nature may reserve a superfluous nourishing fluid in this pithy part, if from any cause the young tree or plant should become dry, that then it may be taken up and converted into its food and support.

It must be evident, that what has been said concerning the trunks of trees and plants, must be equally applicable in every respect to the branches and other ramifications, as having the same parts continued from such trunks, of which they in fact form a part in the ways which have already been pointed out.

The trunks of trees and other vegetable productions during their growths are enlarged in their size and thickness throughout their whole lengths, as well as in their heights, and not at any one particular point or part only, as has been fully proved by numerous and repeated trials of various kinds. And in those which are only of an annual or one year's growth and duration, the enlargement or expansion in length continues simply until they have protruded and completed their flowers and flowering process, when the constituent parts of the trunks, stems or stalks begin to take on a hardened form, and at length, in a gradual manner, become quite dry and rigid.

But in those which are of a perennial nature, or of some years' growth and duration, this enlargement or increase in the trunks, stems, or stalks, continues until such times as the leaves decay and fall off in the autumnal season, when a germ or bud protrudes and fixes itself in the place which contains the basis or rudiment of a new trunk or stem, that by degrees during the winter months increases in size until the advance of the vernal season, when, throwing off its former covering, it continues the enlargement or increase of the new trunk or stem, in the same manner as the inferior or lower part was augmented during the former year; as in the place where a bud is situated, a swelling-out takes place and extends itself, which is so continued with the new trunk or stem, as scarcely to leave any mark or vestige where it was. The increase of the trunks or stems in breadth, however, does not proceed from the dilatation or enlargement of the woody layers of them, but from the generation and production of new laminae or layers, which are every year deposited and added to them, by the vessels which are contained in the barks of them, as has been sufficiently shewn by different experiments.

It has been further shewn by observation and experience, that the trunks or stems of trees and some other plants are augmented every year by two woody laminae or layers, but that the size or thickness of them is by no means each year exactly the same, this depending in some measure upon the vigour of growth, age, and state of the climate, as they are the greatest when the state of growth is the most, the age in the middle degree, and the heat of the situation moderate; for the warmer the summer, the more slender the bark, or outward covering.

The trunks, or stems and stalks, in trees and plants, are of several different kinds, and distinguished by many different names. Some trees have trunks or stems which are very short and thick, others have long large clean ones; and some again have them long, small, and clean, others more knotty; some are very crooked, others quite straight; and there are still many further differences in these and several other respects. Trees of the oak, ash, beech, and elm kinds, and the several sorts of the fir-tribe, have, in general, the largest, thickest, and clearest trunks or bolls; but there are many other varieties of trees which furnish good useful trunks and stems, such as the lime, the walnut, the willow, the poplar, the chestnut, &c. in particular situations. The trunks of trees are valuable as timber, according to the particular uses and purposes for which they are designed, and to which they are put. Thus in ship-building, their being properly crooked is a great recommendation; while in many works of carpentry and other descriptions, their being perfectly straight renders them of the most estimation. In fact, their having a straight clean growth is in general a favourable property, and a circumstance which makes them readily disposed of in the markets.

In plants of other kinds the trunks are often small, so as more properly to deserve the title of stems; and at other times

times they are of a soft and pulpy nature, so as to demand the name of stalks. See PLANT, STALK, and STEM.

In these sorts of plants the *stalk* is the most common sort of trunk or stem, both among small plants of the tree kind, and those of the nature of herbs, as producing and supporting the leaves, flowers, and fruit. The name of *culm* is given to trunks or stalks of the straw or haulm kind, which are peculiar to grasses and grain, and equally bear the leaves, flowers, and produce or fruit. *Fronde* is a term which is constantly applied to the trunks or stems of plants of the palm and fern kinds or tribes, which are of a compound nature, as being formed of a branch and leaf united or blended together, and not unfrequently the flower and fruit too. The *peduncle* is a term signifying that sort of trunk or flowering-stalk which rises sometimes from the root, but more commonly from the branches, raising or elevating the flowers and fruit, but not the leaves. The *petiole* is a term implying that sort of trunk or leaf-stalk which bears the leaves only, and not the flowers.

The term *scape* is a name which is applied to herbaceous naked stems or trunks which serve to elevate and raise up the fructification only, as in those of the hyacinth and daffodil kinds.

The term *stipes* is applied to that sort of trunk or stem which is found in some kinds of fleshy plants, such as those of the common mushroom, and others of the fungus tribe. See these terms respectively.

Trunk is therefore a term which has a very extensive application in the cultivation of garden vegetables of the culinary and flowery ornamental kinds, as well as in planting, to trees of the timber and other sorts, as is more fully shewn and explained in speaking of *stalk*, *stem*, *timber*, and *tree*. See these heads.

TRUNK, in *Canals*, denotes a wooden culvert sometimes made under canals.

TRUNK and *Valve*, is a trunk of wood laid through the bottom of the bank of a canal, by which water can be let out of the canal, by drawing of the valve at its inner end.

TRUNK, in *Mining*, is a strek or strakes (*q. d.* stream) with a very small stream or dribble of water, to wash the slime of tin or copper ore, by which the lighter earthy parts are carried off with the water. The operation is called *trunking the slimes*.

TRUNK is also popularly used for the snout of an elephant, by naturalists called the proboscis.

TRUNK, in *Natural History*, a pointed, hollow, slender, and oblong body; joined to the fore-part of the heads of many insects, and serving them for sucking the blood or juices of the animals, or vegetables, on which they feed.

The trunks of flies serve for distinguishing many genera of those little animals, from their different form and other accidents. Some of these are a tube formed all of one simple piece, and others composed of several shorter pieces, nicely joined together: some are thin and as it were shelly, others thick and fleshy; those of some flies are terminated by a sort of broad foot, or by a sort of thick lips; and those of others have no lips, or at least no sensible ones; and others are made in form of a spindle hollowed at the end.

It is often necessary to have recourse to the microscope, to distinguish with nicety and exactness between these.

Without the assistance of glasses, however, it is easy to distinguish among the flies of different genera, three different manners of carrying this organ when in a state of inaction. Many flies have trunks which they can shorten, when they are not using them; these are fixed in the fore-

part of the creature's head, where there is a cavity destined to receive them when they are not in use. In many species, this cavity is no more than a mere sinus, or hole, in the fore-part of the head; but in others it is more nicely contrived, the anterior part of the head lengthening itself, and forming a kind of arched vault for its reception. Other flies have trunks which in the time of inaction are turned, or somewhat folded from above downwards: the trunks of bees are of this kind.

There are others also, which have their trunks contained entirely in a sort of case, where they lie straight at length, without being either turned or folded; but they are able to incline them in any direction, in regard to the position of their legs: of this kind are the trunks of the cicadæ, gnats, &c.

Among the butterfly class, a great number are furnished with a trunk; but there are also a great number that have it not: the fly of the silk-worm, and many, as well larger as smaller kinds, are without this organ. Those species which have it, shew it to the first view; it is placed in the middle of the head, directly between the two eyes. And though in several species it is very long, yet it takes up even in these but very little room: when it is not in use, it is always rolled up in a spiral form, in the manner of the spring of a watch; and even the shortest of them are thus turned as well as the longest.

There are among the butterflies, some which never settle upon any thing, but are eternally upon the wing, in the manner of swallows: these feed on the wing as those birds do. We often see them buzzing about a flower in the manner of a bee, and in that case they sustain themselves in the air with their wings, while they unroll their trunk, and thrust its extremity into the flower, to suck from its bottom the honey-dew, which is the common food of them, of the bees, and of many other insects. It has been much disputed, among the curious observers of nature, whether the trunk be originally composed of two parts, or two trunks laid close to another; or whether it were owing to its slender structure, that it was easily split by breaking its parts.

Mr. Bonani was of the first opinion, and Mr. Riget agreed with him at first, but he afterwards became of the contrary sentiment; and thought that they really broke in this splitting, being originally only one; but Reaumur has determined the question in favour of Bonani: having by repeated observations, found them composed of two parallel trunks, nicely and evenly laid sidewise together.

The action of the trunk in sucking is easily seen on giving a piece of sugar to a butterfly that has been kept without food for some days, after its being produced out of the chrysalis; many of the species will in this case feed on the sugar in the same manner that they would on the juices of flowers, and will shew that the use of their rolling up their trunk at times, is the swallowing what they have received into it. The trunks of the several species of butterflies are as different in colour as in shape: some are black, others reddish, many of a chestnut colour; some are also of a pale brown, and some of a beautiful yellow; many of them also are hairy on the under side, and many are smooth. The thicker trunks are always shorter than the flat ones, and have only one canal. Reaumur, *Hist. Inf.* vol. i. p. 287. 293. 309.

TRUNK of *Gnats*, the instrument by means of which the gnat strikes the flesh, and sucks the blood from animal bodies.

This is a machine well worth an attentive observation. As fine and small as this instrument appears, it is nevertheless of a very complex structure. The piercer, or more properly

perly the piercers of this instrument, are all entirely hid in the sheath which makes what we call the trunk; and is the only part we have naturally offered to our view. The trunk appears to be cylindric in the greater part of its length, and is covered with scales resembling small leaves. Near its end it has an oblong button, furnished with an aperture, out of which is occasionally thrust a fine point, which is complex, being made up of a great number of pointed bodies.

The best way to get a regular sight of the trunk of this creature, and of its manner of using it, is to suffer a gnat to fettle upon the hand, and not disturb him in the operation; but with a magnifying-glass in the other hand, to observe all his motions. In this case, we may first see a small and slender point thrust out at the end of the case, and the fly trying several different parts of the skin with this sharp instrument: when it has done this, it chooses that part which is most easily pierced; and where lies a vessel underneath, capable of furnishing as much blood as it will have occasion to suck. As soon as he has made his choice, the wound is given; and since the point of the compound piercer cannot be protruded so far out of the case as is necessary for striking to a proper depth, the use of the slit in this case is seen; for while the button at the end of this remains firmly applied to the orifice of the wound, where the piercer is introduced, and supports that delicate and feeble instrument from bending, the case opens at the slit, and its two sides bend to give room for the piercer to penetrate; and at length, when the piercer is sunk to its utmost depth, the two extremities of each piece touch, and the sides are brought close together.

The several species of gnats have great variety in their trunks; and in the observing of many kinds, the true structure of that organ in all will be most regularly and easily found. Some have the case of the piercers only one single tube split lengthwise along its upper part; others have this slit made by the junction of two cases, which cover closely a great part of its circumference, and others have the two tubes so well adjusted, and nicely fitted to one another, that a good glass cannot discover them from the rest of the trunk, when in a state of rest; but in others this structure is easily discoverable, as the extremity of one of them, when best fixed, is still to be discovered somewhat separated from the trunk, and adorned with a pencil of short hairs, like those of the antennæ. The male gnats, which have their antennæ feathered, are those which have the plumes at the extremities of these additional pieces of the case of the trunk; and these have not the beards which are found situated over the trunks of the other species of gnats.

In some gnats four darts are thrust out occasionally from the opening side, one of which serves as a sheath to the other three. The sides of them are extremely sharp, and they are barbed or indented towards the point.

Out of the immense number of gnats that one sees in summer, in wet places, it is easy to determine that very few have any chance, even once in their lives, to suck the blood of larger animals. The rest, however, are far from being doomed to perpetual famine; the herbs of the field afford them a sufficient nourishment; for these, like many other of the insect tribes, are partly carnivorous, partly otherwise, and feed equally on flesh and vegetables. Reaumur, Hist. Insect. vol. iv. p. 580, seq. Baker's Micr.

1743, p. 205.

TRUNK, *Fire*, in a *Fire-ship*. See FIRE-SHIP.

TRUNK-*Manna*. See MANNA.

TRUNK-*Roots of a Plant*, are little roots which grow out of the trunks of plants.

These are of two kinds: 1. Such as vegetate by a direct descent, the place of their eruption being sometimes all along the trunk, as in mints, &c. and sometimes only in the utmost point, as in some other plants and trees.

2. Such as neither ascend nor descend, but shoot forth at right angles to the trunk, which, therefore, though, as to their office, they are true roots, yet, as to their nature, are a medium between a trunk and a root.

TRUNKED, among *Heralds*, is applied to trees cut off at each end, which are said to be *trunked* or *truncated*.

TRUNNIONS, or TRUNIONS, of a piece of ordnance, those knobs or bunches of metal in a gun, mortar, or howitzer, which project from the piece, and bear it upon the cheeks of the carriage.

TRUNNION-*Ring*, is a ring about a cannon, next before the trunnions.

TRUNNION-*Plates*, are two plates in travelling carriages, mortars, and howitzers, which cover the upper parts of the side-pieces, and go under the trunnions.

TRUNS, in *Geography*, a town of the Grisons, where the independence of the Grey League was first ratified, and an alliance concluded between the chiefs and the communities, on the Rhine; 7 miles W. of Ilantz.

TRUNTZ, a town of Prussia, in Ermeland; 9 miles N.E. of Elbing.

TRURO, a large market-town and borough in the western division of the hundred of Powder, and county of Cornwall, England; is situated in a vale at the conflux of the two small rivers Kenwyn and St. Allen, 22 miles S.S.W. from Bodmin, 46 miles S.W. by S. from Launceston, and 257 miles W.S.W. from London. It is called in ancient records Trevery, Trieureu, and Truru-burgh. It was one of the decayed market-towns for the repairs of which an act of parliament was passed in 1540; but it has now become a place of considerable trade. Its central situation with respect to the commerce and chief products of the county, its improved and still improving state, the regularity and handsome appearance of the buildings, with its increasing population, justify its title to pre-eminence amongst the towns of Cornwall. Leland says, "There is a castle, a quarter of a mile by west out of Truro longing to the erles of Cornwalle, now clene down. The site thereof is now used for a shooting and playing place, out of the town of Truro." This castle is not mentioned in Domesday book, and was therefore erected after the Conquest. William of Worcester speaks of it as being in ruins in the time of Edward IV. It stood on an eminence on the more westerly side of the two currents: its only remains are a waste area, and an artificial mount or keep, the earth of which is daily decreasing by its being applied to other purposes. From the increase of the buildings since the time of Leland, the site is now included within the town, which appears to have derived its origin from the castle; but was so nearly coeval with it, that it is noticed as existing within a century after the Conquest, and as having a charter in the reign of Henry I. The corporation of Truro, as established by a charter of queen Elizabeth, bearing date 1589, consists of a mayor, four aldermen, and twenty capital burgesses. In these twenty-five persons, the right of electing two members to parliament (possessed by the borough ever since the reign of Edward I.) is vested; though the number of inhabitants, as ascertained by the population return of the year 1811, is 2482, when the houses were enumerated at 400. The burgesses of Truro have sundry privileges by grant of their ancient lords; and the mayor's jurisdiction extends even over Falmouth. This last mentioned privilege, which is said to have been granted

by king Joim, and is recorded in the herald's visitation of 1620, was loft in the early part of the laft century; it having been then contefted by, and decided in favour of, the inhabitants of Falmouth, who now enjoy the jurifdiction of their own port. This town is fituated in the three parifhes of St. Mary, St. Clement, and Kenwyn. St. Mary's church is a fpacious edifice, of the architecture which prevailed in England about the reign of Henry VIII. It confifts of two aifles of equal fize, and a fmall one; and has a modern fteeple, which does not correpond with the body of the church. In the windows are feveral fragments of painted glafs; and in one of them, on the fourth fide, is the date 1518, the year when the church was erected. Here are feven meeting-houfes for the accommodation of diftenders of various denominations. Truro is one of the original coinage towns; and here only, and at Penzance, with the exception of a few times at Helfton for the convenience of the merchants, have the coinages of late years taken place. Moft of the tin is coined here, and more is exported hence than from any port in the county. The blocks lie in heaps about the ftreets, and are left entirely unguarded, as their great weight renders it difficult to remove them without immediate detection. Here is a coinage-hall; and Hals, in his Parochial Hiftory, mentions the town poffeffing one fo early as king John's reign. Here is alfo a manufactory for converting block-tin into bars and ingots: the weight of the former is from eight ounces to one pound; that of the latter, from fixty to feventy pounds each. The bars are exported to the Mediterranean and Baltic; the ingots are fent to the Eaft Indies. Considerable quantities of copper-ore are exported from this town to Wales. A manufactory for carpets has been recently eftablifhed, which is carried on with great fuccefs, and forms a material addition to the export trade. The improvements made in Truro of late years have been very confiderable, and particularly fince the year 1794, when an act of parliament was paffed for lighting and paving the town. The principal ftreet was formerly contracted, and diffigured by a row of houfes fretching along the middle from the coinage-hall to the market-place. Thefe have been removed, and a fpacious opening formed, from which a new ftreet is built, diverging from the other at right angles. A literary fociety and a county library were eftablifhed here in the year 1792. A theatre and affembly-room have alfo been erected in that part of the town called the High-Crofs: and on the 12th of Auguft, 1799, a county infirmary, a fpacious ftone building, was opened in Kenwyn parifh, under the patronage of the prince of Wales. A free grammar-fchool was founded at an early period: and there are two exhibitions, of 30*l.* *per annum*, at Exeter college, Oxford, for fcholars of Truro fchool, founded by the trustees of the charitable bequefts of the Rev. St. John Eliot, who died in 1760. A central fchool on Dr. Bell's plan was eftablifhed in 1812, in which there are 130 boys and 70 girls. An hofpital for ten poor houfekeepers in St. Mary's parifh was built in 1632, purfuant to the will of Mr. Henry Williams, who endowed it with lands which now produce 120*l.* *per annum*. The corporation make widows the exclusive objects of this charity, and allow them a penfion of four fhillings each *per week* and clothes. The market at Truro is held by prefcription; the claim to it having been certified and allowed in the reign of Edward I. Here are now two market-days, Wednefday and Saturday, both well fupplied with butcher's meat, fifh, and other provifions. A corn-market is alfo held on Wednefday. Four annual fairs are likewife kept for cattle.

About a mile from Truro, on the road to Falmouth, at Calinnick, is a large fmelting-houfe for tin. It confifts of

ten reverberatory furnaces, fix feet in height, and about twelve feet in length, each. Culin-coal is ufed as the flux, in the proportion of about one-eighth to the ore, of which nearly 600 cwt. is fmelted within fix hours, and yields about 350 cwt. of tin.—*Beauties of England and Wales*, vol. ii. Cornwall; by J. Britton and E. W. Brayley, 1802. *Lyns's Magna Britannia*, vol. iii. 1814.

TRURO, a town of Nova Scotia; 40 miles N. of Halifax.—Alfo, a town of Barnftaple county, in the ftate of Maffachufetts, on the E. fide of Cape Cod bay, containing 1209 inhabitants. N. lat. 42° 1'. W. long. 70° 2'.—Alfo, a townfhip of Franklin county, in the diftrict of Ohio, containing 672 inhabitants.

TRUSAM, a river which rifes in the Brisgau, paffes by Friburg, &c. and joins the Eltz, near Riegel.

TRUSS, TRUSSA, a bundle, or a certain quantity of hay, ftaw, &c.

A trufs of hay is to contain fifty-fix pounds, or half a hundred weight: thirty-fix truffes make a load.

In June, July, and Auguft, a trufs of new hay muft weigh fixty pounds. The trufs of ftaw is likewife to weigh a certain weight, but this is various, in fome degree, in different places. In other matters, the truffes differ greatly according to cuftom or other circumftances.

A trufs of forage is as much as a trooper can carry on his horfe's crupper.

TRUSS, or *Bunch*, among *Florifts*, is a term applied to the tuft of flowers which is formed at the top of the main ftem or ftalk of fome plants of that kind, and which, in the auricula and polyanthus fort, confifts of a fmall bunch of flowers, to which the title of pips or bloffoms is given, and which are fupported by as many little foot-ftems, proceeding from out of the top part of the main ftem; fome of the properties of which are thefe: the pips or bloffoms, which are the flower parts, confift of the difk or outer rim, the eye or inner rim, the tube or pipe, and the thrum, chives, or apices. The pips or bloffoms, in thefe kinds of flowers, fhould always be rich, and of a lively good colour or colours, as fuch as may immediately ftrike and captivate the mind of the beholder with the idea of real beauty; as this is the property which is the foundation of all the others in thefe forts of flower-plants: confequently, where the colours of the flowers in them have a faint or dead appearance, or are of an ordinary and inelegant tinge or hue, they are good for nothing, even though the whole of their other properties fhould be the moft excellent.

In all the painted or ftriped flowers of thefe forts, the colours fhould constantly be fo equally diftributed over the rim or difk, as that there may be an equal uniformity amidft the whole variety; in order that, upon the whole, the fight may not be in the leaft diftracted or offended with any fort of difproportion, or perceive one fide to be of a brighter or darker hue or fhade than that of another. The edges of the rims fhould be round, or at leaft fo near it, that the indentures may bear but a fmall proportion to the difk; as when thefe are deep, and the points of the petals ftand in fomewhat the ftar-form, greatly divided, the largenefs of the vacancies will affect the fight with an evident deficiency: and the cafe is ftill worfe in thofe pips or bloffoms which are liable to run out into a greater breadth on one fide of the eye than the other; fuch irregularities and difproportions are very difgufting in thefe flowers. The eye, which is the iris or little ring that environs the tube or pipe, and which ought to be formed in the manner of the difk, either perfectly or nearly round, and of an entire clear colour; and of a fnowy or pure white, in all painted or ftriped flowers; and of either a white, bright yellow, or good ftaw-

draw-colour, in self or plain-coloured flowers. The farina, mealy, or dusty property should also be fine; as, if coarse, it will be unpleasant to the eye, or in appearance. The eye of the flower should appear entire, though not separate from the disk or rim; that is, it should be blended with or shaded into it in such a manner, as not to occasion any indistinctness between the edges of the one and the other: as, in flowers where these two properties of the eye are imperfect, the lively contrast or difference between the rim and the eye, which otherwise reciprocally display and shew each other off to the best and most advantage, is, in a great measure, lost and destroyed. The face of the whole pip, rim, and eye, should likewise be so opened as to lie perfectly or very nearly flat; as when it either inclines inward, which is termed *cupping*, or throws itself backwards, as in particular flowers, such as the martagan lily, the true form as well as colours are in some degree obscured by being covered and put out of sight. See TUBE and THURM.

The length of the pedicles which support the pips or blossoms in the truss, should be proportioned to the number and size of the pips which they sustain; as, if they be very long, and the pips small, there will be unsightly vacancies in the truss; or if they be short, and the blossoms many and large, they will be too much crowded together, so that neither the colours can be fully viewed, nor the other properties of the pips be displayed. The pedicles should also be sufficiently elastic, firm, and strong, in order that they may not droop by the weight of the pips or blossoms, and fall loose and in a disarranged manner, but sustain the truss firmly and closely, without either vacancy or crowding. They should, too, be nearly all of the same length, so that the pips may stand together at the same height, and form a regular umbel, or rather corymb, which is the formal perfection of the truss. The pips should also be nearly of the same size and colour, so as not to be readily distinguished from each other; as otherwise the unity and harmony of the truss will be destroyed, and though ever so plentifully formed, would appear as if taken from different sorts of these flowers. A plant of these kinds should blow freely, and expand all its pips or blossoms at the same time; as, by this means, the colours in them all will appear equally fresh and lively; whereas in those which do not blow some of the pips until others have passed their prime, the whole appearance of the truss falls much short of that beauty which would otherwise be conspicuous.

The stem or stalk which supports the truss, and which is mostly termed the main stalk, should be elastic, straight, and sufficiently strong for bearing it without drooping. It is also an excellency in it to be erect and lofty, as thereby the truss, and of course the whole flower, will make a more stately, commanding, and handsome appearance.

Such plants of these kinds as have these properties or qualities can hardly fail to please the curious florist; yet as, on the one hand, some plants may be somewhat deficient in several particulars of less consideration, and still be justly deemed fine and valuable flowers; so, on the other hand, it will be an additional excellence, in such as have all these properties, that they naturally stand long in bloom, and wear their colours without alteration or fading in any way. The truss or bunch is probably so named by florists, in consequence of its having naturally something of that appearance about it.

TRUSS, in the language of *Surgery*, is a particular sort of bandage, or apparatus, employed in cases of ruptures, (see HERNIA,) for the purpose of keeping up the reduced parts, and hindering a fresh protrusion. It must of course be

adapted to the situation and nature of the rupture. As a truss is of all the inventions of surgery one of the most important, and highly essential to the health of a large portion of the human race, the most advantageous modes of constructing and applying it are objects which it is as much the duty of the surgeon to know something about, as about any other means of curing or lessening the danger of so serious and common a disease as a rupture.

A truss which fulfils its intention properly, should compress the neck of the hernial sac, and the ring or external opening of the hernia, in such a manner, that a protrusion of any of the contents of the abdomen will be prevented with complete security. Hence, it is the indispensable quality of a good truss, first, to make effectual and equal pressure on the parts indicated, without causing pain or inconvenience to the patient; secondly, not easily to slip out of its right situation, in the varying motions and positions of the body.

The different kinds of herniary bandages may be reduced to the two classes of elastic and inelastic. The latter are composed of leather, fustian, dimity, or similar materials. These cannot be at all depended on, and should, therefore, be entirely banished from surgery. Since (as Mr. Lawrence has remarked) the size of the abdomen varies according to the different states of the viscera, and to the motions of its parietes in respiration, a non-elastic bandage must vary constantly in its degree of tightness, and keep up either too great or too little pressure. The omentum, or intestine, easily slips out when the opening is not exactly closed, and the patient who wears such a bandage, must be in a state of constant insecurity. Those who lead an active life, or are obliged to use laborious exertions, will be more particularly exposed to risk. If the patient, after experiencing these defects, endeavours to remedy them by drawing the bandage tighter, he may confine the viscera, but he produces other inconveniences. The increased pressure injures the spermatic chord, and may affect the testicle: the integuments become red, painful, and excoriated; and the bandage must be entirely laid aside, until the parts have recovered. Richter has often seen painful tumefaction of the testicle, hydrocele, and even circocele, produced from this cause, and entirely dissipated by the employment of a proper truss. *Traité des Hernies*, p. 24.

He also saw the pad of a non-elastic bandage excite, in the region of the abdominal ring, a considerable inflammation, which terminated after a few days in suppuration. The hernia never appeared again after the cure of the abscess. The inflammation had extended to the neck of the sac, and obliterated that part. Lawrence on Ruptures, edit. iii. p. 69, 70.

Every truss consists of a pad, for compressing the ring or aperture through which the hernia protrudes, and of another piece, which surrounds the abdomen. To these are sometimes added a thigh-strap, which passes under the perineum, and a scapulary, which is applied over the shoulder. The use of the two latter appendages is to keep the pad from slipping up or down, an inconvenience which it is difficult to prevent in certain cases, unless a scapulary or thigh-strap be worn. In the inelastic trusses, the piece which extends round the body, is a simple girt or band; but in every elastic truss, this part is constructed with a spring, which is the most important thing of the whole instrument.

Elastic trusses, when they are well made, and fit properly, are to be preferred to the inelastic, in regard to security. They yield to the varying motions of the body; are less liable to slip off the part upon which they are intended to

press; and, in general, do not require the use of a thigh-strap, which is usually a very disagreeable part of the truss to a patient.

“The valuable properties of this instrument (says Mr. Lawrence) depend entirely on its spring, which keeps the pad constantly pressed against the hernial opening; and gives it a power of reaction, by which a uniform pressure is maintained under varying attitudes. This elasticity can be attained only by the employment of steel. In the first attempts at procuring something better than the non-elastic bandages, iron was used; and the instruments fabricated by Blegny at Paris were constructed of this metal. It is obviously inadequate to accomplish the ends which we have in view, in treating herniæ; yet it is only at a comparatively recent period that its defects have been discovered. Arnaud, whose writings contain much valuable information on this subject, recommends for the spring of a truss a mixture of malleable iron and steel, so that the instrument may be moulded by the hand to any particular shape which the patient may require; and he is followed on this point even by Richter. A truss which admits of such management, must in effect be exposed more or less to the objections which apply to the non-elastic bandage; and the only material which possesses the requisite qualities of firmness and elasticity, is well-tempered steel.

“The most important part, then, of an elastic truss, consists of a flat and narrow piece of steel, adapted to the form of the body, and called the *spring*. This passes round the affected side of the trunk, terminates anteriorly on an expanded plate of iron, to which it is rivetted, placed over the mouth of the sac, and extends behind to various distances beyond the spine. The posterior surface of the plate is furnished with a convex cushion, termed the *pad*, and adapted in form and size to the opening which it is designed to close. The spring is covered externally with leather, and that it may sit easily on the body, its inner surface is lined with some soft substance; a strong strap, extending from its posterior end, passes round the sound side of the trunk, and is fastened to a hook on the front of the plate. This strap, being perforated by several holes, enables the patient to tighten or loosen the truss at pleasure.” Lawrence on Ruptures, p. 71, 72. edit. 3d.

In a note, this gentleman observes, that the spring of the truss has commonly been a semicircle, with the posterior end resting on the spine. Camper proposed to carry it round to the anterior superior spine of the ilium on the sound side: and Scarpa very much approves the plan. Trusses of this form fit with a firmness which cannot be given to the others by tightening the strap. They keep up the rupture much better than even a stronger spring of the other kind. Hare-skin, with the hair outwards, is considered the best article for covering the spring, with a view of keeping it from the ill effects of the perspiration.

When it is necessary to make strong compression, as in large old ruptures, and in persons who cannot avoid labour and exercise, the elastic spring should be made accordingly thicker and broader. But an object of the first-rate importance is to make the spring press equally upon every point of the body which it touches. This is what demands the earnest attention both of the surgeon and the instrument-maker, especially as the hips of some individuals are flat and narrow, while those of other persons are broad and prominent. A thick, flexible, metallic wire, accurately applied round the pelvis, will serve to take the measure and proper shape of the spring, which may afterwards be altered a little, if found necessary. The wire, however, should be

somewhat longer, on account of the length of the spring being diminished in the construction of it. Callisen disapproves of springs which extend quite round to the opposite hip; but he thinks a certain bend of the spring downward, near the pad, is useful in trusses for inguinal ruptures, as, by this means, the part of the instrument which goes round the pelvis can be made to fit more closely, and is placed at a convenient distance from the trochanter, so as to be less liable to derangement. The neck of a truss for a femoral hernia should be shorter, and, in general, the instrument requires in this case the employment of a thigh-strap to keep the pad from slipping into the bend of the groin.

The pad of a truss is frequently composed of a piece of cork covered with leather, with the intervention of some wool or horse-hair. Proposals have been made to use pads which are formed of bladder or elastic gum, filled with air, but we know nothing of the real merits of such contrivances, nor should we expect them to answer. Callisen gives a general preference to pads which have a flat and not a conical surface, which last form not only produces less equal pressure, but is more liable to slip. The shape and size of the pad should of course correspond to the figure and dimensions of the ring, or opening, at which the rupture protrudes. In the inguinal hernia, the pad should be long and oblique; in the crural, shorter; in the umbilical, round; and in the ventral, for the most part, oval. In large old ruptures, the pad should be large accordingly; and in small recent cases, it should be small in proportion. For fat subjects, the pad should be firm and prominent; but for thin persons, it should be flatter and softer. Nay, it has even been found sometimes necessary to accommodate the shape of the pad to the various degrees of convexity or flatness of the os pubis.

Trusses are sometimes fabricated with a pad moveable on the spring, instead of being rivetted to it. This may be inclined upwards or downwards, according to the form of the abdomen; and it is retained at the desired point by a spring fitting into the teeth of a rack. In others, the plate contains a screw, by which the cushion is pushed farther inward, or allowed to recede, at pleasure. Although there cannot be a doubt that some of these inventions possess considerable merit, and are, in certain instances, superiorly useful, it must be confessed that, in general, their utility is not so much greater than that of common pads, as to make amends for the want of simplicity and the increase of expence. We should be sorry, however, to say any thing that would unfairly discourage all such ingenious endeavours to improve so difficult an instrument to make perfect as a truss; and we therefore repeat our belief, that there are particular cases, in which pads, with racks, screws, springs, &c. may be employed with great advantage.

Notwithstanding every care, sometimes even elastic trusses cannot be hindered from slipping away from the part which they are designed to compress. Sometimes they slip downwards, which in fat subjects is generally caused by the projection of the abdomen. Occasionally, the fault consists in the instrument becoming displaced in the direction upwards, which mostly happens in thin persons, and is produced by the flatness of the abdomen. In the first case, the displacement is to be prevented by the use of an elastic scapulary; in the second, the slipping of the pad upwards is to be prevented by the employment of a thigh-strap.

When a patient is afflicted with a rupture on each side, the two protrusions may be very well kept up by means of a single truss, made with two pads, which are joined together, at the exact distance of the rings from each other,

by a piece of steel, applied over the convexity of the symphysis of the pubes, and proportioned in length to the space between the two openings through which the viscera descend. In such cases, however, it is absolutely necessary to have the spring stronger, than if there were only one rupture. The truss should also be made to put on that side of the body, upon which the hernia, most difficult to retain, is situated. There are some practitioners, who give the preference to the use of two single trusses, joined together in front and behind with suitable straps.

With respect to the application and use of trusses, the following instructions seem to merit attention.

1. A truss should never be first applied, or changed, except when the patient is in the horizontal posture, and it is known with certainty that all the contents of the rupture are completely reduced.

2. The first applications of a truss should always be made under the superintendance of the surgeon himself; and care should be taken to put on the instrument in such a manner, that the lower third of the pad will compress the neck of the hernial sac against the os pubis, while the upper portion will compress the abdominal ring. The surgeon should also make the patient acquainted with the right manner of applying the truss; the principles on which it keeps up the bowels, and affords a chance of a radical cure; the requisite cautions to be observed, &c. When a patient first begins to wear a truss, he should be particularly careful not to be guilty of any imprudent exertions, and it behoves him to observe most attentively, that the instrument does not slip from its proper situation. It will also be necessary for him to pay attention to the instrument being neither too tight, nor too loose.

3. The patient ought to be provided with at least two trusses, which should be changed every morning in bed. In order to save the truss, especially in fat persons, who perspire a great deal, it is a good plan to lay a soft piece of linen under the pad.

4. An uneasiness about the ring, which always gives rise to a suspicion that a portion of intestine, or omentum, is protruded, makes it proper to take off the truss, carefully examine the parts, and reduce them if they have descended.

5. When the skin is excoriated by the truss, the part may be cured by sprinkling upon it the powder of acetite of lead, fuller's-earth, lapis calaminaris, &c. or bathing the part with the saturnine lotion. It will also be right to protect the excoriated place with a piece of linen put under the truss.

6. When the pressure of the truss excites affections and swellings of the spermatic cord and testicle, either the thigh-strap must be relaxed, or the lower part of the pad made less prominent.

7. In children a very tight truss is altogether hurtful, and may be the cause of various curvatures and deformities; but the erroneous opinion, that they ought not to wear a spring truss, we have noticed in another place. See **HERNIA**.

8. Sometimes very old large ruptures cannot be securely kept up by means of a truss, and even when the pad is extremely large, not more success is often experienced. Should they be retained, it may happen that the ill effects of the compression will be felt in the straightened state of the cavity of the abdomen, or in the speedy appearance of another hernial tumour on the opposite side. Ruptures totally irreducible, and various disorders of the testicle and cord, do not admit of the use of a steel truss.

Whoever wears a truss, should be careful to employ it day and night, without interruption, so that there may be

no opportunity for the hernia to protrude again. If, under the employment of a truss, the rupture once descends again, either a strangulation happens from the narrowness of the neck of the sac; or, at all events, the hope of a radical cure, which may have been entertained for months and years, vanishes in a moment. For experience has put it beyond all doubt, that, by the continual unremitted use of a truss, and the steady retention of the contents of the hernia, the neck of the hernial sac, and the ring, may be gradually lessened in diameter, until they are entirely closed, and a radical cure of the rupture effected. This is more frequently observed in young subjects; seldom in adults; and hardly ever in persons of advanced years. But trusses must be worn a long while, nor should the patient venture to lay aside their use till after many cautious attempts; beginning the experiment at first only in the night-time, and not making it in the day, till after a considerable period from the time when he first thinks himself safe. The longer and more attentively a truss is worn, the greater is the hope of a radical cure. Callisen, *Syst. Chir. Hod. tom. ii.*

Representations of various kinds of trusses may be seen in *Plate IX. Surgical Plates. Fig. 1.* exhibits a common truss. *Fig. 2.* the spring terminating in front in the expanded plate of metal, often termed the head of the truss. *Fig. 3.* represents a truss for a double rupture, with two pads affixed to one spring, and furnished with two thigh-straps, which, in such a case, would be almost indispensable. *Fig. 4.* exhibits Dr. Hulme's palm truss, so named by its inventor, from its acting continually like the pressure of a hand. Its particularity consists in its springs not being placed in that part of the truss which goes round the body, but in the pad itself; where there are three spiral springs. A full description of this truss may be found in the *Transactions of the Medical Society of London*; but as the construction of this instrument does not make much provision against the slipping and displacement of the pad, it can afford very little security to the patient, and does not therefore appear to us to be deserving of recommendation. *Fig. 5.* represents a very good ordinary truss, made by Mr. Whitford, a surgeon's instrument-maker in Smithfield. *Fig. 7.* exhibits Mr. Salmon's patent truss, with the additional springs, all three of which together are capable of exerting a force equal to nine pounds weight. A is the spring, made so as to exert a positive force on the cushion at each end. At the front and back ends are different holes, to which the plates and cushions may be instantly shifted by the wearer, so as to admit of being correctly accommodated to the parts. B, C, the additional springs detached, either, or both, of which may be added, so as to increase the power of the truss, if requisite. These springs are simply slipped into a loose leather or other case. D, the front plate with its cushion. This plate will apply to either of the holes in the spring, and is kept on the ruptured part by the pin, on which it turns in all directions; so that whatever be the shape or inclination of the body, the plate adapts itself to such changes, not being confined in its direction by any power of the spring. The cushions are simple cases stuffed with the softest materials. E, the back plate and cushion. F F a strap to be used, if occasion require, to prevent a forcible removal of the cushions.

Fig. 7. represents a section of the pelvis, round which the truss is to be applied. Mr. Salmon contends, that if the spring only passed round to the point diametrically opposite that from which it commenced, it would not remain stationary, as both extremities would rest on planes inclined to their action. For a full explanation of this figure, however,

ever, we must refer to Mr. Salmon's Mechanical Analysis of Trusses.

Fig. 8. a truss for a navel-rupture, invented by the late Mr. Marrison, of Leeds. It consists of two pieces of thin elastic steel, which surround the sides of the abdomen, and nearly meet behind. At their anterior extremity they form conjointly an oval ring, to one side of which is fastened a spring of steel, of the form represented. At the end of this spring is placed the pad, or bolster, that presses upon the hernia. By the elasticity of this spring, the hernia is repressed in every position of the body, and is thereby constantly retained within the abdomen. A piece of calico, or jean, is fastened to each side of the oval ring, having a continued loop at its edge, through which a piece of tape is put, that may be tied behind the body.

When there is a great projection of the abdomen below the navel, as is often the case in women who have borne many children, the oval ring (especially if made wide) is thrown into an oblique direction, and then does not give the pad so true a bearing upon the hernia. To prevent this inconvenience, Mr. Marrison made the lower bow of the ring to project more than the upper one; and instead of the calico skirt surrounding the ring, he used a belt fastened to the lower bow only, as is represented in Mr. A. Cooper's work on hernia, part ii. plate 9. fig. 6.

Afterwards Mr. Marrison usually made his trusses with the lower bow of the ring only; forming this to project so as to suit the pendulous state of the abdomen. To the round end of the spring, which supports the pad, he affixed a strap, in which were contained spiral wires, for the purpose of regulating the degree of pressure upon the hernia. In a flat abdomen he inverted the position of the truss, directing the bow to be placed above the navel.

Fig. 9. represents a new truss for a navel or ventral rupture, invented by James Eagland, truss-maker at Leeds. The truss consists of two semicircular bows of steel; each of which, at its anterior extremity, is fastened by a distinct brass hinge, placed vertically, to the outer side of an intermediate plate of block-tin. This plate is somewhat concave on its inner side. The concavity is filled with a piece of blanket, which is covered with leather. This lining causes the leather covering to project a little; but in so small a degree, that when the concave side of the plate is applied to the abdomen, the pressure of the bows brings the rim of the plate, in every part of its circumference, into contact with the skin.

The posterior part of each bow, for about an inch and a half from its extremity, is turned backward, so as to form a flat surface, where it rests upon the back of the patient. To the inner side of this flattened part is sewed a soft leather cushion, lined with blanket, to prevent the patient from being hurt by the ends of the bows.

A strap of leather is sewed to the covering of the truss, near the posterior end of one bow; and a buckle is fixed, in like manner, near the end of the opposite bow, but resting upon it. By means of this strap, the patient can keep the ends of the bows steady, without being hurt by the buckle. See Hey's Practical Observations in Surgery.

Fig. 10. shews a back view of Eagland's navel truss, and of Salmon's patent inguinal truss, applied.

Fig. 11. represents a front view of the same instruments applied.

Besides trusses for ruptures, there are also trusses for another purpose, namely, supporting the scrotum in cases of hydrocele, inflamed testicle, farcocoele, &c. These last are commonly called bag-trusses, or suspensory bandages. In fact, they simply consist of a linen bag, for the reception

of the scrotum, and of a girt which goes round the body, and to which the bag-part of the truss is fastened by means of little hooks, so as to afford the requisite degree of support to the scrotum. Many persons who hunt, and are accustomed to take violent horse-exercise, make use of bag-trusses, in order to keep the scrotum from being hurt by contusions against the pommel of the saddle.

TRUSS, in a *Ship*, a machine employed to pull a yard home to its respective mast, and retain it firmly in that position. As the truss is generally used instead of a parrel, it is rarely employed, except in flying top-gallant-fails, which are never furnished with parrels. It is no other than a ring or traveller, which encircles the mast, and has a rope fastened to its after-part, leading downward to the top or decks; by means of which the truss may be straightened or slackened at pleasure. The haliards of the top-gallant-fail being passed through this ring, and the fail being hoisted up to its utmost extent, it is evident that the yard will be drawn close to the mast, by pulling down the truss close to the upper part of the fail. For, without the truss, the fail and its yard would be blown from the mast, so as to swing about by the action of the wind, and the rocking of the vessel; unless the yard were hoisted close up to the pulley in which the haliards run; which seldom is the case in flying top-gallant-fails, because they are usually much shallower than those which are fixed or standing. Falconer.

TRUSSES, short pieces of ornamental carved work, mostly in small ships fitted under the taffarel, in the same manner as the *term-pieces*.

TRUSS-Parrel. See PARREL.

TRUSS-Pendants. See PENDANTS.

TRUSS-Tackles. See TACKLE.

TRUSSED, in the *Manege*. A horse is said to be *well-trussed*, in French *bien gigote*, when his thighs are large, and proportioned to the roundness of the croupe. On the contrary, a horse with thin thighs, that bear no proportion to the breadth of the croupe, is said to be *ill-trussed*.

TRUSSELS, in *Rope-Making*, have a back with stout pins and four legs braced together. They are used at the upper end of a rope-ground, or put under ropes of a short length, when the strands cannot be put on the stake-heads.

TRUSSING, in *Falconry*, is a hawk's raising any fowl or prey aloft, soaring up, and then descending with it to the ground.

TRUST. See CESTUI *que trust*.

TRUSTEE, one who has an estate, or money, put or trusted in his hands for the use of another. See FIDEI *commissum*.

TRUSTRA. See TRISTRA.

TRUTH, VERITAS, a term used in opposition to falsehood; and applied to propositions which answer or accord to the nature and reality of the thing of which something is affirmed or denied.

Thus, when we say, that four is the fourth part of twice eight, that proposition is true, because agreeable to the nature of those numbers.

Truth, according to Mr. Locke, consists in the joining or separating of signs, as the things signified by them do agree or disagree one with another. Now the joining or separating of signs, is what we call making of propositions. Truth, properly, belongs only to propositions, of which there are two sorts, mental and verbal; as there are two sorts of signs commonly made use of, *viz.* ideas and words.

Mental propositions are those in which the ideas in our understanding are put together, or separated, by the mind perceiving or judging of their agreement or disagreement.

Verbal

Verbal propositions are words put together or separated, in affirmative or negative sentences. So that proposition consists in joining or separating of signs; and truth consists in putting together or separating those signs, according as the things they stand for agree or disagree.

Truth, therefore, as well as knowledge, may come under the distinction of *verbal* or *real*; that being only *verbal* truth, where terms are joined according to the agreement or disagreement of the ideas they stand for, without regarding whether our ideas were such as really have, or are capable of having, any existence in nature. But it is then they contain *real* truth, when these signs are joined as our ideas agree; and when our ideas are such as we know are capable of having an existence in nature: which, in substances we cannot know, but by knowing that such have existed.

Truth is the marking down in words the agreement or disagreement of ideas, as it is. Falsehood is the marking down in words the agreement or disagreement of ideas, otherwise than it is: and so far as these ideas, thus marked by sounds, agree to their archetypes, so far only is the truth real.

The knowledge of this truth consists in knowing what ideas the words stand for, and the perception of the agreement or disagreement of those ideas, according as it is marked by those words.

Besides truth, taken in the strict sense before mentioned, which is also called *logical* truth, there are other sorts of truths: as,

TRUTH, Moral, which consists in speaking things according to the persuasion of our own minds, or the conformity of our expressions to our thoughts, called also *veracity*: and, in a more general sense, comprehending also *faithfulness*, which is a conformity of our actions to our words. Whereas lying or falsehood, as opposed to truth, is generally a mean, selfish, or malevolent, and always an unjustifiable, endeavour to deceive another, by signifying or asserting that to be truth or fact, which is known or believed to be otherwise; and by making promises, without any intention to perform them.

TRUTH, Metaphysical or Transcendental, which is nothing but the real existence of things conformable to the ideas which we have annexed to their names.

In which sense a cloek may be said to be true, when it answers the idea or intention of the person who made it. Others will have metaphysical truth to consist in the agreement of a thing with the idea thereof in the divine understanding.

TRUTINA HERMETIS is used, among *Astrologers*, for an artificial method of examining and rectifying a nativity, by means of the time of conception.

TRUTINATION, formed from *trutina*, a pair of scales, the act of weighing or balancing a thing.

TRUTTACEOUS, in *Ichthyology*, the name of a genus of fish, of the trout kind, which are distinguished from all other fish by a small fat fin, which they all have near the extremity of the back, and which has no rays or nerves. Of the fish of this genus, some live only in fresh waters, never entering the sea or salt rivers; others frequent both the fresh and salt waters, and are therefore called *anadromi* or *catanadromi*. These leave the fresh waters while young, and go into the salt rivers to feed and grow, and again return into the fresh rivers at the time of their full growth and spawning, that their offspring may have the same advantages themselves have had, of being hatched into life in fresh water.

The truttaceous fish are divided into two orders, those which have, and those which have no teeth. Of the edentulous kind, or such as have no teeth, are the lavaretus, ferra, thymallus, oxyrinchus, and albula; and of the toothed kind, are the salmo, umbra, trutta, carpio, &c. In dissection, the truttaceous fish have all apophyses to the pylorus, and are all a high-tasted and fine fish for the table. Ray's *Ichthyology*, p. 182.

TRUTULENSIS PORTUS, in *Ancient Geography*, a port of the isle of Albion, according to Tacitus, in his life of Agricola. The situation of this port has not been satisfactorily ascertained; but it has with the greatest probability been fixed at Richborough or Rutupa, in the county of Kent.

TRUXILLO, in *Geography*, a town of Spain, in Estremadura, defended by a citadel; the birth-place of the celebrated Francis Pizarro, the conqueror of Peru; 40 miles N.N.E. of Merida. N. lat. 39° 15'. W. long. 5° 22'.

TRUXILLO, a city of South America, in the viceroyalty of Peru, and see of a bishop. It was built in the year 1535, by Don Francisco Pizarro, in the valley of Chimo. Its site is pleasant, notwithstanding the sandiness of the soil, the general inconvenience of all the towns in the vallies. It is surrounded with a brick wall, and from its circuit may be classed among cities of the third order. It stands on a small river, about half a league from the sea: two leagues to the northward is the port of "Guanchaco," the channel of its maritime commerce. The houses make a creditable appearance. The generalities are of bricks, with stately balconies, and superb porticoes; but the others are of baxareques. Both, however, are low, on account of the frequent earthquakes, and few of them have so much as one story. The corregidor of the whole department resides in this city, and also a bishop, whose diocese begins at Tambez; with a chapter, consisting of three dignitaries, namely, the dean, archdeacon, and chanter, with four canons, and two prebendaries. Here is an office of revenue, assisted by an accountant and treasurer, one of which resides at Lambayeque, several convents, a college, and an hospital. The inhabitants consist of Spaniards, Indians, and all the other casts. Among the first are several rich and distinguished families. The women in their dress and customs follow nearly those of Lima. About a league from the city is a river, the waters of which are conveyed by various canals through this delightful country. The diocese comprehends eight jurisdictions, viz. Truxillo, Sana, Piura, Caxamarca, Chachapayas, Lulia and Chilloas, Pataz or Caxamarquilla, and Jean de Bracamoros; the last is situated in the audience of Quito; the rest in the viceroyalty of Peru. The jurisdiction of Truxillo is situated on the coast of the Pacific ocean, and extends twenty leagues in length, and as much towards the interior part of the country, composed throughout of beautiful vallies. In this climate there is a sensible difference between winter and summer; the former being attended with cold, and the latter with excessive heat. The country of this whole valley is extremely fruitful, abounding with sugar-canes, maize, fruits, and garden vegetables, as also with vine and olive yards. The parts nearest the mountains produce wheat, barley, and other grain; so that the inhabitants enjoy not only a plenty of all kinds of provisions, but likewise make considerable exports to Panama, especially of wheat and sugars. This remarkable fertility has been improved to the great embellishment of the country; so that the city is surrounded by several groves and delightful walks of trees. The gardens also are well cultivated,

cultivated, and make a very beautiful appearance, which, with a continual serene sky, prove not less agreeable to travellers than to the inhabitants. The city is situated 480 miles S. of Quito. S. lat. $8^{\circ} 6'$. W. long. $79^{\circ} 20'$.

The progress of this city to splendour and opulence was very rapid; but in the midst of its career it was attacked and deluged by the buccaneer Francis Grammont, in the year 1678. The consequence of his invasion was almost a temporary depopulation. However, the salubrity of the air and the fertility of the soil have drawn thither inhabitants sufficient to make their number amount to 7600 persons. The land about it produces sugar, cacao, indigo, coffee, and in general all the productions of the torrid and some few of the temperate zones. Wheat is obtained here of an excellent quality, and in abundance. They also breed sheep and goats: their mutton is large and good; their cheese much commended; and of the wool they fabricate goods, of certain and profitable sale. The women are employed in making sweetmeats, which have an extensive circulation. The commercial articles of Truxillo are conveyed to Maracaibo by the lake; but their most common intercourse is with Carora, where they send their goat and sheep-skins to be dressed. The air enjoyed by the inhabitants of Truxillo is pure; but their waters, though clear and light, are impregnated with metallic particles. The spot occupied by the city lies between two mountains, so as to give it the shape of a coffin. Here is a monastery of Franciscans, and also another of Dominicans. The nuns of Truxillo employ themselves in making delicate articles of bark, which have a ready sale.

TRUXILLO, a sea-port town of Mexico, in the province of Honduras, situated on a hill, near the sea; frequently ravaged by the English and the Dutch, and at present much decayed. N. lat. $15^{\circ} 45'$. W. long. $86^{\circ} 40'$.

TRUXILLO, or *Nuestra Señora de la Paz*, a town of South America, in the province of Venezuela; 120 miles S. of lake Maracaybo. N. lat. $8^{\circ} 45'$. W. long. $69^{\circ} 35'$.

TRUXTON, a post-township of New York, in the N.E. corner of Cortlandt county, 142 miles W. of Albany; bounded N. by Fabius, in Onondaga county, E. by Madison county, S. by Solon, and W. by Preble: its extent is 10 miles E. and W., and 5 miles N. and S., comprising the S. half of the township of Fabius, in the military tract. It resembles Fabius in the general character of surface, soil, timber, &c. and is watered only by branches of the Tioughnioga that rise in that town. The soil is good, the agriculture productive, and the township improving. In 1810 the population was 1012, the senatorial electors 129, and the taxable property assessed at 47,673 dollars. The settlements commenced in 1800. Truxton village is agreeably situated, and has about twenty houses.

TRUZZA, or TRUZZO, a town of Tunis, with a sulphurous spring. Little of the town exists but ruins; 84 miles S.S.W. of Tunis.

TRY, *To*, in *Sea Language*. See TRYING.

TRYAL. See TRIAL.

TRYBERG, in *Geography*. See TRIBERG.

TRYBLION, a word used by the old medical writers, to express the pot or dish in which the medicines used in fumigations were placed at the time of use.

TRYCHNUS, in *Botany*, the same as *Strychnus*, the name of nightshade.

TRYDEFFRIN, in *Geography*, a township of Pennsylvania, in the county of Chester, containing 1253 inhabitants.

TRYGGEVELDE, a town of Denmark, in the island of Zealand; 4 miles W. of Store Heddingen.

TRYGUM, in *Ichthyology*, the Greek name given by Ælian, Athenæus, and Appian, to the fish which we call the *psalinaca marina*, or fire-flaire. Aristotle and some others write it *tragum*.

TRYING, in *Pharmacy*, the purifying of fat substances by means of melting, and separating them from their membranes, &c. See SUET.

In the College Dispensatory, the method laid down for the purifying of lard, suet, &c. was this: melt them at a gentle fire, with the addition of a little water intermixed, and, when melted, strain them from the membranes. The addition of water in this keeps the fat from burning and becoming black, which it would otherwise do; for the water not being capable of receiving any greater degree of heat than that of boiling, will keep the bottom of the vessel from growing too hot, much better than the nicest management of the fire could do.

TRYING, in *Sea Language*, denotes the situation in which a ship lies nearly in the trough, or hollow, of the sea, in a tempest, particularly when it blows contrary to her course. In trying, as well as in scudding, the sails are always reduced in proportion to the increase of the storm. Thus, in the former state, the ship may lie by the wind under a whole main-sail, a whole fore-sail, or a whole mizen; or under any of those sails, when diminished by the reef or balance. As the least possible quantity of sail used in scudding is the goose-wings of the fore-sail, so, in trying, the smallest portion is generally the mizen-stay-sail, or main-stay-sail; and in either state, if the storm is excessive, she may lie with all the sails furled, or, according to the sea-phrases, under bare poles.

The intent of spreading a sail at this time is to keep the ship more steady, and, by pressing her side down in the water, to prevent her from rolling violently; and also to turn her bow towards the direction of the wind, so that the shock of the waves may fall more obliquely on her flank than when she lies along the trough of the sea. While she remains in this situation, the helm is fastened close to the lee-side, or, in the sea language, *hard-a-lee*, to prevent her, as much as possible, from falling-off. But as the ship is not then kept in equilibrio by the effort of her sails, which at other times counterbalance each other at the head and stern, she is moved by a slow but continual vibration, which turns her head alternately to windward and leeward, forming an angle of three or four points in the interval. The part where she stops, in approaching the direction of the wind, is called her *coming-to*, and the contrary excess of the angle to leeward is termed her *falling-off*. Thus, suppose the wind northerly, and a ship trying with her starboard side to windward: if, in turning her head towards the source of the wind, she arrives at N.W. $\frac{1}{2}$ N. or N. 39° W. and then declines to the leeward as far as W. $\frac{1}{2}$ S. or S. 84° W. the former will be called her *coming-to*, and the latter her *falling-off*. In this position the advances very little, according to the line of her length, but is driven considerably to leeward. Falconer.

TRYLISIA, in *Geography*, a town of Russian Poland; 10 miles E.N.E. of Zytomiers.

TRYON, a county of the state of New York.

TRYON Mountains, mountains of North Carolina, west of Salisbury, bordering on Tennessee.

TRYPETHELIUM, in *Botany*, from $\tau\rho\upsilon\pi\alpha$, a perforation, and $\theta\rho\upsilon\lambda\epsilon$, a nipple, on account of the mammillary orifices of the warts containing the receptacles; a genus of the great family of LICHENES. (See that article.)—Achar. Lichenogr.

Lichenogræ 58. t. 4. f. 8, 9. Syn. 104. Act. Gorenk. v. 1. — Class and order, *Cryptogamia Algæ*. Nat. Ord. *Lichenes*.

Eff. Ch. Crust somewhat cartilaginous, flat, uniforme, fixed. Warts of the substance of the crust, coloured, prominent. Receptacles several, concealed in the substance of each wart, of a thick, black, simple texture, the orifice nipple-shaped, projecting as far as the surface of the wart, the globular cellular nucleus being altogether internal.

Professor Acharius defines eight species, all found on the barks of different tropical trees. They are nearly allied to his THELOTREMA. See that article.

TRYPHALIA, in *Ancient Geography*, a maritime country of the Peloponnesus, between Messenia and the Elide, according to Polybius.

TRYPHERA, τρυφερα, in *Pharmacy*, a denomination given to divers medicines, especially of the opiate kind. The great tryphera is composed of opium, cinnamon, cloves, and several other ingredients: it is used to fortify the stomach, to stop fluxes, and is good for some diseases of the womb.

The word is formed from the Greek τρυφερος, delicate, on account of their gentle and pleasant operation, or, according to others, because they make those who use them rest.

The Saracenic tryphera, and Persian tryphera, thus called, because first introduced, the one by the Saracens, and the other by the Persians, were both of them gentle purgatives.

TRYPHIODORUS, in *Biography*, a Greek poet, was a native of Egypt, and commonly referred to the reign of the emperor Anastasius, in the commencement of the sixth century. Of his history little is known; but he was denominated a grammarian, and wrote many works, the titles of which are given by Suidas. Of these, none are extant besides his poem on the destruction of Troy, Πηχ Αλωσις, in about 700 lines, without any discriminating merit besides its being a relic of Greek literature. It was first printed by Aldus, and has passed through subsequent editions by Merrick, Oxon. 1741; Bandini, Florent. 1765; and Northmore, Oxon. 1791, which are those the most esteemed. Vossius. Moreri. Gen. Biog.

TRYSTS, CATTLE, a term applied to fairs for them in some of the northern parts of the island.

TRYSUNDA, in *Geography*, a small island on the W. side of the gulf of Bothnia. N. lat. 63° 9'. E. long. 18° 35'.

TRYVET, a village of Ireland, in the county of Meath. This place was rebuilt by Hugh de Lacy, and peopled by a colony of English; after which it became a considerable town, but is now fallen to decay; 8 miles S.E. of Navan.

TSABA, a town of Asiatic Turkey, in Natolia; 10 miles E. of Boli.

TSA-CHOU, a town of Corea; 43 miles S.S.E. of Koang-tcheou.

TSAKATHURN. See CSAKATHURN.

TSAKTELU, a town of Asiatic Turkey, in Caramania; 28 miles N.N.E. of Akfhehr.

TSAALGO, a town of Georgia, in the province of Carduel; 50 miles S.W. of Teflis.

TSAAL-HASSAR, a town of Arabia, in the province of Hadsjar; 45 miles N.N.W. of Cathem.

TSANG, a city of China, of the second rank, in Petcheli; 102 miles S. of Peking. N. lat. 38° 21'. E. long. 116° 34'.

TSANG-CHIN, a town of Corea, near the sea; 35 miles S.S.W. of Han-tcheou.

TSANPOU. See SANPOO.

TSANTSE-AGHISI, a town of Asiatic Turkey, in Natolia; 12 miles N.W. of Eregri.

TSAO, a city of China, of the second rank, in Chantong; 72 miles W.S.W. of Yeng-tcheou. N. lat. 35° 22'. E. long. 115° 16'.

TSÄO-SU, a small island near the coast of China. N. lat. 25° 22'. E. long. 119° 42'.

TSÄO-TCHANG, a town of Corea; 20 miles N. of Han-tcheou.

TSAPHARI, in the *Materia Medica of the Ancients*, a name given by some to the cadmia, called by Dioscorides *placitis*, and by others of the Greek writers, *zonitis* and *onychitis*. It was a flat kind, forming a sort of coat or crust on the walls or sides of the furnace; hence it had the name *placitis*, or *crustaceous*; and it was called *onychitis* and *zonitis*, because, when broken transversely, it appeared made up of several successive plates, which had the appearance of so many belts or zones. Serapio tells us, that this and the botryoide cadmia were dug out of the mines; that is, that they were natural productions; but this is erroneous, and contrary to all the accounts of the ancients.

TSASMA, in *Geography*, a town of Croatia; 8 miles E. of Ivanitz.

TSATSORKEN, a town of Thibet; 501 miles E.S.E. of Lassa.

TSCHAGATAY, or DSCHAGATAI, a name given to the Mongolian state; which was assigned to one of the sons of Tschingis-khan, so called after the name of its founder, to whom his father assigned the Greater and Less Bucharina, Turfan, the country of the Iguers, and part of the present Kalmuckey.

TSCHA-HAFFER, a town of Arabia Deserta; 80 miles W. of Cathem.

TSCHAMA-CALAB, a town of Persia, in Adirbeizan; 60 miles S.E. of Tauris.

TSCHARSHEBEH, a town of Asiatic Turkey, in Natolia, on the Meinder; 20 miles N. of Degnizlu.

TSCHASCHWITZ, a town of Silesia, in the principality of Neisse; 4 miles W. of Neisse.

TSCHASLAW. See CZASLAW.

TSCHASTOLOWITZ, a town of Bohemia, in the circle of Konigingratz; 14 miles E.S.E. of Konigingratz.

TSCHAVÄT. See JAVÄT.

TSCHEAHDORF, a town of Silesia, in the principality of Neisse; 9 miles N.N.E. of Patfchkau.

TSCHOKENAGAR, a town of Asiatic Turkey, in Caramania; 50 miles N.N.E. of Cogni.

TSCHELATSCH, a town of Austrian Poland, in Galicia; 28 miles N. of Cracow.

TSCHENGA, a town of Bulgaria, near the Daphne; 50 miles W.S.W. of Varna.

TSCHENSTOCHOWA, a town of Austrian Poland, in Galicia; 46 miles N.N.W. of Cracow.

TSCHEREMISSES, or TCHEREMISSES, a tribe of Finns, who dwell in the governments of Viatka, Kazan, Simbirsk, and Ufa, on both shores of the Volga, especially the left. They call themselves Mari, *i. e.* men. Although their language be mixed with Tartarian and Russian words, it is easily distinguishable as a Finnish dialect. The Supreme Being they call Yuma. In the time of the Tartars they were subject to them, and dwelt more southerly, between the Volga and the Don; but at the downfall of the Tartarian dominion, they fell to the Russian empire, and even in this state they long retained their own khans, which, however, ceased upon

the extinction of the princely race. They were formerly a pastoral people, but under the Russian government they are gradually become husbandmen. The present amount of them is not known; but they have been estimated at 20,000.

TSCHERIKOV. See TCHERICOV.

TSCHERIKOV'S Island, an island in the North Pacific ocean, so called by Capt. Vancouver, after the companion of Beering. In the point of view in which Capt. Vancouver saw the south-west, southern, and eastern sides of this island, it appeared to form a somewhat irregular four-sided figure, about ten leagues in circuit; having from its western part, which is low and flat, and which had the appearance of being insular, a remarkable high, flat, square rock, lying in a direction S. 66° W. at a distance of two miles, between which and the island is a ledge of smaller rocks. The centre of the island appeared to be in N. lat. 55° 49'. E. long. 205° 4'.

TSCHERKASK. See TCHERKASK.

TSCHERKASSIANS. See TCHERKASSES and CIRCASSIANS.

TSCHERNEMBL. See ZERNEMBL.

TSCHERNOIYAR. See TCHERNOIYAR.

TSCHERSK, or CZERSK. See CZERSKO.

TSCHESCHENGIANS, or MIKSCHESSIANS, a tribe of vassals to Russia, living in the eastern part of the great Kabardia, who in time of war can raise 5000 horsemen.

TSCHESME, a small town of Asia Minor, situated almost opposite to the isle of Scio, at the head of a spacious road, to which art has no occasion to add, in order to make it a good harbour. A citadel somewhat extensive, constructed by the Genoese, runs sloping to the sea-shore, and seems intended to secure from all insult both the town and the harbour. Tschesmé is built on the ruins of Cyffus. This road is famous for the victory which the Roman fleet gained there over that of Antiochus, and also for the burning and total destruction of the Turkish squadron by the Russians in 1770. Geographers place at the head of a bay, two or three leagues to the N. of Tschesmé, the ancient Erythræ, celebrated for the oracles of the Sibyl. The territory of Tschesmé furnishes grain and fruit in abundance: a little oil and a great many raisins are also produced here. It is from this harbour that the island of Scio draws a great part of its subsistence, and by means of it frequently keeps up an intercourse with Smyrna.

TSCHETCHES, the name of a colony of strangers and Christians, who are secluded from the world in a most sequestered part of the wilds of Caucasus, so called in the language of the country. These poor people are said to lead lives of the most exemplary piety, and to exhibit a primeval simplicity of manners. They are totally ignorant of their origin, any farther than knowing that they are strangers, and their being considered as such by the scattered neighbouring nations. From an affinity in their language, and some other circumstances, they are supposed to be descended from a colony of Bohemians, who, flying from religious persecution in their own country towards the close of the fifteenth century, found at length a refuge from oppression in the distance from the rest of mankind which these remote deserts afforded.

TSCHIGRI, a town of Russia, in the government of Kurfk; 48 miles E.N.E. of Kurfk.

TSCHILLA, a town of Bohemia, in the circle of Rakonitz; 8 miles S.W. of Rakonitz.

TSCHIRNE, a town of Silesia, in the principality of Glogau; 20 miles E. of Gros Glogau.—Also, a river of Silesia, which runs into the Bober, two miles below Sagan.

TSCHIRNHAUSEN, EHRENFRIED WALTER VON, in *Biography*, an ingenious mathematician, was a descendant of a noble Bohemian family, and born at Kissingwald, in Upper Lusatia, in 1651. Having studied for some time at the university of Leyden, directing his particular attention to mathematics and philosophy, he entered into the Dutch army in 1672, and for the purpose of further improvement visited France, Sicily, Italy, and Malta. He also established three glass-houses in Saxony, with a view to the improvement of the science of optics, and having shewn how porcelain might be made from an earth found in that country, he may be regarded as the founder of the Dresden porcelain manufactory. As to his claims on the invention of caustic curves, we refer to the article *CAUSTIC CURVE*. His account of them was communicated to the Academy of Sciences at Paris in 1682. See also the same Memoirs for 1703. For the construction and powers of his burning-glass, constructed about the year 1687, we refer to the article *BURNING-GLASS*. Heedless of the fame which he so justly acquired, Tschirnhausen took delight in encouraging the researches of others, who were engaged in pursuits similar to his own, and was at considerable expence in printing works of public utility. He died, highly esteemed and much regretted, in the month of September 1708. He furnished the Leipzig Transactions with many articles; and also the Memoirs of the Academy of Sciences with the following: *viz.* "Observations on Burning-glasses of three or four Feet Diameter," in the vol. for 1699; "Observations on the Glass of a Telescope convex on both Sides, and of thirty-two Feet focal Distance," 1700; "On the Radii of Curvatures, and finding the Tangents, Quadratures, and Rectifications of many Curves," 1701; "On the Tangents of Mechanical Curves," 1702; and "On a Method of Quadratures." The only work published separately was his "Medicina Mentis," resembling Malebranche's "Recherche de la Verité," but much more extensive; first published in 1687, and again with improvements in 1695. Montucla, *Hist. des Mathem.* Hut-ton's *Math. Dict.*

TSCHIRNHAUSIANA QUADRATRIX. See QUADRATRIX *Tschirnhausiana*.

TSCHOPA, in *Geography*, a river of Saxony, which rises near Weisenthal, on the borders of Bohemia, and runs into the Mulda, between Dobeln and Leisling.

TSCHOPA, or Zschopou, a town of Saxony, in the circle of Erzgebirg, celebrated for its blue manufacture; 7 miles S.E. of Chemnitz. N. lat. 50° 4'. E. long. 13° 2'.

TSCHUDI, AEGIDIUS, in *Biography*, an eminent Swiss historian, was descended from a noble family, and born at Glarus in 1505. After completing his school education, he went to Basle, and accompanied his preceptor Glareanus to France, with a view to farther improvement. Upon his return to his native place, he was employed, in 1528, on a mission respecting the Reformation, in which he conducted himself to the satisfaction of both Reformers and Catholics; and in the following year he was chosen chief magistrate of Sargans. By his discharge of the duties of this office, he gained increasing reputation, and more extended trusts of a similar kind. His great object was to enlarge his acquaintance with the Helvetic history; nor did he cease to pursue it, even in the military service of France, or in any of the honourable stations which he was appointed to occupy. Towards the close of his life he was severely afflicted with the stone, but death terminated his pains and labours in the year 1572, and 69th year of his age. His principal works were "A Description of the ancient Rhætia," published at Basle in 1538; the "Helvetic Chronicle," commencing with the year

year 1001, and terminating at 1470, edited by Ifelin, in two vols. fol. Balle, 1734—1736; "De vera et prifca Alpina Rhætia, &c." Balle, 1538, 4to. ib. 1560; "Defcription of the Alps," Balle, 1738, &c. Tschudi was a zealous Catholic, as we may infer from his "Treatife on Purgatory," and another "On the Invocation of Saints;" though he was fully apprifed of the errors of popery, the licentious manners of the clergy, and the avarice of the convents, which he very freely expofed.

TSCHUKOTSKOI Noss, or *Cook's Straits*, in *Geography*, a part of the fhores of the government of Irkutfk, washed by the Eastern or Pacific ocean, extending to the frontiers of China; or in other words, from the mouth of the river Aimakan; *i. e.* from about 65° to 45° N. lat.

TSCHUKTSCHES, a people who occupy the north-eastern point of Siberia, towards the Frozen ocean and the Eastern ocean, which is called the Tschuktfehly-cape, and in all respects fo much refemble the Koriaks, that one might be induced to take the two nations for relational ftems. They may be computed at 4000 bows. We may naturally fuppofe that they are the primitive poffeffors of thefe coasts, who either came over from the continent of America, or were divided by the probable infraction of the fea, and the confequent feparation of the two quarters of the world. They, as well as the Koriaks, Kamifhadales, Tungufes, and Lamutes, bear a great likenefs to the neareft Americans beyond the fraits.

TSCHUVASSES are a very numerous nation of Finns, paying the tax for more than 200,000 heads. They refide principally on both fides of the Volga, in the governments of Tobolfk, Viatka, Nifhnei-Novgorod, Kazan, Simbirfk, and Ufa. Their language at prefent borders more upon the Tartarian than that of the Finns, and hence fome will not allow them to belong to this flock; nevertheless their manners and customs very much refemble thofe of the generality of Finns, particularly thofe of the Votiaks and Tschermiffes. Thefe three tribes dwell together in villages, but never in towns; they are inured to agriculture, and have abandoned their nomadic way of life; they are fond of horfe-flesh; they are moftly heathens, and they have among them enchanters, and a fort of place for divine worfhip, which they denote by the generic name of Keremet. At their meetings they facrifice a horfe, in which their principal religious folemnity confifts. See **TCHEREMIFFES**.

TSE, a town of China, in Chan-fi; 300 miles S.S.W. of Peking. N. lat. 35° 30'. E. long. 112° 26'.

TSEBID, or **TECEBIT**, a town and diftrict of Africa, in the country of Sugulmeffa; 75 miles E. of Sugulmeffa. N. lat. 31° 40'. E. long. 1°.

TSELGA, or **TCHELGA**, a town of Abyffinia; 30 miles N. of Gondar.

TSEMERUITZU, a mountain of Croatia; 20 miles S. of Bihaes.

TSENA, a river of Malacca, which runs into the Chinefe fea, N. lat. 7° 33'. E. long. 101° 21'.

TSERKESB, a town of Afatic Turkey, in Natolia; 36 miles N. of Angura.

TSHAC, a mountain of Little Bucharia; 80 miles S.S.W. of Hotun.

TSHANI. See **TCHIANI**.

TSHARISKOI MOUNTAINS, a very extended branch of the Altai mountains that fall to the fhare of Ruffia, in the range of Kolhyvan. They comprife the whole fpace between the higheft fources of the Ulba, Ouba, and the Kokofun (to the point where the Tfhuya falls into the Kokofun), and between the courfe of this latter river and the Ka-

tunaia, and carries its powerful forked ridges along both fides of the Tfharifh, from its origin to its difemboguing into the Oby. The direktion of thefe mountains is from E. to W. and N.W., and on the S. they are parted, by a rude valley, from the Oubinskoi fnow-mountains. In feveral places this range rifes to a great height, heaving up enormous pinnacles, which in fome parts are covered with never-failing fnow, and which, for the moft part, confift of granite, porphyry, jafper, and flint breecia. One of thefe, *viz.* the Tigeretzkoï, to a confiderable height confifts of marble, which contains a multitude of fea-fhells. Thefe in general are found to be 4392 Paris feet higher than the Shlangenbergh. One of the higheft points is the Koffipnaia-Sopka (the Ragged-head), confifting of monftrous blocks of hoary granite. In feveral places of thefe wild and extenfive mountains, iron, copper, and lead ores have been dug up, but no regular works have been eftablifhed.

TSHATSHI, a town of Little Bucharia; 30 miles N.E. of Aefu.

TSHEGULA, an ifland belonging to the clafs called Fox iflands, and arranged by Muller under the appellation Kavalang.

TSHENIKE', a town of Afatic Turkey, in the government of Sivas; 20 miles N.E. of Amafieh.

TSHETCHINA, one of the iflands compréhended under the name of Andreanofskiye Ofrova, on which a high white mountain overtops the reft, which is apparently an extinct volcano, as there are ftill hot fprings on this ifland.

TSHETGHINA, one of that clafs or divifion of the iflands that lie between Kamtshatka and America, called Chao.

TSHIBUK-ABAD, a town of Afatic Turkey, in Natolia; 18 miles E.N.E. of Angura.

TSHIGAMA, one of the clafs of iflands called Fox iflands, diftinguifhed in Mr. Muller's arrangement under the name Kavalang.

TSHI-KOI, a river of Ruffia, which runs into the Selenga, 12 miles S. of Selenginlk.

TSHIKOTA, one of the Kurile iflands, diftant from Kunaffyr ifland 70 verfts, 120 verfts long, and 40 broad. It has lofty mountains, with fimilar forefts to thofe of Kunaffyr, with lakes and fstreams of wholefome water.

TSHILLIENI, a town of Walachia; 7 miles S. of Caracalla.

TSHINKA, in the *Materia Medica*, a name by which fome authors have called the clove-tree, the tree which produces the fpike of that name.

TSHIRINKUTAN, in *Geography*, one of the Kurile or Kurilfkoi iflands, about 30 verfts from Ikarma. The ifland is round, and its diameter is about fifteen verfts. A mountain nearly upon the ftrand is continually emitting fmoke, and very frequently large ftones roll down one of its fides, by which a valley has been excavated from top to bottom. The coaft round about is mountainous and rocky. It has a great number of wild fowl, and in other refpects very much refembles Ikarma.

TSHIRPO-OI, one of the Kurile iflands, may be eftimated in length and breadth at 15 verfts. This ifland has had a volcano, that has difcharged ftones over the whole face of it. Inftead of foreft-woods, it prefents to view merely bufhes of the forbus fylveftris, but no fstreams, and one fmall faline lake. In one fpot is a falt-fpring of that kind called acidulæ, the water of which lofes its acidity by boiling. On an adjacent ifland is alfo a volcano.

TSHLUCHOW, a town of Pruffian Pomerdia; 44 miles S.S.W. of Dantzig.

TSI, a city of China, of the second rank, in Ho-nan; 242 miles S. of Peking. N. lat. $34^{\circ} 30'$. E. long. $114^{\circ} 34'$.

TSIA, in *Botany*, a name taken from the Japanese, and used by some authors for the tea-tree.

TSJAKELA, H. M.—*Ficus Malabarica*, *femel in anno fructifera, fructa minima*, a species of fig-tree growing in Malabar. Of the bark of this tree they make strings for their bows, and prepare a red colour for dyeing the Cambavan cloths.

TSIAM PANGAM, a name used by some authors for the tree whose wood is the log-wood, used in dyeing, and in medicine.

TSIAMAJA, in *Geography*, a town of Laos; which see. TSIAMPA. See CHIAMPA.

TSIANA EUA, in the *Materia Medica*, a name given by some authors to the costus root.

TSIAO, in *Geography*, a city of China, of the second rank, on the fourth coast of the island of Hai-nan; 125 miles S.S.W. of Kiong-tcheou. N. lat. $18^{\circ} 20'$. E. long. $108^{\circ} 25'$.—Also, a town on the west coast of the island of Morty. N. lat. $2^{\circ} 5'$. E. long. $128^{\circ} 18'$.—Also, a lake of China, in Kiang-nan, about 60 miles in circumference; 42 miles S.W. of Nang-king.

TSIAO-TING-CHAN, a town of Corea; 50 miles E.N.E. of Koang-tcheou.

TSIAO-TONG, a town of Corea, on an island of the same name. N. lat. $37^{\circ} 48'$. E. long. $124^{\circ} 14'$.—Also, an island in the Hoang-hai, or Yellow sea, near the coast of Corea, about 35 miles in circumference. N. lat. $37^{\circ} 44'$. E. long. $124^{\circ} 54'$.

TSIASSEM, a kingdom of the island of Java, on the north coast, E. of Carawang.

TSIBBA, a town of Japan, in the island of Nippon; 30 miles E.S.E. of Jedo.

TSI-CHU, in *Botany*, the name of a Chinese tree, which furnishes the liquor of which they make their celebrated varnish.

TSIEN, in *Commerce*, a weight in China. The Chinese weigh gold and silver by the gin or catty, of 16 lyangs or taes; and the lyang is subdivided into 10 tsiens or maces, 100 fwens or candarines, and 100 lis or cash. The gin is the Chinese denomination for this weight, and the catty that of the European. See TALE.

TSIEN-OUEY, in *Geography*, a town of Chinese Tartary; 40 miles S.W. of Ning-yuen.

TSIERIBON. See CHERIBON.

TSIJA, a town of Thibet; 48 miles W. of Con-tchoudfong.

TSIKUMMA, a town of Japan, in the island of Nippon; 88 miles W. of Meaco.

TSILI, a town of Corea; 35 miles W. of Sing.

TSILKANI, a town of the principality of Georgia, in the province of Carduel; 20 miles N.W. of Teflis.

TSILON-PALHASIN, a town of Chinese Tartary, in the country of the Monguls; 13 miles S. of Oulan.

TSIM-YUEN, a town of Corea; 650 miles E.N.E. of Peking. N. lat. $42^{\circ} 28'$. E. long. $129^{\circ} 54'$.

TSIN, a city of China, of the second rank, in Chen-fi; 620 miles S.W. of Peking. N. lat. $34^{\circ} 35'$. E. long. $105^{\circ} 24'$.—Also, a city of China, of the second rank, in Hou-quang; 645 miles S.S.W. of Peking. N. lat. $26^{\circ} 36'$. E. long. $109^{\circ} 2'$.

TSIN, or *Tsin*, a town of Corea; 188 miles S.S.E. of King-ki-tao. N. lat. $34^{\circ} 52'$. E. long. $127^{\circ} 44'$.

TSIN, in *Natural History*, the name given by the Chinese

to a stone which they make great use of in their manufacture of porcelain ware. It is of a deep blue colour, much resembling Roman vitriol in appearance, and is found in lead-mines, and supposed to contain some particles of lead; its effects being the same in the porcelain manufacture as those of cerufs, or white lead, in making the other colours penetrate into the substance of the vessels. The deep violet colour that we see so beautiful on the china-ware, is usually made with this stone. They find it about Canton and Peking; but the latter place affords the best, and it sells at greatly the best price.

The painters in enamel melt this stone in their way, and use it very much; they form many beautiful works, by laying it upon silver; but it is apt to come off in time. When the tin is used in the porcelain manufacture, it is only used to the vases that pass a second baking, and are intended as the best kinds.

The tin is prepared by only beating it to powder, not roasting it in the common way. They mix the powder with large quantities of water, and stirring it together, they let it subside a little, to separate any earthy or extraneous matter that might be among it. They then let the powder subside. The water which is thrown away has no colour from this matter, and the powder itself is not of that fine blue it was in the lump, but of a pale ash-colour; but this recovers all its beauty when it is laid on the china and baked. The settlement taken from the water is dried and preserved in powder, and when it is to be used, they only mix it up with gun-water, or a solution of glue, and lay it on with a pencil. *Observ. sur les Costumes de l'Asie.*

TSI-NAN, in *Geography*. See TCI-NAN.

TSINCHAN, a town of Corea; 13 miles N.W. of Sing.

TSIN-CHOU, a river of China, which runs into the Yuen, near Meyang.

TSINEH, a town of Asiatic Turkey, in Natolia; 16 miles W.N.W. of Mogla.

TSING, a city of China, of the second rank, in Chan-fi; 267 miles S.S.W. of Peking. N. lat. $36^{\circ} 42'$. E. long. $112^{\circ} 24'$.—Also, a lake of China, in Kiang-nan, 22 miles in circumference; 45 miles N. of Hoai-ngan.

TSING-HING, a city of China, of the second rank, in Yun-nan; 1162 miles S.S.W. of Peking. N. lat. $24^{\circ} 47'$. E. long. $102^{\circ} 30'$.

TSING-KIANG, a town of China, in Kiang-nan, on the Yang-tse river; 50 miles S.E. of Yang-tcheou.

TSING-LAN-OUEI, a town of China, in Hou-quang, near the source of the river Yuen; 25 miles S.W. of Hoang.

TSIN-KIEN, a river of China, which runs into the Hoang; 12 miles E.S.E. of Yen-tchan.

TSIN-NING, a city of China, of the second rank, in Chen-fi; 585 miles W.S.W. of Peking. N. lat. $35^{\circ} 36'$. E. long. $105^{\circ} 25'$.

TSINO, a town of Japan, in the island of Awaji; 10 miles N. of Awaji.

TSINRAMA, a town on the west coast of the island of Celebes. S. lat. $3^{\circ} 10'$. E. long. $119^{\circ} 14'$.

TSIN-TCHUEN, a town of Corea; 40 miles S.E. of Hoang-tcheou.

TSIN-YANG, a river of China, which rises near Tci-hia, in Chan-tong, and runs into the Eastern sea, near Fou-cha.

TSIN-YUEN-OUEI, a fortress of China, in Chen-fi, near the great wall, on the river Hoang; 75 miles N. of Lingtao.

TSISAGATA, a town of Japan, in the island of Nippon; 110 miles W. of Meaco.

TSISIR, a town of Thibet, now in ruins. N. lat. $34^{\circ} 14'$. E. long. $96^{\circ} 19'$.

TSITA, a lake of Thibet, 45 miles in circumference. N. lat. $33^{\circ} 32'$. E. long. $90^{\circ} 39'$.

TSITICHICHAR. See TCHITICAR-HOTUN.

TSIURAC, a river of Thibet, which runs into the Meinder, at Tcharfhebeh.

TSO, a city of China, of the second rank, in Petcheli; 22 miles S.S.W. of Peking. N. lat. $39^{\circ} 32'$. E. long. $115^{\circ} 39'$.—Also, a city of China, of the second rank, in Quang-li; 930 miles S.S.W. of Peking. N. lat. $22^{\circ} 42'$. E. long. $106^{\circ} 49'$.

TSO-CHOUI, a town of Corea; 55 miles S.E. of Kang-tcheou.

TSOKAMA, a town of Japan, in the island of Nippon; 170 miles W. of Meaco.

TSOL-ABAD, a town of Asiatic Turkey, in Carmania; 32 miles S.W. of Akshehr.

TSONDUE, a town of Thibet; 7 miles W. of Painom-Jeung.

TSONG-HE, a town of Corea; 10 miles N. of Hoang-tcheou.

TSONG-KING, a city of China, of the second rank, in Se-tchuen; 857 miles S.W. of Peking. N. lat. $30^{\circ} 38'$. E. long. $103^{\circ} 23'$.

TSONG-MING, a town of China, in the island fo called. N. lat. $31^{\circ} 45'$. E. long. $120^{\circ} 51'$.

TSONG-MING, or *Tjung-ming*, an island near the coast of China, in the Eastern sea, at the mouth of the Yang-tse river, belonging to the province of Kiang-nan, about 50 miles in length, and 10 in breadth. This island was formerly a place of banishment for criminals, to whom some poor Chinese families resorted, and they divided the lands amongst them; but not being able to clear all the land they had appropriated to themselves, called other families from off the continent to their assistance, and yielded to them for ever a part of the lands, on condition that they should pay annually, in divers goods, a rent proportionable to their harvest. The country is divided by an infinite number of canals, that have high banks to defend it from inundations, for the land is level, having no hills; the air is healthful and temperate, and the country agreeable. Here are large towns scattered about the island at convenient distances, wherein is a great number of shops, well furnished with all manner of necessaries and conveniences of life; and, dispersed between each town, there are as many houses about the country as there are families employed in tillage. The highways are very narrow, and are bordered with little shops that sell refreshment to travellers; and, indeed, one would imagine the whole island to be one exceeding large village. Here are no wild fowl, but great numbers of large geese, ducks, hens, hogs, and buffaloes, but these latter are used only for tillage. The land is not alike throughout the island, the produce of it being very different: that towards the north is not cultivated, but the reeds which grow here naturally produce a considerable revenue: as there are no trees in the whole island, they use part of these reeds to build houses in the country; the other part serves to burn, and supplies fuel not only for the whole island, but also for some parts of the neighbouring continent. The second sort of land is that which extends from the first quite to the sea on the south side; this produces two crops every year; one of grain, which is generally in the month of May, the other of rice, or cotton; of rice, in September; of cotton, a little later:

their grain is rice, wheat, barley, and a sort of bearded corn, which, though it resembles wheat, is nevertheless of a different nature. There is a third sort of land, which, though it appears barren, produces a greater revenue than all the rest; it consists of a whitish earth, found in several parts of the north side of the island, from whence they get such a great quantity of salt, that it supplies not only the island, but part of the continent. In this island there is a number of mandarins, and the governor is one of those called "literati." He alone administers justice, receives the tribute paid by every family to the emperor, gives passports to ships, and passes sentence of death on criminals. When the people have occasion for rain, or fine weather, this mandarin proclaims a general fast; butchers and inn-keepers are then forbid to sell any thing, under the severest penalties; they however take care to get rid of their provisions, by paying some money privately to the officers of the tribunal, whose business is to enforce the observance of this order. The mandarin afterwards walks in procession, accompanied by his subalterns, to the temple of the idol whom they intend to invoke; he kindles on the altar two or three small aromatic twigs; they then all sit down: to pass the time, they drink tea, smoke, and converse an hour or two; after which they retire. This is what they call begging for rain or fine weather.

Father Jacquemin relates, that in his time the viceroy of one of the provinces, becoming impatient because rain had not been granted to his repeated requests, sent an inferior mandarin to tell the idol, from him, that if it did not rain before a certain day he would drive him from the city, and cause his temple to be razed. No rain having fallen before the day mentioned, the viceroy, in a great passion, forbade the people to carry, according to custom, their offerings to the idol, and ordered the temple to be shut, and the gates sealed up, which was immediately executed. N. lat. $31^{\circ} 38'$. E. long. $120^{\circ} 54'$.

TSONG-SIO, a town of the kingdom of Corea; 27 miles S.E. of Hoang-tcheou.

TSO-PING-ING, a town of Corea; 30 miles S.E. of Koang.

TSOR, or *SOR*, or *Sur*, or *Soor*, a town on the east coast of Arabia, in the province of Oman; 22 miles S.E. of Kalhat. N. lat. $22^{\circ} 36'$.

TSORLII, or *Ciorli*, or *Tziourly*, a town of European Turkey, in Romania; 15 miles N.E. of Rodosto.

TSOTSANG, a river of China, which runs into the Hoang, near Hoai-king.

TSUBSUKI, a town of Japan, in the island of Nippon; 65 miles N.N.W. of Meaco.

TSUEN, a city of China, of the second rank, in Quang-li; 912 miles S.S.W. of Peking. N. lat. $25^{\circ} 50'$. E. long. $110^{\circ} 44'$.

TSUEN-TCHEOU, a city of the first class in China, in the province of Fo-kien, and reckoned one of the most beautiful cities in China, on account of its situation, extent, trade, triumphal arches, temples, and its well-paved streets. It has in its district seven cities of the third class. In its neighbourhood is a bridge remarkable for its extraordinary size, and the singularity of its construction. It was built at the expence of one governor. It is wholly built of the same kind of blackish stone, without arches; but it has above 300 large stone pillars, which terminate on each side in an acute angle, the more easily to break the violence of the current. Five stones of equal size, laid transversely from one pillar to another, form the breadth of the bridge; of these there are 1000, all of the same

fame size and figure. On each side there are buttresses or props, constructed of the same kind of stone, on the tops of which are placed lions on pedestals, and other similar ornaments. This is merely one part of the work,—that which is between the small city of Lo-yang and the castle built upon the bridge: for beyond the castle there is another part, equally stupendous with the first.

TSUGA, a town of Japan, in the island of Niphon; 45 miles W.N.W. of Nambu.

TSUGARA, a town of Japan, in the island of Niphon; 60 miles N. of Jedo.

TSUI-TSANG, a town of Corea; 40 miles W.S.W. of Sing.

TSUKUKI, a town of Japan, in the island of Niphon; 36 miles N.N.E. of Jedo.

TSUNTINITZ, a town of Croatia; 16 miles W. of Damianovitz.

TSUN-Y, a city of China, of the first rank, in Setchuen; 890 miles S.W. of Peking. N. lat. $27^{\circ} 38'$. E. long. $106^{\circ} 35'$.

TSUR. See TSOB.

TUA, in *Ancient Geography*, an estuary on the south-eastern side of the isle of Albion, between the estuary Vara, or Firth of Tayne in Sunderland, and the mouth of the river Celnus, and the Spay, in the shire of Elgin. The Tua was therefore Cromarty, or Murray Firth.

TUA, in *Geography*, a river of Portugal, which runs into the Duro, 15 miles N.W. of St. Joao de Pefqueira.

TUABO, a town of Africa, in the kingdom of Jaen, on the side of the Senegal. N. lat. $14^{\circ} 56'$. W. long. $10^{\circ} 28'$.

TUACA, a town of Africa; 10 miles S. of Mombaça.

TUAK, a small island in the Red sea, about 12 miles from the coast of Arabia. N. lat. $5^{\circ} 58'$. E. long. $41^{\circ} 58'$.

TUAM, a post-town of the county of Galway, Ireland, which is represented in the "New Traveller's Guide for Ireland," as "a large, populous, well-built town;" but which Dr. Beaufort calls, though an archiepiscopal see, a very poor city. It may have been improved since the publication of Dr. Beaufort's work, but the other account must be received with caution, especially when it speaks of "byelanes and alleys thickly inhabited by an industrious populace and working mechanics." It may, however, have a considerable retail trade, and may have derived great advantage from the introduction of the linen manufacture into its neighbourhood. The archbishop's palace is a spacious, venerable structure. The cathedral is a neat, but not extensive, edifice, which serves also for the parish-church. Tuam lost its privilege of being represented in parliament at the Union. It is 93 miles W. from Dublin, and 16 miles N. by E. from Galway.

TUAM, an archiepiscopal see in Ireland, being the lowest in dignity of the four, and having the smallest jurisdiction; the number of benefices in this province being only 87, whilst in Armagh there are 419, in Dublin 252, and in Cashel 362. The see of Tuam contains the greatest number of acres of any see in Ireland, extending over a great part of the counties of Galway and Mayo, and including a part of Roscommon; yet such is the want of cultivation, and the poverty of the country, that it was found necessary to unite the bishopric of Ardagh in the province of Armagh, to enable the archbishop to support the dignity of his station. The number of parishes is 89, forming 23 benefices, and having 24 churches. The chapter consists of a dean, a

provost, an archdeacon, and eight prebendaries. The suffragan bishoprics are those of Clonfert, Elphin, and Killalla.

TUAPE, a town of New Navarre; 160 miles S. of Casa Grande.

TUARIK, a people of Africa. The west and south of Fezzan, says Mr. Horneman, is inhabited by the Tuarik, a mighty people, who border south-west on Bornou, south on Bornou, Soudan, and Tombuctoo, eastward on the country of the Tibboo and Fezzan, northward on part of Fezzan and the Arabs who live behind the regions of Tripoli, Tunis, and Algiers, and westward on the great empire of Fez and Morocco; of whom a few colonies are found in Sockna, Augela, and Siwah; in such places, the language of the Tuarik is the only one spoken by the inhabitants. The Tuarik are divided into many nations and tribes, who all speak the same language. The Tuarik of Hagara and Kolluvi are thin in growth, rather tall than short, their walk swift but firm, their look stern, and their whole demeanour warlike. Cultivated and enlightened, their natural abilities would render them perhaps one of the greatest nations upon earth. Their character, particularly that of Kolluvi, is much esteemed. The western tribes are white, as much as the climate and manner of living will admit. The Kolluvians who reached the region of Asben, and conquered Agades, and mixed with the nation, are of different colours, many of them black, but their features are not like those of negroes. The Hagara and Mutkara tribes are yellowish, like the Arabs: near Soudan there are tribes entirely black. They are not all Maliometans. In the neighbourhood of Soudan and Tombuctoo live the Tegama, who are white and pagans: they carry on a commerce between Soudan, Fezzan, and Gadames. Their caravans give life to Mourzouk, which without them is a desert; for they love company, song, and music. The greater part of the eastern Tuarik lead a wandering life.

TUAT. See TWAT.

TUB, is used as a kind of measure to denote the quantity of divers things. A tub of tea is a quantity of about 60 pounds. A tub of camphor is a quantity from 56 to 80 pounds. A tub of vermilion from 3 to 4 cwt.

TUB, *Cheese*, in *Rural Economy*, that sort of large tub which is employed in the making of cheese, which, in some districts, is wetted or washed with cold water before it is used, to prevent the milk from sticking to the wood.

TUBS, in *Gardening*, a sort of strong upright boxes, calculated for containing large green-house exotics, and other potted plants and trees, when grown too large for the pots.

These tubs are made by the coopers proper for this purpose, somewhat in the garden-pot form, a little wider at top than at bottom, from a foot and half to two feet and a half deep; the width in proportion; constructed of the strongest thick staves and bottoms, and well hooped with iron, and with two iron handles at top, by which to remove them: these handles being strong, and generally hooked, especially in very large tubs, in order to receive a pole in each occasionally, that the tub and plant together may be more readily moved. The bottom of the tubs have auger-holes bored in different parts, at regular distances, by which to discharge the superfluous moisture, after watering, &c.

In tubbing large-grown plants, they should be removed from their present pots, with the balls of earth about their roots entire; and having earthed the bottom parts of the tubs, the plant should be set in with its whole ball of earth, filling up properly around, and an inch or two over the top of the ball, with more fresh mould, and then watering. See *SHIFTING of Plants*, and *POTTING*.

TUB-Fish, in *Ichthyology*, an English name given to a species of trigla, sometimes called the *flying-fish*. See **TRIGLA**.

TUB-Man, in the *Court of Exchequer*. See **PRECEDENCE**.

TUBA, in *Antiquity*. See **TRUMPET** and **LITUUS**.

TUBA, in *Natural History*, a name by which many old authors call the buccinum.

TUBA, in *Geography*, a river of Russia, which runs into the Enisei, 16 miles S.W. of Abakansk, in the government of Kolivan.

TUBAI, one of the small Society Islands, in the South Pacific ocean; about 12 miles from Bolabola. S. lat. $16^{\circ} 12'$. W. long. $151^{\circ} 44'$.

TUBANSKA, a town of Russia, in the government of Irkutsk; 44 miles N.W. of Ilimsk.

TUBANTES, in *Ancient Geography*, a people of Lower Germany, on the other side of the Rhine. According to Cluvier, they at first inhabited the country now called the counties of Ruvenberg and Lippe; and from hence they traversed the territory which lies between the Rhine and the Sala.

TUBAON, in *Geography*, a town on the north coast of the island of Java. S. lat. $5^{\circ} 50'$. E. long. $112^{\circ} 14'$.

TUBBAULEH, a town of Hindoostan, in Lahore; 10 miles S.S.W. of Callanore.

TUBBER, in *Mining*, a name given in Cornwall to that mining instrument, which is in other parts of England called a *beele*.

TUBBER-Men, in *Cornwall*, the people who work with this tool, and who are, from its other name of *beele*, called in other places *beel-men*.

TUBBERMORE, in *Geography*, a post-town of the county of Londonderry, Ireland, which is $90\frac{1}{2}$ miles N. by W. from Dublin.

TUBE, **TUBUS**, pipe, conduit, or canal; a cylinder, hollow within, either of lead, iron, wood, glass, or other matter, for the air, or some other fluid, to have a free passage or conveyance through.

The term is chiefly applied to those used in physics, astronomy, anatomy, &c. On other ordinary occasions, we more usually say *pipe*.

In the *Memoirs of the French Academy of Sciences*, M. Varignon gives a treatise on the proportions necessary for the diameters of tubes, to give precisely any determinate quantities of water. The result of his piece turns upon these two analogies; that the diminutions of the velocity of water, occasioned by its friction against the sides of tubes, are as the diameters; the tubes being supposed equally long: and the quantities of water issuing out of the tubes, are as the square roots of their diameters, deducting out of them the quantity each is diminished.

For the tubes of barometers and thermometers, see **BAROMETER** and **THERMOMETER**. For the ascent of liquors in capillary tubes, see **ASCENT** and **CAPILLARY**.

TUBE, in *Astronomy*, is sometimes used for *telescope* (which see); but more properly for that part of it into which the lenses are fitted, and by which they are directed and used.

The goodness of the tube being of great importance to that of the telescope, we shall here add its structure.

The Construction of a Draw-tube for a Telescope.—The chief points to be regarded here are, that the tube be not troublesome by its weight, nor liable to warp and disturb the position of the glasses; so that any kind of tube will not serve in every case: but,

1. If the tube be small, it is best made of thin brass

plates covered with tin, and formed into pipes or draws, to slide within one another.

2. For long tubes, brass or iron would be too heavy; for which reason, some chuse to make them of paper, thus: a wooden cylinder is turned, of the length of the paper to be used; and of a diameter equal to that of the smallest draw. About this cylinder is rolled and pasted paper, till it be of a sufficient thickness: when one tube is dry, provide others after the same manner; still making the last serve for a mould for the next, till you have enough for the length of the tube desired. Lastly, to the extremes of the draws are to be glued wooden ferrils, that they may be drawn forth the better.

3. Since paper draws are apt to swell with moist weather, so as to spoil their sliding; and in dry weather to shrink, which renders them loose and tottering; in both which cases, the situation of the lenses is easily disturbed; the best method of making tubes is as follows: glue parchment round a wooden cylinder, and let the parchment be coloured black, to prevent the reflected rays making any confusion. Provide very thin slits of beech, and bending them into a cylinder, glue them carefully to the parchment; cover this wooden case with white parchment, and about its outer extreme make a little ring or ferril: after the same manner make another draw over the former; and then another, till you have enough for the length of the tube.

To the inner extremes of each draw, fit a wooden ferril, that the spurious rays, striking against the sides, may be intercepted and lost. In those places where the lenses are to be put, it will be proper to furnish the ferrils with female serews. Provide a wooden cover to defend the object-glass from the dust, and putting the eye-glass in its wooden ferril, fasten it by the serew to the tube. Lastly, provide a little wooden tube of a length equal to the distance the eye-glass is to be from the eye, and fit it to the other extreme of the tube.

TUBE, or *Pipe*, among *Florists*, is that part of a fine flower which has something of a straw-like pipe or opening; and which, to constitute a good flower, in some sorts, as those of the auricula and polyanthus, should stand exactly in the centre of the blossom, and have a truly round or circular form; be well filled with chives or little thread-like parts, something in the manner of a brush at their points, rising even with the face of the pip or blossom; as when only the style or pointal rises like a pin, without being surrounded or encompassed with the chives to the same height, the flower is said to be pinned, and displays a chasm or vacancy, which is so very unpleasant to the eye of the curious in flowers, that though, in many other respects, such flowers may have good properties, yet failing in this central perfection and beauty, nothing else can atone or make up for it; and such flowers are, of course, held in but small estimation by the florist. See **THRUM** and **TRUSS**.

TUBES, in *Artillery*, are instruments used in quick firing, made with us of tin; their diameter is two-tenths of an inch, so as just to enter into the vent of the piece; their length is about five or six inches, with a cap above, and cut slanting below in the form of a pen, and the point is strengthened with some folder, that it may pierce the cartridge.

Through each tube is drawn a quick-match, and the cap is furnished with mealed powder, moistened with spirits of wine. To prevent the mealed powder from falling out by carriage, a cap of paper is tied over it, which is taken off when used; but of late this cap is made of flannel, steeped in spirits of wine, and with saltpetre dissolved in it; and
there

there is no occasion to take it off, because it takes fire as quick as loose powder.

The French use a small reed, to which is fixed a wooden cap, and they are about two inches long, filled with mealed powder, moistened with spirits of wine; and a small hole is made through them of the size of a needle, through which the fire darts with great violence, and gives fire to the cartridge, which must be pierced before-hand with the priming-iron.

These tubes may be kept a great while without being spoiled; but piercing of the cartridge retards the quickness of firing. Muller's Art. p. 293.

TUBE, Alimentary. See **DUCT**.

TUBE, Eustachian, or Trumpet, in Anatomy, a canal of communication between the throat and the tympanum. See **EAR**.

TUBE, Eustachian, Disease and Obstructions of, in Surgery. These are often a cause of a considerable degree of deafness, because it is necessary for perfect hearing, that air should be conveyed from the mouth through this passage into the cavity of the tympanum, which now can no longer happen.

A degree of deafness generally attends a severe cold, which is accounted for by the Eustachian tube being obstructed with thickened mucus. Mr. Saunders tells us, that the obstruction most frequently arises from syphilitic ulcers in the throat, or sloughing in the cynanche maligna. The deafness comes on when such sores are healed, that is, when the obstruction is complete. The descent of a nasal polypus into the pharynx, and enlarged tonsils, have also been known to close the tube.

When the Eustachian tube is obstructed, the patient cannot feel the membrana tympani crackle, as it were, in his ear, on blowing forcibly with his nose and mouth stopped. Previous ulceration, or disease, of the throat, will sometimes aid in facilitating the diagnosis.

When the Eustachian tube is obstructed with mucus, it has been proposed to employ injections, which are to be thrown, by means of a syringe and catheter, into the guttural orifice of that canal. This operation, however, is alleged to be always attended with trouble; and when the os spongiosum inferius happens to be situated near the floor of the orbit, the introduction of any instrument like a female catheter would be impracticable. Richerand *Nosographie Chirurgicale*, tom. ii. p. 131. edit. 2.

Mr. A. Cooper had noticed, that hearing was only impaired, not lost, when suppurations in the tympanum had injured, and even destroyed the membrana tympani; and that the degree of deafness by no means equalled what resulted from an obstruction of the Eustachian tube. Hence, when the tube was permanently obliterated, he conceived that a small puncture of the membrana tympani might be the means of enabling the patient to hear. Mr. A. Cooper practised the plan with success, and others have imitated him with the same result.

The operation consists in introducing an instrument, resembling a hydrocele trocar, but curved, into the meatus auditorius externus, and pushing it through the anterior and inferior part of the membrana tympani; a place rendered most eligible, on account of the situation of the chorda tympani and manubrium of the malleus, parts which should be left uninjured. The instrument must not be introduced far, lest it should wound the vascular lining of the tympanum, and cause a temporary continuance of the deafness, by an effusion of blood. When the puncture is made, in proper cases, and in a judicious manner, hearing is immedi-

ately restored. A small hole in the membrana tympani now conveys the air into the cavity of the tympanum, answering the same purpose as the Eustachian tube.

The surgeon will be able to operate with more ease, if he take care to lessen the curvature of the meatus auditorius, by drawing upward the external ear.

There is some chance of a relapse, in consequence of the opening closing up. This consideration has led Richerand to propose making the aperture with caustic, so as to destroy a part of the membrane. (*Nosographie Chirurgicale*, tom. ii. p. 132. edit. 2.) The suggestion is not, however, likely to be adopted, on account of the inconveniences of applying caustic within the ear. Mr. Saunders is an advocate for making the opening large. This gentleman relates, that he instantaneously restored hearing in one case, in which the patient had been deaf thirty years, in consequence of a loss of part of his palate by syphilis. Mr. A. Cooper's cases are in the *Philosophical Transactions* for 1802.

Puncturing the membrana tympani has been attended with some degree of success in France, as well as this country. It is not to be dissembled, however, that there are numerous failures. We are informed that professor Dubois has done the operation in four instances, without success. Richerand *Nosographie Chirurgicale*, tom. ii. p. 132.

In most cases, the patients who have been benefited, are said to have experienced pain just after the trocar was withdrawn. The organ, in consequence of not being accustomed to sound, had become so extremely sensible, that it could not bear the gentlest impression of the sonorous vibrations; and the patient's first request, after the perforation was made, was that they who were near him might speak softly. This excessive tenderness of the sense gradually subsides.

TUBES, Fallopian, or Trumpets, in Anatomy, two small canals, forming communications between the cavities of the uterus and abdomen, and serving to convey the germs of the new beings, in generation, from the ovaries to the uterus. See **GENERATION**.

TUBE, Glass. See **GLASS-Tube**, **LAMP-Blowers**, and **HERMETICAL Seal**.

In order to bend a glass-tube, if the glass is pretty thick, and the bore narrow, it may be held in the weaker part of the lamp-flame, and softened for about an inch or two of its length, and then bent slowly into any required shape. But if the tube be wide, and the glass thin, this mode of bending will entirely destroy the cylindrical form of the bore at the part that is bent, making a double flattening. In order to avoid this, first seal up one end of the tube, and then, whilst bending it at the required part, blow steadily and gently into the open end, and the pressure of the breath will counteract the falling in of the sides of the bending portion, and keep the bore cylindrical. The closed end is then cut off by the file; for which purpose, make a deep scratch with one edge of a fine three-cornered file on the part intended to be cut, then break the tube with a smart pull in that direction in which the scratched part will be outmost; and it will in general separate accurately at this point.

In order to join two tubes, heat them both in the flame, and apply them together, when quit hot, turning them round to finish the consolidation; or else, to avoid the thick ring of glass which this produces, previously close one end of one tube, and when the two ends are fully joined, blow into the open end of the other tube, and pull them out a little at the point of juncture, till an equal cylinder is formed.

To form a bulb (e. g. of a thermometer), chuse a tube

of a very equal bore, seal the end in the usual manner, and to collect a greater mass of glass at the end, press upwards on it while quite hot with any iron instrument, so as to consolidate and shorten it a little; let it remain in the hottest part of the flame, till the lump of glass is quite white hot; then remove it, put your lips to the open end without loss of time, holding it with the hot part lowest, and blow moderately and steadily. The lump of hot glass will immediately open into a bulb, the size of which may be regulated at pleasure.

TUBE, *Stentorophonic* and *Torrucellian*. See the adjectives.

TUBEIPILLY, in *Geography*, a town of Hindoostan, in Myfore; 20 miles W. of Chinna Balabaram.

TUBEL, a word used by some chemical writers to express scales of copper or brass.

TUBELDIE, in *Geography*, a town of Dar-Fur; 180 miles S. of Cobbé.

TUBER, or *TUBERCLE*, in *Botany*, a kind of round turgid root, in form of a knob or turnip.

The plants which produce such roots are hence denominated *tuberosæ*, or *tuberous plants*. See *TUBEROUS ROOTS*.

TUBER, an old Latin name for a sort of excrescence, appropriated also to several things of the fungus tribe. Its derivation is from *tumeo*, to swell. Botanists have retained this name for the present genus, to which it originally perhaps belonged.—Mich. Gen. 221. Perf. Syn. Fung. 126. With. Bor. Arr. v. 4. 371. Sibth. Oxon. 398. Sm. Prodr. Fl. Græc. Sibth. v. 2. 351. Juss. 3. Lamarck Illustr. t. 887.—Class and order, *Cryptogamia Fungi*. Nat. Ord. *Fungi*.

Ess. Ch. Roundish, fleshy, solid, closed; its substance variegated with veins bearing seeds.

1. *T. cibarium*. Common Truffle. Perf. n. 1. With. n. 1. Bulliard. v. 1. 74. t. 356. Sowerb. Fung. t. 309. (*T. brumale*, pulpâ obscurâ odorâ; Mich. Gen. 221. t. 102. *Tubera*; Tourn. Inst. t. 333. *T. terræ*; Ger. Em. 1583.)—Blackish, rough with prominent warts.—Found under the surface of the ground in most parts of Europe, where the soil is light and dry; as well as in Japan, and the East Indies. Dogs are taught to find this fungus by the smell, and to scratch it out of the earth. It is brought to table, either simply boiled, or stewed in various forms. The French and Italians introduce truffles into different made dishes, sauces, pies, &c. They are reported to have a stimulating, or aphrodisiacal quality, which, whether imaginary or not, perhaps renders them more popular than their flavour, which is trifling. The size of this fungus is about that of a walnut in its outer coat, but the surface is irregularly tumid, and harsh to the touch from innumerable sharp warts. The inner substance is greyish, or pale brown, with numerous curved branching veins, lodging the minute seeds. No signs of a root are observable. There are said to be several varieties of colour in this species.

2. *T. moschatum*. Musky Truffle. Bulliard v. 1. 79. t. 479. Perf. n. 2.—Blackish, smooth.—Native of France. Like the foregoing in size, and general figure; but its surface is smooth, the internal substance rather soft, and the scent musky. By drying the coat becomes wrinkled. Bulliard.

3. *T. griseum*. Grey Truffle. Perf. n. 3. (Truffe grise; De Borch Truffes du Piemont, 7. t. 1, 2.)—Roundish, irregular, smooth, soft, greyish-ashcoloured.—Native of Piedmont, in a light, moderately moist, soil. The size of the two preceding, but more irregular in shape, of a soapy texture and light colour, with a strong scent of garlic.

VOL. XXXVI.

4. *T. album*. White Truffle. Bulliard v. 1. 80. t. 404. Perf. n. 4. With. n. 2. Sowerb. Fung. t. 310. (Bianchetti; De Borch Truff. du Piem. 6, 7? *Lycoperdon gibbosum*; Dickf. Crypt. fasc. 2. 26.)—Light reddish-brown, roundish, half above ground; veins rusty-coloured.—In woods, in England and France, also in Greece, but partly sunk in the earth. The outside is smooth, turning more yellow in drying; the inner substance resembles rhubarb. Its flavour is said to be disagreeable.

Dr. Withering describes a variety, or more probably, as he observes, a distinct species, whose internal substance is uniform, like cork, of the hue of tanned leather; the surface knobby and pitted, hairy in the pits. The whole mass perforated by stems of grass; so that it must have been above ground in a soft state.

5. *T. æstivum*. Summer Truffle. Mich. Gen. 221. n. 2. (*T. album* β ; Perf. n. 4. *Lycoperdon æstivum*; Wulf. in Jacq. Coll. v. 1. 349.)—Nearly globular, smooth, brown, or blackish; spongy within; entirely subterraneous.—Plentiful in Carinthia and Carniola from May to August. These have little taste or smell, but are used much for the table. When young the surface is whitish and scaly, but gradually becomes brown or blackish. Their size is equal to a chestnut or walnut. Perhaps, as Persoon thought, this may not be a different species from the last.

6. *T. cervinum*. Bastard Truffle. With. n. 3. (*Tubera cervina*; Lob. Ic. v. 2. 276. *Lycoperdastrum tuberosum* arrhizon fulvum, cortice duriore crasso et granulato, medullâ ex albo purpureascente, femine nigro crassiore; Mich. Gen. 220. t. 99. f. 4.)—Globular, finely granulated, rather solid, finally bursting; powdery in the centre.—Found barely sunk in the ground, in several parts of England, as well as in Bohemia and Silesia, about September. The diameter is about an inch and a half; the outside tawny; inner substance, or nucleus, purplish.

7. *T. solidum*. Hard Truffle. With. n. 4. (*Lycoperdon cepæ facie*; Vaill. Paris. t. 16. f. 5, 6.)—"Globular but compressed, (rather depressed,) brown, reticulated, very firm; blue-black within."—Found in Dr. Withering's park at Edgbaston, near Birmingham, under an oak-tree by the pool, in August. This had a short root, as Vaillant represents it, and appears to be, as Mr. Sowerby supposes, only a nearly sessile variety of his *Lycoperdon defossium*, Engl. Fung. t. 311.

8. *T. radicum*. Rooted Truffle. With. n. 5. (*Lycoperdon cervinum*; Bolt. Fung. v. 3. t. 116. *L. spadiceum*; Dickf. Crypt. fasc. 1. 25. *Lycoperdastrum obscurum*, altiùs radicum, pulpâ atro-purpureâ, cute lacerâ, veluti punctatâ; Mich. Gen. 220. t. 99. f. 3.)—Roundish, depressed, cracked in the surface, with a thick short root.—Found on heaths, and in woods, in Italy and England in the summer, but rare. Two or three inches in diameter, solid, never bursting, nor becoming internally powdery. The outer skin is brown, or olive, cracking into angular portions, but not warty. Inner substance purplish, veined with black; finally quite black. Apparently different from *Lycoperdon aurantiacum* of Bulliard, t. 270; so that the fine smoke in his figure may not be altogether, as Bolton says, "conjectural;" it may represent the powdery seeds, escaping from holes eaten by insects, as Bolton himself supposes.

TUBER, or *Tuberosity*, in *Surgery*, is used for a knob or tumour growing naturally on any part; in opposition to tumours which rise accidentally, or from a disease.

The same term is also used for a knot in a tree.

TUBERA TERRÆ. See *TRUFFLES*.

TUBERAN, in *Geography*, a town of Persia, in the province of Kerman; 171 miles N.E. of Schiras.

TUBERCLE, a small, hard, superficial tumour, circumscribed, and permanent, or suppurating partially.—Bate-man's Synopsis of Cutaneous Diseases.

TUBERCULA QUADRIGEMINA, in *Anatomy*, a part of the brain. See BRAIN.

TUBERCULARIA, in *Botany*, so called from its small tubercular figure.—Tode Fung. Mecklenb. fasc. 1. 18. Perf. Syn. Fung. 111. Obf. Mycol. fasc. 1. 78.—Clafs and order, *Cryptogamia Fungi*. Nat. Ord. *Fungi*.

Eff. Ch. Roundish, compact, smooth, permanent, soluble in wet.

1. *T. discoidea*. Discoid Tubercularia. Perf. n. 1. Obf. Mycol. n. 138. fasc. 1. 79.—Burling from the cuticle of trees, crowded, even, red; with a discoid permanent base.—On decayed branches of Maple.

2. *T. vulgaris*. Scarlet Tubercularia. Tode 18—20. t. 4. f. 30. Perf. n. 2. (*Tremella purpurea*; Linn. Sp. Pl. 1626. Hudf. 565. Lichenoides tuberculofum amœnè purpureum; Dill. Musc. 127. t. 18. f. 6.)—Aggregate or scattered, bright red, corrugated, with a thick pale base.—Very common on dead or dying branches of trees, especially currant-bushes, where it becomes conspicuous by its scarlet or deep-rose colour.

3. *T. granulata*. Dull Granulated Tubercularia. Perf. n. 3.—“Roundish, dull red, with a corrugated granulated surface.”—On the branches of Sycamore, or other species of *Acer*, but rare. Its colour is brownish and opaque; yellowish within. *Perfoon*.

4. *T. confluens*. Confluent Tubercularia. Perf. n. 4.—“Crowded and confluent, of a fleshy red brick-colour, small, oblong, angular or flattish.”—On dry branches of the Common Maple. Coloured much like *T. vulgaris*, but smaller, and softer.

5. *T. castaneæ*. Chestnut Tubercularia. Perf. n. 5.—“Scattered, small, sunk in the bark, flattish, very smooth, bright red.”—On the bark of the chestnut-tree. Half the size of *T. vulgaris*, and scarcely projecting out of the cuticle of the bark. Its colour externally is like that of a strawberry, the inside yellowish, firm.

6. *T. rosea*. Rosy Tubercularia. Perf. n. 6. Obf. Mycol. n. 137. fasc. 1. 78. (*Lichen roseus*; Schreb. Lipf. 140.)—Scattered, loose, irregularly globose, rose-coloured.—On trees, especially adhering to *Lichen stellaris, parietinus*, &c. We have found it on the former at Hetherset, near Norwich. The bright-pink little masses, of which this species consists, might be taken for the tubercles of some *Lichen*; but they dissolve in wet.

TUBERCULUM ANNULARE, in *Anatomy*, a part of the brain. See BRAIN.

TUBERCULUM Loweri, a small eminence in the right auricle of the heart. See HEART.

TUBERNICENSE OPPIDUM, *Tubernoke*, in *Ancient Geography*, a town of Africa, built in form of a crescent, between the summits of a mountain, 7 leagues S.W. of Tunis.

TUBERNOKI, in *Geography*, a town of Tunis, anciently the see of a bishop; 21 miles S.S.E. of Tunis.

TUBEROSE, in *Botany*, see POLIANTHES. This English name is not compounded of *tube* and *rose*, as most people would naturally conceive, but originates in the old appellation of Tuberoſe, or Tuberos, Hyacinth, *Hyacinthus tuberosus*; alluding to the tuberous root, and the resemblance of the flower to a Hyacinth.

TUBEROUS ROOTS, in *Gardening and Agriculture*, such as consist of one or more swelled or knobbed tubers, of a solid fleshy substance. In this tribe are comprised many plants of the ornamental flowery kind, and some esculents of the

kitchen garden; as in the former, anemone, ranunculus, filipendula, many sorts of iris, aconitum, pæony, orchis, cyclamen, winter-aconite, day-lily, &c.; some also with bulbo-tuberous roots, as gladiolus, polianthes or tuberoſe, ophrys, &c.; and of the esculent tuberous roots are the potatoe and Jerusalem artichoke: all of which plants are principally perennial in their roots, being perpetuated annually by offsets, or cuttings for sets. See ROOT.

It has lately been suggested, and in some measure confirmed by experiment, that, in cultivation, the root of this kind, called the potatoe, is liable to have the disease termed the curl produced in crops of it, by the tubers which are used for feed-stock or sets having been allowed to become too ripe the preceding year; and that this practice of over-ripening, being repeated year after year, is the real cause of the disease, the vegetative power in the tubers being in this way exhausted.

It has been long known to all cultivators of this sort of crops, that the usual method of reproducing any particular variety of the root is by cuts or sets of the tubers; and that this manner of propagation is continued from year to year, as long as that particular sort is wished for, without ever thinking of reinvigorating the *feed-stock*, or tubers for planting, by raising new plants from the real seed; the *species* being reproduced only by sowing the true seeds of the plant. It is only thus that *new* varieties are obtained. But if seeds be taken from any particular variety which is wished to be preserved, and if care be exercised that the plants shall have no communication with the farina of any other plants of the same species in flower, then the produce of these seeds will probably be the same with that variety from which the seeds were saved; and from the *feed-stock* being renewed, and reinvigorated in this manner, it seems likely that the variety so obtained may, by observing a proper management, be preserved from this disease, or any other kind of degeneracy, for any length of time.

This opinion of the over-ripening of the *feed-stock* for the supply of the ensuing year, by allowing it to remain too long in the ground, especially when planted early, and of the repetition and continuance of it rendering the tubers wholly unfit for producing vigorous healthy plants, by exhausting their power, being the chief cause of this disease, has however been almost uniformly objected to, as being quite contrary to experience in regard to seeds in general, as full ripeness has been considered the best recommendation of them. It is notwithstanding apprehended, that this objection arises from the taking of an improper view of the matter. For though it be true, that all of what are properly called *seeds* are improved by being thoroughly ripened; the *cuts* or *sets* taken from the tubers of this sort cannot, strictly speaking, be considered as seeds. The planting cuts of this kind of tuberous root, is analogous, it is supposed, to budding or grafting of trees, being only a secondary mode of propagation, and consequently that such an objection cannot hold good. Besides, the suggestion is illustrated and supported by different other circumstances and considerations, as well as by the well-known powerful cause which weakens the vegetative power in the tubers,—that of allowing the plants that are intended for the supplying of *feed-stock* for the ensuing year to run to flower, and produce seed. This, it is thought, should in all cases be prevented, by cutting off the flowers as they appear in their embryo state. In this way, by turning nature from her ordinary course, to force her to exert herself in another direction, and to throw back into the tubers that portion of the vital principle of the plant, which would have been exhausted in the formation of flowers and seeds. Nothing will, it is supposed, contribute more to prevent degeneracy in this
fort

sort of tuberous root, and especially of the disease to which it is so liable, than this treatment. See the first volume of the Transactions of the Scotch Horticultural Society.

TUBERSOKE, in *Geography*, a town of Tunis, anciently the see of a bishop; 48 miles S.W. of Tunis.

TUBIG, a town on the E. coast of the island of Samar. N. lat. $12^{\circ} 13'$. E. long. $135^{\circ} 27'$.

TUBILUSTRUM, compounded of *tubus*, trumpet, and *lustro*, I purify, in *Antiquity*, a feast or ceremony in use among the Romans. This denomination was given to the day on which they purified their sacred trumpets, as also to the ceremony of purifying them. It was held on the fifth and last day of the feast of Minerva, called *quinquatrus*, or *quinquatris*, which was performed twice a year.

TUBINGEN, in *Geography*, a town of Wurtemberg, situated in a valley on the Neckar, between two hills. An university was founded here in the year 1477, and restored in the year 1770. Here is a seminary for the study of divinity, and a college for the nobility. The foundation of the town is unknown, but assuredly of great antiquity. It is the origin of the pfalzgravate of Swabia, and though the descent of the ancient palatines of Tubingen be unknown, yet they had their pfalz or palatium, which stood on the spot of the present castle. One of the eldest pfalzgraves known at present, lived in the year 1080; and the last of them, viz. George Eberhard, died in the year 1631. The two pfalzgraves, Gobz and William, in the year 1342, sold the town to count Ulrich of Wurtemberg. In 1535, duke Ulrich, pulling down the old castle, caused that of Hohen Tubingen, which is the present residence, to be erected, with fortifications. In 1540 the town was damaged by fire. In the thirty years' war it was frequently besieged and taken; and in 1688, was considerably injured by the French; 16 miles S.S.W. of Stuttgart. N. lat. $48^{\circ} 33'$. E. long. $9^{\circ} 10'$.

TUBIPORA, *Red tubular Coral*, in *Natural History*, a name given by Linnæus to a genus of Zoophyta, in the class of worms; the characters of which are, that its animal is a nereis, and that it is a coral, consisting of cylindric, hollow, erect, and parallel tubes.

In Gmelin's edition of the Linnæan System we have the following

Species.

MUSICA. With fasciculated combined tubes; the transverse partitions membranaceous and distant. This is the purple tubipora of Pallas, of which he mentions a variety, or the flexuose tubipora. It is found in the American, Indian, and Red seas, affixed to other corals or rocks; and is used by the Indians as an antidote to strangury and wounds inflicted by poisonous animals.

CATENULATA. With parallel tubes, connected into a lamina anastomosing with a folded wreath. Found on the shores of the Baltic sea.

SERPENS. With cylindric, erect, very short, distant, axillary tubules; divaricated at the dichotomous base: the Millepora liliacea of Pallas. Found in the Mediterranean and Northern seas, and on the shores of the Baltic.

FASCICULARIS. With filiform fasciculated tubes; the sides anastomosing. Found on the shores of Gothland.

RAMOSA. With roundish interstices, and simple, flexuose, aggregate, conglutinated tubules of the confluent branches. Found in the White sea.

PINNATA. Dichotomous, erect, with tubules distributed in the form of small feathers. Found in the Mediterranean sea.

PENICILLATA. Stalky; the top incrassated, and formed

of tubules connected towards the base. Found in the Greenland sea, affixed to testacea.

FLABELLARIS. Depressed, flabelliform, radiated with parallel conjoined tubules. Found as the former.

STELLATA. With separate tubes, combined in layers or tables, many of these tables being remote, horizontally tubulous, and radiated with striæ on the surface. Found among fossils.

STRUES. With distant diverging tubes, loose behind and often bent; with tubules small, simple, and horizontal, combined. Found among fossils.

TUBNA, in *Geography*, a town of Algiers, anciently called Thubana. The Arabs bury their treasure under the ruins; 110 miles S.S.W. of Constantinople. N. lat. $35^{\circ} 8'$. E. long. 5° .

TUBOE, a town on the south coast of Mindanao. N. lat. $7^{\circ} 40'$. E. long. $124^{\circ} 32'$.

TUBŒUF, a town of France, in the department of the Mayenne; 6 miles N.N.E. of Laflay.

TUBOR TERRÆ, a name used by some botanical authors for the cyclamen or sow-bread.

TUBUG, in *Geography*, a harbour on the west coast of Mindanao, much frequented by pirates. Near it is the house of a rajah, strongly pallisadoed, and defended with twenty swivel guns; 10 miles N. of Pollock harbour.

TUBUHACAN, a town of Africa, in the country of Sugulmessâ; 9 miles from Sugulmessâ.

TUBULARIA, in *Zoology*, a genus of the Zoophyta class of worms; the characters of which are, that the animal is vegetating and radicated; the head crested with tentacula, generating small eggs; and that the stem is tubulous, horny, very simple or branched, affixed at the bottom, and the animal thrust out at the apex. Among the following species are included several of the tubular corallines of Ellis.

Species.

CORNUCOPÆ. With simple tube, attenuated below, flexuous and rough. Found among the corals of the American and Mediterranean seas. Colour dusky-yellow.

INDIVISA. With very simple stalks, and wreathed joints. One of Ellis's tubular corallines. Found in the European and Mediterranean seas. Colour yellowish-grey.

RAMOSA. With branched stalks, and wreathed joints: one of Ellis's. Found in the European sea. The soft tubules fordily grey.

RAMEA. With compound branched tubes, large and small branches alternate. Found in the Mediterranean ocean. Brownish-grey.

FISTULOSA. With dichotomous articulated stalks, with impressions in form of a rhombus. Bugle coralline of Ellis. Found in the European, Mediterranean, and Atlantic seas. Pale-grey.

FRAGILIS. With dichotomous stalks, and compressed joints. Found in the American sea. White or greenish.

MUSCOIDES. With sub-dichotomous stalks, wholly annulate-rugose. One of the tubular corallines of Ellis. Found in the European and Mediterranean seas. Pale-grey.

PAPYRACEA. With a very large papyraceous tubule, alternately ramose. Found in the Indian ocean.

PENICILLUS. With aggregate, simple, radicated tubules, proliferous and penicillated at the apex. Found in the American sea. It is doubted whether this and the last be of this genus.

ACETABULUM. With filiform stalks; the terminal pelta or shield striated, radiated and calcareous. Found in the Mediterranean and American seas. White and soft, and adjoined to testacea.

SPLACHNEA. With capillary very simple stalks; the terminal pelta smooth and membranaceous. Found in the Mediterranean sea. Of horn-colour.

CORYNA. Sub-ramose, filiform, papyraceous, jointed with ovato-acuminated capsules, and dilatable mouth, and terminated with cylindrical armed tentacula. Found on the shores of Holland and England. Arenaceous and reddish.

AFFINIS. Simple, sub-annulated, soft; with the tentacula of the mouth encompassing the papilla attenuated. Found on the English coast, adhering to fuci, and akin to the last.

FABRICIA. Stellated, with pinnated cirrhi, and six rays encompassing the mouth. Found on the shores of Norway and Greenland, often in the fisheries of rocks. Grey, green, or white.

LONGICORNIS. With two setaceous cirrhi, longer than the tubule. Habitation unknown.

MULTICORNIS. With more than twenty cirrhi centrally white; body round and hyaline, tubule mace-like. Habitation unknown.

CAMPANULATA. With lunated crest; orifices of the vagina annulated; body concealed within the vagina. Found in the stagnant waters of Europe.

REPENS. Crested, with cirrhi on both sides radiated; vagina extended, tubule opaque, procumbent. Found in the stagnant waters of Northern Europe.

REPTANS. With lunated crest; body tractile beyond the vagina. Found in the stagnant waters of Europe. Hyaline, soft, with about sixty cilia.

SULTANA. With infundibuliform crest, ciliated at the base. Found in the pools of Gottingen.

STELLARIS. Crested, with pectinated cirrhi, brown, annulated erect tubule. Found in the fucus of the Baltic sea.

SIMPLEX. With eight linear cirrhi, and conic hyaline tubule. Found in the fucus of the Norwegian sea.

SPALLANZANI. With five plumose cirrhi, pectinated on both sides, and cylindrical, horny tubules, below incurvated. Found in the Mediterranean sea.

MEMBRANACEA. With a double concentric range of fitulous tentacula, and a membranaceous, contractile, viscid, cylindrical tubule inclosing the inhabitant. Found in calm parts of the Mediterranean; but doubted whether it belongs to this genus.

TUBULARIA Fossilis, in *Natural History*, the name of a species of coral found very often fossil in Germany and Italy, and composed of a great number of tubes, or longitudinal pipes, often resembling so many worms ranged perpendicularly in the mass.

They are usually found either in masses of a lax stone, or in single tubules in those of the harder and firmer texture. In these two states this fossil makes two very different appearances; and, according to the different directions in the mass, or the different views of them that the sections of it place them in, they make a number of very elegant figures. Hill.

TUBULATED FLOWER, *Tubulatus flosculus*, in *Botany*, a term used by authors to express those small flowers, a great number of which go to compose one large compound flower. These are called *tubulated*, by way of distinction from another kind of them, which are, from their shape, called *ligulated*. The tubulated floscules generally compose the disk, and the ligulated ones the radius of the compound flowers. The tubulated ones are formed into a hollow cylinder, which expands into a mouth at the top, and is divided into five equal segments, which stand expanded, and in some measure bent backward.

TUBULI CONCAMERATI, in *Natural History*, the name

of a genus of the *Tubulus marinus*, distinguished abundantly from all the others by its figure and inner structure.

They are long shelly bodies, usually either of a conic or cylindrical form, or else resembling the dentales in shape; and sometimes, but that very rarely, they have their smaller end bent and twisted round. They are composed within of a number of hollow compartments, each of which communicates with the next by means of a siphunculus, which runs through the whole length in the manner of the thick nautilus, or the cornu ammonis. We know not these in their recent state at this time, but frequently meet with them fossil in the stones brought from Sweden for pavements, and in some others.

Some authors have called these by the name *alveoli*, confounding them with the conic body found in the belemnites. See **ALVEOLUS**.

Others have called them *pyramidal entrochi*, others *obelisci marmorei alveolares*; and they are the bodies described by Gesner and Aldrovand, under the names of *lapides caude cancri*, or *cancrites*. Some late authors have called them also *polythalamii*, and others *cone-stones*. Klein. de Tubul. p. 7.

TUBULI Fossiles, the name given by authors to the cases or tubules of sea-worms, found buried in the earth.

They are in their native state of very various kinds, but by different accidents attending them in their accidental one, they are subject to a multitude of other appearances. They are found of very various sizes, sometimes complete, and buried in the strata of earth or stone; sometimes they are more or less perfect, and are immersed in masses of the *ludus Helmontii*, or *septariae*, and in this state they make one kind of *lapis syringoides*, or pipe-stone; but the most beautiful *syringoides*, or pipe-stones, are the parts of the bottoms of ships, or posts fixed in the sea, which have been pierced, in their original state of wood, by these sea-worms, and afterwards petrified with the cases or tubuli of the worms remaining in them.

Of these there are many beautiful specimens on the shore of the island of Sheppey, and in our clay-pits about London and Richmond.

Those tubuli called *dentalia et entalia*, are not less frequent, and found of various kinds in the clay-pits about London and the hills of Yorkshire; but they are more frequent in similar places in France and Italy.

TUBULI Lactiferi, or *Galaetophori*, in *Anatomy*, the canals in which the milk is secreted. See **BREAST**.

TUBULI Semiferi, the innumerable minute canals composing the body of the testis. See **GENERATION**.

TUBULI Uriniferi, the small tubes terminating on the papillæ of the kidney. See **KIDNEY**.

TUBULI Vermiculares, a name sometimes used by naturalists for certain small oblong and hollow sea-shells resembling worms.

TUBULUS Marinus, or *Canalis*, in *Natural History*, the name of a genus (according to some writers) of univalve shell-fish; the characters of which are these: it is of an oblong figure, terminating in a point, and hollow within, so that it resembles a tube or horn. These are also called by the old writers *dentalia*, from their resembling the tooth of a dog. See **DENTALIUM**, **CONCHOLOGY**, and **SHELLS**.

It has been a common error of authors to confound under the general name of *tubulus marinus*, these shells, and those very different ones of the *vermiculi marini*, which make a number of pipes or tubes joined together; these, by their number and joinings, have induced a late French author to place them among the multivalve shells, while the *canales* are usually single and separate, and can have no title to any class but the tubular univalve one. Aldrovand observes, that the

tubuli called *dentalia*, and those called *antalia*, differ only in size; and he thinks they have no title to the name *concha*, since they are neither of the nature of the common bivalve nor univalve shells, such as the *patella* and *auris marina*; but this is very idle, since by this rule the snails, and many other families, might be excluded as well as these. This author says, in another place, that the *antale* is formed of many circumvolutions; whence he seems to have taken in the *buccina* under this name; but later writers have more nicely distinguished in these cases. The sea-pencil is evidently of this genus, though extremely different from all the other species of it, in having its head pierced with a multitude of holes, in the manner of the head of a watering-pot. Some authors, from the figure of the shell, call this *phallus marinus*, and the French call it *le priape*. Aldrovand. de Testac. lib. lii. p. 382.

TUBULINA, in *Botany*, a diminutive, from *tubus*, a tube, expressing the structure of the fungus in question.—Perf. Syn. Fung. 197.—Class and order, *Cryptogamia Fungi*. Nat. Ord. *Fungi*.

Eff. Ch. Receptacles tubular, combined in a tuft, generally seated on a subjacent membrane. Seeds powdery, naked, farinaceous.

1. *T. fallax*. Doubtful Tubulina. Perf. n. 1. Obs. Mycol. fasc. 2. 28.—“Opaque, indeterminate, brownish. Receptacles combined at the top into an uniform bark.”—Found, very rarely, on the trunks of trees. Perfoon appears to have examined a single specimen only, and therefore knew nothing of the appearance of the plant in an early stage of growth. This specimen was about an inch long, various in breadth, of an earthy or rusty colour. The tubes were full of powder, otherwise he would have thought it rather the early state of some *Boletus* or *Sphæria*.

2. *T. fragiformis*. Strawberry Tubulina. Perf. n. 2. Obs. Mycol. fasc. 2. 29. (*Tubulifera arachnoidea*; Jacq. Misc. Anstr. v. 1. 144. t. 15. *T. Ceratum*; Fl. Dan. t. 659. f. 2.)—Nearly globular; first red; then brown; receptacles rather swelling upwards, distinct at the top.—Found on the trunks of trees, after heavy rains in summer, attracting notice by its likeness to a large strawberry. When arrived at maturity, it becomes opaque, of a rusty brown. The author above quoted mentions in his *Observationes Mycologicae*, fasc. 2, numerous *fungi* allied to this, partly observed by himself, and partly described by other authors, which he was doubtful whether to consider as species or varieties. His doubts seem to have been rather increased than diminished when he wrote his *Synopsis*, and therefore we cannot presume to remove them. Among these obscure productions are *Sphærocarpus fragiformis*, Bulliard t. 384, and *S. cylindricus*, t. 470. f. 3, which appear to answer well to the generic character of *Tubulina*, and to be specifically distinct from *T. fragiformis*, as represented by Jacquin. Perfoon also mentions a *Reticularia multicapsula* of Sowerby's *Fungi*, t. 169, which is an altogether erroneous reference; nor shall we attempt to guess whether it alludes to any thing in that author's t. 399, or any other.

TUBULOSE LEAF, among *Botanists*. See **LEAF**.

TUBURBO, in *Geography*, a town of Africa, in the kingdom of Tunis, on the Mejerda, supposed to be the ancient Tuburbum. Mahomet, a late bey of this kingdom, planted a great number and variety of fruit-trees in the neighbourhood of this town, which were ranged in so particular a method, that each species was confined to one grove, and thereby removed from all influence of another. In the adjacent valley, where the Mejerda conveys its stream, the same curious and generous prince erected out of the ruins of a neighbouring amphitheatre, a large maffy

bridge or dam, with proper sluices and flood-gates to raise the river to a convenient height for watering and refreshing these plantations. But this, which was too laudable an invention to subsist long in Barbary, was soon entirely broken down and destroyed; 16 miles W.N.W. of Tunis.

TUBUS COROLLÆ, in *Botany*, the inferior, more or less cylindrical, part of a monopetalous corolla, supporting the **LIMBUS**; see that article. The tube differs in length, in different genera or species of plants, as well as in shape. A rotate, or wheel-shaped, corolla has the tube necessarily very short, or scarcely any; a funnel-shaped one has the same part elongated, and dilated upward. Sometimes the tube conceals the stamens, which are inserted either into some part of itself, or more rarely into the receptacle; sometimes, indeed very frequently, the stamens project, with the style, out of the tube. Its mouth is usually pervious; sometimes hairy; in several genera of the tribe *Asperifoliae*, that part is closed by arched or converging valves, covering the anthers. The claws of the petals, in a polypetalous corolla, stand in the place of the tube of a monopetalous one, and in some instances are so far connected, at an early period, as really to constitute a tube, subsequently splitting into claws. Examples occur in the order of **PROTEACEÆ**, which have caused some perplexity, and difference of opinion, in the characters given by different botanists of the plants of that order.

TUCABATH, in *Ancient Geography*, a town of Africa, in the interior of Libya. Ptolemy.

TUCANA, in *Ornithology*, a name given by some to the toucan.

TUCAPEL, in *Geography*, mountains of Chili, S. of Conception. S. lat. 37° 30'.

TUCAVAN, a town on the W. coast of the island of Negros. N. lat. 11° 12'. E. long. 122° 57'.

TUCCA TEREBINTHINA, *Sheebak*, in *Ancient Geography*, a town in the interior of Africa, near Assiur and S.W. of it. Ptolemy.

TUCCABAR, in *Geography*, a town of Tunis, on the Mejerda; 24 miles W. of Tunis.

TUCCABATCHE, a town of the state of Georgia; 10 miles S.W. of Oakfuskee.

TUCCI, MARTOS, in *Ancient Geography*, a town of Spain, in Betica, S. of Castulo.

TUCHAN, in *Geography*, a town of France, in the department of the Aude; 12 miles S. of La Grasse.

TUCHEL, a town of Prussia, in Pomerelia; 25 miles N.W. of Culm.

TUCK of a Ship, a name given to that part of the ship where the ends of the bottom planks are collected together, immediately under the stern or counter. When this part, instead of being incurved, and forming a convex surface, assumes the shape of a vertical or oblique plane, it is said to be square; and a square tuck is accordingly terminated above by the wing-transom, and below, and on each side, by the fashion-pieces. Falconer.

TUCK-Rail, the rail which is wrought well with the upper side of the wing-transom of ships, &c. and forms a rabbet for the purpose of caulking the butt-ends of the planks of the bottom.

TUCKABATCHEES, in *Geography*, a town of the Creek nation of Indians.

TUCKAHOC CREEK, a branch of the river Choptank, in Maryland.

TUCKAHOE, in *Botany*, the North American Indian name of a very extraordinary production, found in various parts of the United States, which appears to be a subterraneous fungus, nearly allied to the genus **TUBER**; see that article.

article. The Tuckahoe is found in irregular, more or less globular or oblong, lumps, from an ounce to thirty pounds in weight, having a brown corrugated bark. Its internal substance is uniform, solid, snow-white, farinaceous, with little or no taste or smell; and has been used by the natives as food. This production is generally found attached to the roots of some tree, especially of the genera *Pinus* and *Quercus*, the fibres of which are interwoven with part of its texture, but in process of time are obliterated. Its growth appears to be very slow. In decay the inner substance assumes an acid flavour, and brown colour. Such are some of the particulars of the history of this fungus, for so we presume it to be, which we have received from Dr. Macbride of Charlestown, South Carolina; who has lately given a more ample and detailed account of it, with specimens, to the Linnæan Society of London.

TUCKAREAH, in *Geography*, a town of Africa, in Sahara, anciently called Tigava; 106 miles S. of Algiers.

TUCKATPOUR, a town of Hindoostan, in the circar of Ruttunpour; 18 miles S.W. of Ruttunpour.

TUCKEA, a town of Hindoostan, in Goondwana; 10 miles W. of Nagpour.

TUCKER, in *Rural Economy*, a term sometimes applied to a person employed in the business of felling.

TUCKER, JOSIAH, D.D., in *Biography*, a controversial writer, was the son of a small freeholder in Wales, and born in the year 1711. Having completed his education at St. John's college, Oxford, and taken orders, he served a curacy at Bristol, and was promoted by bishop Butler, who made him his chaplain, to the rectory of St. Stephen's in that city. His residence at Bristol drew his particular attention to commercial matters, in reference to which he published, about the year 1747, "A brief Essay on the Advantages and Disadvantages which respectively attend France and Great Britain with regard to Trade;" which was followed by "Reflections on the Expediency of a Law for the Naturalization of foreign Protestants," published in two parts, 1751—2, and advocating liberal and enlarged principles. In these principles he espoused the cause of the Jews in two "Letters to a Friend concerning Naturalizations," 1753. The part he took on this occasion exposed him to much obloquy, and was the occasion of his being burnt in effigy by the populace. However, in 1755 he obtained the degree of D.D., and was made a prebendary of Bristol. His activity in promoting the election of Mr. Nugent, afterwards lord Clare, as a representative for Bristol, was recompensed in 1758 by the deanery of Gloucester. In the controversy occasioned by the petitioning clergy in 1771, he took a part, and published in 1772, "An Apology for the present Church of England, as by Law established;" in which, whilst he opposed their claims, he expressed his wish for the omission of the Athanasian creed in the church service, and for excusing students of the universities upon matriculation, and graduates in lay faculties, from subscription to the articles. In the same year he published "Six Sermons," on doctrinal points that were then much agitated. In 1773 appeared his Letters to Dr. Kippis's "Vindication of the Protestant Dissenting Ministers with regard to their late Application to Parliament," which were written with moderation and candour, and in which he seems disposed to unite the claims of the church of England respecting its own members, with liberal concessions to those who dissent from it. In 1774 he published his "Four Tracts, together with Two Sermons, on Political and Commercial Subjects;" in which he unfolded his whole plan for settling the dispute with America, deemed by both the contending parties extravagant; this was "to separate entirely from the North

American colonies by declaring them to be a free and independent people, over whom we lay no claim; and then by offering to guarantee this freedom and independence against all foreign invaders whatever." But he did not wish to concede the point of right in this controversy, as appeared from his publication in 1775, entitled "The respective Pleas and Arguments of the Mother Country and of the Colonies distinctly set forth; and the Impossibility of a Compromise of Differences, or a natural Concession of Rights, plainly demonstrated." Mr. Burke treated his scheme with some degree of contempt, and therefore he addressed to him one of three subsequent publications on this subject. The dean became ardent and irritable in the prosecution of this dispute, and allowed himself in the abuse of the colonists, and particularly of Dr. Franklin. In 1781, apparently deviating from the principles which he had avowed in more early life, he attacked Mr. Locke and his followers on the origin, extent, and end of civil institutions, in his "Treatise concerning Civil Government." The advocates of Locke retorted upon him with warmth, and perhaps with some degree of asperity; but "he might console himself (as one of his biographers says) by having his work quoted by lord Mansfield in the house of peers, with a fine eulogium on the talents of the author, whom he mentioned as a writer of the first class for sagacity and knowledge." Indulging his resentment against the Americans, and predicting consequences likely to result from their independence, which have not been verified by fact, he addressed to M. Necker, in 1782, a pamphlet entitled "Cui Bono? or, An Enquiry, what Benefits can arise either to the English or the Americans, the French, Spaniards, or Dutch, from the greatest Victories or Successes in the present War." In the "Preface" to this work, he undertakes to refute the opinions of the advocates for equal representation. In his subsequent commercial publications he declares himself adverse to all restrictions upon trade, and desirous of leaving it to regulate itself. Having resigned his rectory at Bristol to his curate, he resided at his deanery in Gloucester, and discharged the various duties of his office with exemplary assiduity. Although he was married, he left no issue. He lived to the advanced age of eighty-eight years, and died in 1799, by a paralytic stroke. *Gent. Mag. Month. Rev. Gen. Biog.*

TUCKER, the Rev. WILLIAM, one of the gentlemen of king Charles II.'s chapel, and precentor of Westminster Abbey, was a very judicious composer of choral music. Mr. Mason, in speaking of the full anthem, "O give thanks unto the Lord," by this ingenious dilettante, very truly observes, that "every syllable in this composition has its just length, and each part of a sentence its proper pause; it admits no perplexing alterations or unmeaning repetitions, but proceeds in one full, yet distinct strain, harmonically, yet intelligibly."

So many circumstances must concur in forming a complete musician among the lovers of the art, who have no other view in its cultivation than pure amusement, that however ardent their zeal and sublime their genius, if they have not been early initiated in the mysteries of counterpoint, and pursued its labyrinths with the perseverance of professional students, timidity, embarrassment, ignorance, and confusion, will appear in their scores at the first glance of a regular-bred composer. In general, their practice, reading of scores, experience, and application, are inferior to those of the meanest organist, or ripieno performer: disdainful to perform under parts, or to study them in the works of great masters, as soon as they know their gammut, their chief practice consists in solos and amusing melodies; so that they remain to the end of their lives unable to count rests, or
keep

keep time, with professional firmness and accuracy; and either totally neglecting or running away too soon from plain counterpoint to florid, a want of instruction and regular study appear in the bases they put to the slightest and most natural melodies.

TUCKER'S Island, in *Geography*, a small island in the Pacific ocean, so called by Capt. Wilson of the *Duff*, from one of the crew who left the ship there. N. lat. $7^{\circ} 22'$. E. long. $122^{\circ} 5'$.—Also, a small island near the coast of South Carolina. N. lat. $32^{\circ} 36'$. W. long. $80^{\circ} 16'$.

TUCKERTON, a sea-port of New Jersey, in Little Egg harbour.—Also, a town of Burlington county, New Jersey; 201 miles from Washington.

TUCKET, a word used by Shakspeare in "All's well that ends well," act iii. sc. 8. corrupted from *toccata*, Ital. a flourish.

TUCKIN, in *Agriculture*, the name of the fatchel that is sometimes used in setting beans in the field.

TUCKING-MILL, in *Rural Economy*, a name given in some places to a fulling-mill.

TUCKT HAZARA, in *Geography*, a town of Hindoostan, in Moultan; 10 miles N.W. of Toulomba.

TUCKUM, a town of the duchy of Courland; 33 miles E. of Goldingen.

TUCKUSH, a small island in the Mediterranean, near the coast of Algiers, opposite a town of the same name on the continent; 12 miles E. of the Cape of Iron.

TUCKWAPOUR, a town of Hindoostan, in Oude; 14 miles S. of Bahraitch.

TUCKYPARA, a town of Bengal; 24 miles S. of Burdwan.

TUCOPIA, an island in the Pacific ocean, discovered by Quiros in 1606. He could not find any anchoring place, but was near enough to converse with the inhabitants, who offered him a present of nuts, and a piece of cloth made of palm-leaves; and they saw some plantations of fruit-trees. S. lat. 12° . E. long. 167° .

TUCRI, a town of Naples, in the county of Molise; 13 miles E.S.E. of Molise.

TUCUBI, or **TACUBIS**, in *Ancient Geography*, a town of Spain, in Lusitania.

TUCUMAN, or **TACMA**, now called the *Intendancy of Salta*, in *Geography*, a province of South America, in the viceroyalty of Buenos Ayres, extending from 26° to 33° W. long., and from $22^{\circ} 30'$ to 30° S. lat.; bounded on the N. by Chicas and Tarija, on the E. by Chaco and Yapitzlaga, on the S. by Cordova, and on the W. by the Andes, which separate it from Chili. This province is now divided into those of Salta and Cordova. Estalla says that the province of Tucuman was the largest in America, extending from the corner called La Guardia to the river of Quiaca, 380 leagues; of which 314 are fertile lands with carriage-roads, and the remaining 66 barren country with horse-paths. As far as Jujuy the temperature is benign, inclining to the warm and humid, and travellers find much convenience and abundance of provisions. The territory of Tucuman is rich and well cultivated, especially towards Chili, with some desert cantons upon the Magellanic side. The soil is sandy, and almost without stones, but very well watered, producing plenty of cotton, wild cochineal, wax, honey, paltel for dyeing, and a variety of fruits, with roots, Indian wheat, &c. They likewise breed here vast numbers of cattle, and have plenty of deer, and other game, with lions and tygers in their woods. The sheep here are very large and strong, but their wool is fine, and the inhabitants use them also for carriage. The natives were formerly naked, but since somewhat civilized by the Spaniards, and covered with their woollen and cotton manu-

factures; they live in small villages very close to one another. Its two principal rivers are the Dolce and Salado, *i.e.* the sweet and salt ones, besides innumerable smaller streams. In this province a kind of large crow is hunted, and an animal between a hare and rabbit. Here are said to be twelve kinds of bees, all producing honey of different qualities. The chief drink is called "Aloja," but Estalla does not mention its ingredients, but it is the *chica* made of maize. Throughout the province there is, as he says, no person so poor that he does not kill a cow or a heifer every day for the support of his family.

In the jurisdiction of San Miguel de Tucuman (see *St. MIGUEL*) is found the tree called "Quebracho," a name derived from its extreme hardness, which breaks the axe; the outer part being white and the centre red, and the latter, after being steeped in water, becoming hard and heavy like stone. In the same province are found spiders, which weave a thread of great strength and beauty. About a league to the south of San Miguel is the salt river called Sali. This town is remarkable for the manufacture of a kind of cars, used in transporting articles of commerce. The city of Salta (see *SALTA*) is crowded with merchants in February and March, though in the rainy season the roads are scarcely passable: the surrounding vale of Lerma produces excellent wheat, and abundant pasturage, but the poor are tormented with a kind of leprosy. The graziers, who deal in mules, and the merchants, chiefly Galicians, are robust, and the women are remarkable for their beautiful complexions and flowing hair; yet the sex, after twenty-five years of age, is subject to a swelling in the throat, called "Coto," producing an effect very strange and ridiculous, and which is carefully concealed with neckcloths, but attended with no disease or abbreviation of life. This deformity seems to belong to the goitre, a disorder formerly believed to be restricted to the mountains; but as Salta is situated in a valley, it is probably produced by the water or the fogs.

TUCUMANITA, a town of South America, in the province of Tucuman; 10 miles W. of St. Miguel de Tucuman.

TUCUYO. See *TOCUYO*.

TUCUYO, or *Tocuyo*, a river of Venezuela, which runs into the sea, N. lat. $10^{\circ} 38'$. W. long. $69^{\circ} 22'$.

TUDDER, a town of France, in the department of the Roer; 11 miles S. of Ruremond.

TUDDINGTON. See *TODDINGTON*.

TUDELA, a town of South America, in the kingdom of New Granada.—Also, a town of Spain, in the province of Leon; 5 miles E. of Valladolid.—Also, a town of Spain, in Navarre, on the Ebro; taken from the Moors in 1118; 4 miles S. of Pamplona. N. lat. $42^{\circ} 11'$. W. long. $1^{\circ} 40'$.

TUDER, **Todi**, in *Ancient Geography*, a town of Italy, in Umbria, to the S.W., among the mountains. From being a small place it became a Roman colony.

TUDERGA, in *Geography*, a town of Asiatic Turkey, in Natolia; 32 miles N.N.E. of Eski-Shehr.

TUDES, in *Ancient Geography*, a town of Spain, on the route from Bracara to Asturica, between Limia and Burbida. Anton. Itin.

TUDWAY, **DR. THOMAS**, in *Biography*, an ecclesiastical composer, educated under Dr. Blow, at the same time as Turner and Purcell. He was one of the second set of children of the chapel-royal after the Restoration. Soon after quitting the chapel-royal, he was received into the choir at Windsor as a tenor singer. Tudway, like his fellow-disciples, endeavoured to distinguish himself early as a composer, and has inserted into the Collection of Church Music which he transcribed for lord Harley, an anthem of
lis

his own composition, in 1675, when he was only nineteen, with six more of his early productions for the church, of which the counterpoint is but ordinary and clumsy. The words are likewise often inaccurately accented: he throws the accent of the word *triumph* upon the second syllable, like Handel; which, though but slight, is, indeed, the only resemblance between them.

In 1681, at twenty-five years of age, he was admitted to the degree of bachelor of music at Cambridge. And in 1705, upon her majesty queen Anne visiting that university, he composed an anthem, "Thou, O God, hast heard my vows," which he performed as an exercise for a doctor's degree; and, after receiving that academical honour, he was appointed public professor of music in that university.

Dr. Tudway composed an anthem, "Is it true that God will dwell with men upon the earth?" on occasion of queen Anne going to St. George's chapel, at Windsor, for the first time; and for this, and other occasional compositions, was permitted to style himself organist and composer extraordinary to that princefs.

In the latter part of his life Dr. Tudway resided much in London, and was patronized by the Oxford family. The valuable scores of English church music, in six thick volumes quarto, which are now in the British Museum, N^o 7337, were transcribed by himself at this time.

It is said that he used to meet Prior, sir James Thornhill, Christian the engraver, Bridgman the gardener, and other eminent artists, at lord Oxford's, once a week; and that sir James drew all their portraits with a pencil, among which is Tudway playing upon the harpsichord. Prior wrote sportive verses under these drawings, which were in the possession of Mr. West, the late president of the Royal Society.

Dr. Tudway's picture is in the music-school at Oxford: at Cambridge he was longer remembered as an inveterate punster, than a great musician.

In the time of the duke of Somers's chancellorship at Cambridge, during the discontents of several members of that university at the rigour of his government and paucity of his patronage, Tudway, himself a malcontent, and joining in the clamour, said, "the chancellor rides us all, *without a bit in our mouths.*" Nor did the wicked sin of punning quit him even in sickness; for having been dangerously ill of a quincy, and unable, for some time, to swallow either food or medicines; the physician who attended him, after long debates and difficulties, at length turning to Mrs. Tudway says, "Courage, madam! the doctor will get up May-hill yet, he has been able to swallow some nourishment:" the doctor cries out, "Don't mind him, my dear, one *swallow* makes no summer."

In the Annals of Queen Anne's reign, 1706, vol. v. p. 333. the following relation of Tudway's disgrace at Cambridge is unaccountable, and mentioned no where that we know of but in these Annals by Boyer, printed in 1707.

"About the latter end of July, the vice-chancellor of the university of Cambridge, having received information that Mr. Tudway had spoken words highly reflecting on her majesty, he convened the heads of houses at the regent's, where Mr. Tudway was cited to appear, which he did, and the words being positively proved upon oath, they all unanimously found him guilty, and proceeded to sentence, which was solemnly pronounced in the presence of the heads, and entered as an act by the public register, as follows: 'That Mr. Tudway be suspended of all degrees taken and to be taken; that he be deprived of his organist's place in St. Mary's church, and of his professorship of music in the university.'

"Mr. Tudway being of King's college, the provost deprived him of that place in the college, and the register there likewise entered his deprivation; and the butler and pantler took his name off the tables in their offices. The master of Pembroke-hall, where he was also organist, in like manner deprived him of that office, and the register there entered it accordingly, so that he was deprived of all he held in the university of Cambridge."

We thought it probable that this sudden paroxysm of disloyalty may have been brought on by the dismissal of his patron Mr. Harley; but that did not happen till a year after. In the account which Tudway gives of himself in his prefaces to the Collection of Choral Music which he made for lord Harley, he speaks with the greatest reverence of the queen, assumes the title of her majesty's composer extraordinary, and speaks of anthems which he composed expressly for her chapels-royal at St. James's and at Windsor. It was perhaps only for the sake of an irresistible pun which offered itself in conversation, that he twisted some sentence or expression into treason, or at least into disrespect; for he recovered all his places, had the degree of doctor in music conferred upon him when queen Anne visited Cambridge, and lived and died music-professor in that university.

TUE IRON, are cones of cast-iron with an aperture to receive the nozzle of smiths' bellows, to prevent the heat of the fire injuring them.

TUECH, in *Geography*, a town of France, in the department of the Ardèche; 18 miles N.W. of Viviers.

TUEL, among *Sportsmen*, denotes the fundament of a horse, or wild beast.

TUELCAR, in *Geography*, a town of Hindoostan; 20 miles N.E. of Travancore.

TUELCOS, savages in the southern part of the American continent, or Terra del Fuego, residing on the Rio Negro or Colachel, N. of the Moluches or Tehuels. (See PATAGONIA.) The Tuelcos are a numerous tribe. They are divided into horse and foot, and are dreaded by the Indians of the Pampas, who amount to five or six thousand souls, with about one thousand warriors; and they often join in attacks on the frontier. Their attachment to war is such, that in case there be no foreign enemy, one *aduar* or village of tents will make war against another. Their lances are generally of strong wild reeds, and they are so dangerous on horseback, that the Spanish fusileers cannot sometimes stand the charge. The head is large and makes a terrible wound, by which, as they express it, they may see through their enemies. In these rencounters the Spanish cavalry prefer the spear, sabre, and pistols, the carabine and cartouch-box being of little avail. The *bola* or bowl is of stone or metal, about the size of those used in billiards; this is fixed to a string about a yard long, and at the extremity, by which it is held, there are some feathers of the American ostrich or cassowary. This string is turned round the head like a sling, and with it they can strike with certainty at a sufficient distance. The bolas or bowls have been adopted by the Spanish soldiery; being two globes of stone or hard wood fastened at the ends of a string, and serving not only to enthrall the wild horses and cattle, but also to annoy their enemies. Poniards, sabres, and cutlasses are more usual among these savages than the bow or the sling. During war they are all cavalry; and they chuse for their general the most robust and valiant of their chiefs. They paint their bodies, particularly the face and hands, with black and red, not only to inspire terror, but to serve as a mark, that they may not be singled out by the enemy. The tents or hovels of all the tribes of savages are similar, being composed of hides of horses, beeves, or other animals, and arranged in streets.

The tent of the cazique is distinguished by painting and superior arrangement. The common food is the ostrich and cassowary, and a kind of armadillo; but their chief regale is the flesh of the mare or foal. In case of urgent thirst, they will drink warm blood, which they draw from their horses. The want of food is supplied with bones, grease, and dry dung. The use of clay is universal, in making various sorts of earthenware. They eat salt with their meat roasted or boiled, and are no strangers to some preparations of milk. The Serranos or mountaineers make a paste of carobs, of which they form their bread in loaves, called *pateis*. In Tuelca, and in other southern parts, the guanaco abounds, the flesh of which, with that of a kind of hare, forms the chief food of the Tehuels or Patagonians. But the flesh is eaten half raw. The dress of both sexes is a mantle, extending to the mid-leg, with an opening for the arms, and girt with a leathern belt. On horseback, the skirts are drawn together so as to form loose breeches. These clothes are sometimes made of wool, but they prefer the skins of the guanaco, lion, and tiger; and the Patagonians use those of seals. With the feathers of the ostrich they make fans, and ornaments for brides, staining them of various colours. These articles they exchange for tobacco, brandy, and the tea of Paraguay, which with them are articles of luxury. Hard-ware and also coarse woollen are much esteemed. The brandy they exhaust at once, making no reserve. The herb of Paraguay, after having served once, is dried, again used, and finally eaten. The tobacco is smoked in a wooden pipe. The caziques or captains have several wives, but monogamy generally prevails. Jealousy is little known, and a payment in kind is the usual penalty for adultery. Homicides and duels are frequent, and these latter open conflicts are deemed honourable; but treason and assassination are capital crimes, and the guilty are put to death with lances or wooden clubs, nor are there any churches to protect murderers. Although all are thieves, they will make war on a tribe that protects robbers. In every tented village, there is a person revered as a forcerer and physician. In the night they have no light but that of fire, which they procure by friction of hard wood. Their conflicts are so violent, that few are seen without marks of deep wounds. The desire of revenge passes from one generation to another. They celebrate their victories with dancing, singing and drinking; painting and adorning themselves for such occasions. Their number has been greatly reduced by the small-pox. They appear to have no religion; but contemplate with reverence the sun, which they call "Antu," and the moon "Quien." The only ceremony that has any aspect of religion is, when they kill a beeve, their sprinkling some of the blood on the ground, with the formulary, "Give me to eat, me, and my people." They think that the moon confers strength and valour; and when the new moon appears, they present their infants, and say "make them strong." They also pray to Quien for courage and strength to avenge injuries, and destroy their enemies. Ineffectual attempts have been made by popish missionaries for their conversion. The missionaries were slain and the few Christians dispersed. Such is Estalla's account of these savages.

TUELLA, LA, a town of France, in the department of the Dora; 16 miles W. of Aosta.

TVER, a town of Russia, and capital of a government, at the conflux of the Tvertza and Volga. It is the see of an archbishop, and, according to Busching, contains seventy churches and convents. Tver, from a small fortress, became a town, and increased in population and wealth to fo great a degree, as to become the metropolis of an independ-

ent sovereignty, called from the town the duchy of Tver. Tver is divided into the Old and New Town; the former, situated on the opposite side of the Volga, consists almost entirely of wooden cottages; the latter was, a few buildings excepted, burned down in the year 1763. The empress was no sooner informed of this calamity, than she ordered a regular and beautiful plan of a new town to be sketched by an eminent architect; and enjoined that all the houses should be reconstructed in conformity to this new model. She raised, at her own expence, the governor's house, the bishop's palace, the courts of justice, the new exchange, the prison, and several other public edifices; and offered to every person who would engage to build a house with brick, a loan of 300*l.* for twelve years without interest. The money advanced by her majesty upon this occasion amounted to 60,000*l.* and she afterwards remitted one-third of this sum. The streets, which are broad and long, issue in a straight line from a square, or rather an octagon, in the centre: the houses of this octagon, and of the principal streets, are of brick stuccoed white, and form a very magnificent appearance. There is an ecclesiastical seminary at Tver, which is under the inspection of the bishop, and admits 600 students. In 1776, the empress founded a school for the instruction of 200 burghers' children; they are taught to read, write, and cast accounts, and a few of them are trained to handicraft trades. In June 1779, an academy was also opened in this town for the education of the young nobility of the province, at the charge of the same imperial patroness. It admits 120 students, who are instructed in foreign languages, arithmetic, geography, fortification, tactics, natural philosophy, music, riding, dancing, &c. Tver is a place of considerable commerce, which it owes principally to its advantageous situation, being near the conflux of the two rivers, along which are conveyed all the goods and merchandize sent by water from Siberia, and the southern provinces towards Petersburg. Pallas speaks of the delicious sherbet, with which travellers are regaled at all seasons of the year; 72 miles N.N.W. of Moscow. N. lat. 56° 50'. E. long. 36° 14'.

TVERSKOE, a government of Russia, bounded on the N. by Novgorodskoe, on the E. by the government of Jaroslavl and Vladimir, on the S. by Moskovikaia and Smolenskoe, and on the W. by Pskovskoe; about 180 miles long, and 100 broad. This part of Russia produces abundance of wheat, barley, rye, oats, buck-wheat, hemp, flax, and all kinds of vegetables. In the forests are to be found oaks, birches, alders, poplars, ashes, pines, &c. At some distance there are elks, bears, wolves, foxes, wild goats, martens, ermines, squirrels, and marmots. There is also plenty of eagles, hawks, cranes, herons, swans, and all kinds of small game. N. lat. 55° 36' to 58° 30'. E. long. 33° to 38°.

TVERTZA, a river of Russia, which runs into the Volga, at Tver.

TUERYE, a town of France, in the department of Mont Blanc; 4 miles E. of Chambéry.

TUESAH, a town of Hindoostan, in Berar; 21 miles E. of Ellichpour.

TUESDAY. See *HÖKE-Day*, *TUISCO*, *TYR*, and *WEEK*.

TUESDAY Bay, in *Geography*, a bay on the coast of Terra del Fuego, in the Straits of Magellan. S. lat. 52° 53'.

TUESIS, in *Ancient Geography*, a town of the isle of Albion, belonging to the Voconagi, according to Ptolemy.

TUFA, in *Mineralogy and Geology*, a stone formed by depositions from springs or rivulets containing much earthy matter

matter in solution, or mechanically suspended. Tuffa is also formed by the concretion of loose volcanic dust or cinders cemented by water; and also by the consolidation of mud thrown out of volcanoes. The disintegration and subsequent consolidation of basaltic rocks forms a third kind of tuffa, which the German geologists call *trap-tuff*.

Calcareous tuffa is formed in large quantities in many lime-stone districts. The waters which issue from calcareous rocks rise to the surface impregnated with a considerable quantity of carbonate of lime. On exposure to the air and light, they deposit their contents on whatever substance is presented to them, and in the beds of rivulets form solid incrustations, sometimes of great extent, and many yards in thickness. The stone thus deposited is always more or less porous or vesicular, and contains portions of plants and fresh-water shells which it has enveloped. This stone hardens by exposure to the air, and is frequently employed in architecture. It is not a little remarkable, that St. Peter's church, and some of the grandest works of ancient and modern architecture at Rome, are formed of a species of calcareous tuffa, called by the Italians *travertino*. In the vicinity of Stroudwater, in Gloucestershire, many of the springs that issue from the feet of the Cotswold hills make large depositions of calcareous tuffa. At one situation, called the Rock-mill, a bed of this stone, more than thirty feet in thickness, has been worked formerly for building, as appears from some of the oldest edifices in the neighbourhood, which proves the hardness and durability of this stone. In Derbyshire, and all the calcareous districts in England, beds of tuffa are formed by similar depositions. Beds of tuffa are very common among the mountains which terminate the high vallies of the Alps, and there are promontories of calcareous tuffa in the vallies of Switzerland. It was generally supposed that the particles of lime-stone were held in solution by carbonic acid in the water, and that the evaporation of this acid, after exposure to the air, occasioned the deposition of the calcareous particles. Dr. Kidd, of Oxford, has made some experiments on the solvent power of simple water on carbonate of lime, which he finds to be much greater than was generally supposed. If, says he, half an ounce of distilled water be agitated for a short time in contact with pulverized carbonate of lime, it will be found, on the addition of oxalate of ammonia, that the water will be rendered turbid. It appears, therefore, that when a spring, charged with as much calcareous matter as it is capable of holding in solution, has issued from beneath the earth, the requisite quantity has been diminished by evaporation, the particles of calcareous matter are liberated and deposited.

Calcareous tuffa forms so rapidly in some situations, as entirely to close up the passage in canals and aqueducts through which calcareous waters flow. Many hot springs deposit tuffa in abundance: the heat appears to assist the solvent power of water, and to accelerate the precipitation of its contents by a more rapid evaporation from the surface.

The travertine, or travertino, is the most remarkable of all the calcareous tuffas, as it has been employed for the construction of some of the proudest monuments of architectural genius in ancient and modern times. Of this stone, Breislak, an Italian mineralogist, gives the following interesting description.

"The Anio, or Tiverone, which descends from the Apennines of Viscovaro and Subiaco to the east of Rome, crosses Tivoli before reaching the plain where it unites with the Tiber. All the land through which the Anio passes in Tivoli, whether near the great cascade or the smaller ones, is filled with masses of a calcareous stone, produced by the de-

position of its waters. Sometimes a piece of rush or reed, or other vegetable matter, is the first point to which the calcareous earth begins to attach itself. It generally deposits in concentric layers, and has the hardness and fibrous tissue of alabafter. These layers are nevertheless separated by a bed of calcareous earth, friable, yellowish, and very fine. At the foot of the mountain of Tivoli, where the Anio enters the plain which extends to Rome, are the quarries of travertine. This calcareous rock is deposited in horizontal beds: its colour is yellowish-white, its grain earthy, fracture uneven, and its hardness far surpasses that of those calcareous masses produced by the Anio in the neighbourhood of Tivoli. Cavities, where the calcareous substance has assumed a sparry grain and stalactitic form, are common in travertine. Sometimes these cavities have been since filled by a calcareous stalactite, whiter, of a finer grain, and harder. This is the origin of those white spots, the regularity of which has caused them to be mistaken for marine bodies enveloped in its paste. Travertine contains no remains of marine substances, but sometimes it affords fragments of vegetables. It is not doubted but travertine owes its origin to the depositions of the Anio; depositions which in the plain may have formed a more solid and compact rock: because its current was less rapid, and perhaps its waters more stagnant in several places. Not far from the quarry of travertine is the Solfatara, so called on account of the great heat of its waters, which abound in sulphuric hydrogen gas, and form a considerable sediment of calcareous matter. A cardinal d'Este caused the canal to be dug which conveys the waters of the lake to the Anio. The calcareous depositions are there so abundant, that if every three years it was not cleaned out, it would be closed up, notwithstanding its depth and breadth. The water which runs in the canal, on meeting with the bits of rush or other bodies, covers them with a white calcareous crust, two or three lines in thickness. These incrustations are known by the name of *comfits of Tivoli*. Before this passage was opened, the overflowings to which the lake is subject were often so considerable, that the water spread over the neighbouring grounds, and formed on their surface a stony crust. The waters of the lake so charged with calcareous earth, uniting with those of the Anio in the floods which their union must produce, have themselves contributed to the formation of travertine. I do not think that the Anio alone would have been capable of forming the quantity which is found in that rock.

"Independent of the immense quarries worked by the ancients, there are besides others of such vast extent, that they may supply the demands of many ages. The lake of Solfatara seems to have greatly assisted in the formation of this rock. Its water being charged with gaz, explains the great number of hollows which travertine presents. It proves, that when the rock hardened, a gaz has at the same time escaped in several places, which has prevented the approximation of its parts, which were still soft. As often as the interior of a mass of rocks presents cavities without any indication of foreign substances which might have opposed the union of its parts, I conceive their origin may be attributed to the escape of gaz at the moment when the substance was passing from a state of softness to solidity, by cooling or drying. From what I have just shewn, it follows that the travertine or rock of Tiber or of Tivoli is a carbonate of lime, formed by the depositions of the Anio and the Solfatara of Tivoli. The Roman artists give the name of travertine only to the stone taken from the quarry situated at the foot of the mountain of Tivoli. The lithologists, less slaves

to locality, bestow it on all calcareous rocks which possess the grain, tissue, and formation analogous to that of the travertine of Tivoli. If the ancient and modern Romans have employed this stone in the most noble structures, they have but followed the examples of other people before them. The temples of Pæstum, the most ancient monuments that are known after the pyramids of Egypt, were built with a travertine formed by the deposition of waters which still exist in that district. This stone, when long exposed to the air, acquires a considerable degree of hardness; its colour assumes a reddish tinge pleasing to the eye, and which in no small degree contributes to bestow on monuments of antiquity that majestic character which is so striking. Buch justly observes, that the temples of ancient, and the churches and palaces of modern Rome, would infinitely have lost of their grandeur and majesty, if the bold genius which erected them had not met with such a material as travertine. They would have lost much of their solidity, if the formation of tufa had not given rise to the discovery of puzzolana. The chance which collects in its vicinity the materials most fit for architecture, travertine and puzzolana, was not a little happy for Rome. The mortar or cement which results from a mixture in just proportion of that ferruginous volcanic earth with lime, so much surpasses in hardness all other known cements, that the exportation of puzzolana by the Tiber and the port of Ostia is become a branch of trade."

According to Ulloa, there are fountains of hot water at Guaniavelica, in South America, which form abundant beds of stone in a very short time, of sufficient hardness to be used for building-stone. Probably these springs contain siliceous, as well as calcareous earth, silic having been found in the waters of most of the hot springs that have had their waters analysed. Siliceous tufa is deposited from the boiling springs in Iceland and the Azores, consisting almost entirely of pure silic.

Basaltic tufa consists of fragments of the various kinds of rocks denominated trap, cemented by a loose argillaceous basis formed from decomposed basalt. Sand-stone fragments, and even pieces of wood, sometimes occur in basaltic tufa. The masses of stone in this species of tufa are from the size of a pea to several hundred weight. The larger fragments generally occupy the lower part of the bed. Sometimes beds of coarse and fine tufa alternate with each other, and sometimes they alternate with basalt. The position of the beds is generally horizontal, their thickness varying from a few inches to several fathoms. A considerable portion of Arthur's seat near Edinburgh is composed of this rock. It occurs also in various basaltic districts.

Volcanic tufa is formed by the earthy powder, improperly called ashes, which is thrown out of volcanoes, and subsequently consolidated by the agency of water. It is intermixed with fragments of lava and scoriæ, lime-stone, pumice, and other rocks. The colour is brown or red, and sometimes spotted. Volcanic tufa is found of different degrees of compactness and hardness; sometimes it forms a durable but light stone, suited for architectural uses.

Beds of volcanic tufa alternate with basalt and lava in Iceland, and according to the account of sir G. Mackenzie, hills of volcanic tufa occur in that country one thousand feet in height. It also constitutes beds of great magnitude in some of the mountains. Lava and beds of tufa, he observes, constantly accompany each other in every part of the island. The mud which issues during volcanic eruptions in South America, forms beds of great extent, which become hard by exposure to the air, and form a species of tufa. See VOLCANO.

TUFAN, in *Geography*. See SIFAN.

TUFARA, a town of Naples, in the province of Capitanata; 5 miles W. of Volturrara.

TUFECESI, a body of the spahis, or horse, in the service of the grand signor.

TUFFE', in *Geography*, a town of France, in the department of the Sarthe; 7 miles S.W. of La Ferté Bernard.

TUFFEN, a town of Switzerland, in the canton of Zurich; 13 miles N. of Zurich.

TUFFENBACH, a town of the duchy of Stiria; 9 miles S. of Judenburg.

TUFFO, in *Botany*, a name given by the people of Guinea to a plant common in that country, and used in decoction to wash sore eyes with. It is of the sun-flower kind, and is called by Petiver, *flos folis Guineensis folio scabro flore minore*. It much resembles some of the American sun-flowers. Phil. Trans. N° 232.

TUFFOFA, in *Geography*, a town of Africa, on the Slave Coast; 40 miles W. of Assom.

TUFFOONS, in *Meteorology*. See TONQUIN.

TUFT, in *Botany* and *Vegetable Physiology*, technically implies a head of flowers, *capitulum*, of which each individual is not sessile, but elevated on either a simple or subdivided partial stalk, though all together composing a dense roundish mass. Perhaps tuft would be better retained in English as synonymous to *fasciculus*, in which sense it is often practically used, for any small number of flowers, on short aggregate or subdivided stalks, springing from the bosoms of leaves, or the divisions of a panicle or corymb. In like manner this term is applied, with more laxity, to little bundles of leaves, hairs, &c. on different occasions.

TUFTED DUCK, in *Ornithology*. See *Tufted Duck*, or FULIGULA under DUCK.

TUFTED Vetch, in *Agriculture*, a term commonly applied to a perennial sort of this plant, which is highly deserving of cultivation by the farmer, for either meadow or pasture land. It is frequently found mixed with the other grasses, in rather moist ground. See VETCH, and VICIA Cracca.

TUFTONBOROUGH, in *Geography*, a town of New Hampshire, on the north side of Winipiseogee lake; 32 miles N. Concord.

TUG, BAVIN, in *Agriculture*, a sort of carriage used in some districts for loading bavins or faggots, and sometimes other kinds of field produce. It is so made as to be capable of carrying a hundred and fifty faggots, each four feet in length, and three feet in girth, without being over top-heavy, so as to be liable to turn over in bad roads. It is much used in the weald of Kent, and some other counties.

TUGELOO, in *Geography*, a town of the state of Georgia; 95 miles N.W. of Augusta. N. lat. 34° 36'. W. long. 83° 21'.—Also, a river of the state of Georgia, one of the branches of the river Savanna, which joins the Keowee; 28 miles N.W. of Petersburg.

TUGGA, a town of Tunis; 20 miles S.W. of Cairoan.

TUGGALA, or TEGLA, a town of Africa, in Kordofan; 150 miles W.S.W. of Sennaar.

TUGGEN, a town of Switzerland, in the canton of Glarus; 5 miles S.W. of Uznach.

TUGGURT, a town of Africa, in the kingdom of Tunis; 60 miles S.W. of Tunis.—Also, a town of Africa, in Nigritia, capital of a district called Wadrag; 360 miles N.E. of Tombuctoo. N. lat. 20° 30'. E. long. 6°.

TUGGURT, or **TOCORT**, a town of Algiers. It was formerly under the protection of the Turks, and paid a trifling acknowledgment. The inhabitants being disgusted with the conduct of their masters, revolted; but were reduced to obedience, the town taken, and great numbers of them put to the sword; 240 miles S.S.E. of Algiers. N. lat. $32^{\circ} 40'$. E. long. $5^{\circ} 50'$.

TUGIA, in *Ancient Geography*, a town of Spain, upon the route from Castulo to Malaca, between Castulo and Traxinum. Anton. Itin.

TUGMA, a town of India, on the other side of the Ganges and near it, with the title of Metropolis, according to Ptolemy.

TUGPINS, in *Artillery*, are the iron pins which pass through the fore-ends of the shafts of the army carts, to fasten the draught chains for the fore-horses.

TUGUESA, in *Geography*, a town of South America, in the province of Darien; 20 miles N.E. of St. Maria.

TUGULIAN, a town of Russia, near the straits which separate the continent of Asia from America. N. lat. $65^{\circ} 54'$. E. long. $189^{\circ} 14'$.

TUGUS, in *Botany*, the name of a sweet aromatic plant, growing up sometimes to eight or nine cubits, much esteemed in the eastern parts of the world, and supposed by father Camelli, who very strictly compared it with the accounts given by Dioscorides and the ancients of their amomum, to be that very plant. The clustered manner of growing of the fruit, together with its oblong shape, and the aromatic taste of the seeds, seem greatly to countenance this opinion.

Each fruit of the tugus contains five or seven seeds; these are of an oblong figure, of a reddish colour, and of an agreeable aromatic taste, but not too acrid. They are much sought after by birds, insects, and field-mice.

The natives seem as fond of these as the ancients were of the amomum; and the young women string them on threads, and wear them as bracelets; sometimes they make the bracelets of the seeds alone; but more usually they string them alternately with pearls, and pieces of red coral: these bracelets they call *caropi*, as well as the fruit itself.

They are supposed, when worn by way of necklace, to keep off the effects of a bad air, and to preserve them from the bites of serpents, or the centipes. If not a preservative, they are, however, found, upon experience, to be a very good remedy in the last case, the common application for the bite of this animal being some of the seeds of the tugus chewed in the mouth to a sort of paste.

The cluster of fruit of the tugus, or true amomum, when newly formed and unripe, somewhat resembles the pseudo-amomum of Garcias; but this likewise wears off as they ripen. For Camelli's accurate description of this plant, illustrated by a figure, see Phil. Trans. N^o 248. p. 2.

TUGUZAK, in *Geography*, a river of Russia, which runs into the Uvelka, 12 miles E. of Troitz, in the government of Upha.

TUGWELL PLOUGH, in *Agriculture*, a light, easy-going, well-contrived implement of this kind, invented by a person of that name. It performs the work well, but not deeply, consequently is improper for weeding lands. It is sometimes termed the Gloucester plough. See **PLOUGH**.

TUHERE', in *Geography*, a town of Brasil; 45 miles E. of Paru.

TUHLOIS, a town of Sweden, in Tavastland; 15 miles N.E. of Tavasthus.

TUI, a river of South America, which runs into the Caribbean sea, N. lat. $10^{\circ} 36'$. W. long. $67^{\circ} 20'$.

TUI, in *Ornithology*, a name by which some call the parrotquet. See **PSITTACUS**.

The word is originally Brazilian; and the names of several of the Brazilian species of this bird, described by Marcgrave, have the word *tui* as a part of them; as the *tuiete*, the *tuipara*, the *tuitirica*, and the *tuiaputejuba*. See **TUIETE**, &c.

TUIAPUTEJUBA, the name of a Brazilian species of parrotquet, all over of a green colour, but in different shades, very deep on the wings, very pale, and somewhat yellowish on the belly, and of a faint colour all over the rest of the body; its tail is very long; it is about the size of a swallow; its eyes are large and black, and have a circle of yellowish-green feathers round them, and over the beak, which is black and crooked; and on his head he has one spot of gold-yellow feathers. See **PSITTACUS Pertinax**.

TUICEA, in *Geography*. See **PIROM**.

TUIETE, in *Ornithology*, the name of a Brazilian species of parrotquet, of the size of a lark, and all over of a pale green colour, variegated with blue; the origin of its wings is blue, as are also the ends of the wing-feathers, so that when the bird sits still, there is, as it were, a blue line seen running down each side; on its rump there is also a blue spot; its tail is but short; its beak is small, crooked, and of a pale red; and its legs and feet grey. See **PSITTACUS Passerinus**.

TUILERIE, or **TYLERY**, French; formed from *tuile*, *tile*, a *tile-work*; a large building, with a drying-place, covered at top, but furnished with apertures on all sides, through which the wind having admittance, dries the tiles, bricks, &c. which the sun would crack, before they be put in the kiln.

The garden of the Louvre is called the Tuileries, as being a place where tiles were anciently made, &c. But the term Tuileries does not only include the garden, but also a magnificent palace, whose front takes up the whole length of the garden.

The palace of the Tuileries is joined to the Louvre by a large gallery, which runs along the banks of the river Seine, and has its prospects on it.

The Tuileries was begun in 1564, by Catherine de Medicis, wife of Henry II., in the time of her regency; it was finished by Henry IV. and magnificently adorned by Louis XIV. The garden of the Tuileries was much improved by Louis XIII.

TUIPARA. See **TAIPARA**, and **PSITTACUS Tuipara**.

TUIROBIUS, in *Ancient Geography*, a river of Albion, on the western side, which lies along the Irish and Vergivian seas: universally agreed to be the river Tyvi.

TUIS, in *Geography*, a town of Italy, in Friuli; 10 miles W. of Udina.

TUISCO, or **TUISTON**, in *Mythology*, a name given by the ancient Germans to a celebrated person, whom they regarded, by the descendants of his son Man or Mannus, as the founder of their nation, and whom they represented to be the son of the earth, because they were ignorant of his origin. He gave them laws, polished them, established religious ceremonies among them, and obtained such a high degree of reputation, that after his death they ranked him among the gods. One of the principal ceremonies of his worship consisted in singing songs in praise of him. These songs, according to Tacitus, were very ancient: "Celebrant," says he speaking of the Germans, "carminibus antiquis Tuistonem Deum, terra editum, et filium Mannum, originem

nem gentis conditoreſque.” Cæſar thought that Pluto was honoured under this appellation. Accordingly he ſays (De Bell. Gall. l. 6.) “the Druids report that the Gauls are come from Diſ or Pluto, who after his death was worſhipped by both nations as their father and founder, by the Gauls under the name of Pluto, and by the Germans under that of Tuilton, and both of them erected ſtatues to him in the woods.”

Some have aſcribed the origin of the name Tueſday to this deity. See WEEK.

TUITIRICA, in *Ornithology*, the name of a Braſilian parroquet, which is a little larger than the common kind; all over of a fine beautiful green, but deeper on the back and wings than elſewhere; its beak is very hooked, and of a pale red; its eyes black, and its feet blue; its tail is but a little longer than the wings when cloſed. This is a ſpecies much eſteemed in the Braſils, as it eaſily learns to talk, and becomes fo tame as to eat out of any one’s mouth. See PSITTACUS *Tirica*.

TUK, in *Geography*, a town of Charaſm; 18 miles N. of Urghenz.—**Alfo**, a town of Egypt, on the left bank of the Nile; 6 miles N. of Nekkadé.

TUK el Eſſirat, a town of Egypt; 5 miles N. of Girgê.

TUKERA, a town of Hindooſtan, in Oude; 14 miles N. of Lucknow.

TUKKIKARI, a town on the eaſt ſide of the gulf of Bothnia. N. lat. 65° 26'. E. long. 25° 12'.

TUKLAKTAK, an iſland in the North ſea, near the coaſt of Eaſt Greenland. N. lat. 61°. W. long. 46° 20'.

TUKOOR, a town of Abyſſinia; 20 miles W. of Tcherkin.

TUKURN, a town of the duchy of Courland; 32 miles E.S.E. of Goldingen.

TUL, a town of Grand Bucharia; 36 miles S.E. of Anderab.

TULA, a city of Ruſſia, and capital of a government, on the Upha. According to Buſching, it contains 144 churches and convents. Near it are ſome iron mines, and in the city are manufactures of fire-arms, all ſorts of cutlery and other works in poliſhed ſteel, and leather. The number of merchants, including ſhop-keepers, is eſtimated at 4000, ſome of whom are very rich. The number of inhabitants is ſtated at 30,000: the population is increaſing, and beſides wooden buildings here are many of ſtone; 112 miles S. of Moſcow. N. lat. 53° 45'. E. long. 37° 39'.—**Alſo**, a town of Mexico Proper; 40 miles N. of Mexico.—**Alſo**, a river of Mexico, which runs into lake Chapala, near Zamora.

TULACUM, in *Natural Hiſtory*, a name given by the people of the Eaſt Indies to a ſpecies of the yellow orpiment, of the coarſer kind, variegated with red. They prepare this by ſeveral calcinations, and then give it internally in fevers, and many other diſorders, eſteeming it a ſort of panacea. They ſay that gold may be extracted from it, which is not improbable; for it is well known, that ſome of the Roman emperors did actually procure gold from one of the other kinds of orpiment, which is now found at Goffelaer in Saxony.

TULAH, in *Geography*, a town of Hindooſtan, in Bengal; 31 miles E. of Dacca.

TULBAGIA, in *Botany*, ſo named by Linnæus in honour of the Dutch governor Tulbagh, long reſident at the Cape of Good Hope, who ſent numerous plants from that country to profeſſor Burmann, and furniſhed Linnæus with ſeveral of its inſects, particularly a fine ſpecies of *Papilio*, which is called *Tulbaghia*, being one of the tribe of

Nymphales; ſee Syſt. Nat. ed. 12. v. 2. 775. Linn. Mant. 2. 148. Schreb. Gen. 215. Willd. Sp. Pl. v. 2. 33. Mart. Mill. Diſt. v. 4. Ait. Hort. Kew. v. 2. 213. Juff. 54. Lamarck Illuſtr. t. 243. Gærtn. t. 16.—Clasſ and order, *Hexandria Monogynia*. Nat. Ord. *Spathacea*, Linn. *Narciffi*, Juff.

Gen. Ch. corrected from the Linnæan MSS. *Cal.* Sheath of two oblong membranous valves, containing many ſtalked flowers. *Cor.* of one petal, inferior, falver-shaped; tube cylindrical; limb in fix equal, lanceolate, acute, ſpreading ſegments, ſhorter than the tube. Nectary of three, diſtinct or combined, cloven, acute, equal, fleſhy leaves, crowning the tube. *Stam.* Filaments fix, very ſhort, three in the throat of the tube, three lower down; anthers heart-shaped, acute. *Piſt.* Germen ſuperior, ovate; ſtyle cylindrical, much ſhorter than the tube; ſtigma turbinate, depreſſed. *Peric.* Capſule ovate, with three angles, three intermediate furrows, three cells, and three emarginate valves. *Seeds* few, oblong, obtuſe, triangular, compressed, corrugated.

Eſſ. Ch. Corolla falver-shaped; limb in fix equal ſegments. Nectary of three cloven ſcales, crowning the tube. Stamens three in the throat, three within the tube. Capſule ſuperior, of three cells and three valves. Seeds compressed.

1. *T. alliacea*. Green and Brown Tulbagia. Linn. Suppl. 193. Willd. n. 1. Ait. n. 1. Thunb. Prodr. 60. Curt. Mag. t. 806. (*T. capenſis*; Linn. Mant. 2. 223. Jacq. Hort. Vind. v. 2. 52. t. 115.)—Flowers drooping. Nectary of one leaf, in fix ſegments, as long as the limb of the corolla.—Native of low ſandy ſpots, near the town, at the Cape of Good Hope, flowering about July, and called by the Dutch coloniſts *Wilde Knoplook*, or Wild Garlick. It is ſaid to be uſed for diſorders of the breaſt, ſtewed in milk; but whether internally or externally, is not recorded. This ſpecies was ſent to Kew by Mr. Maſſon, in 1774. Jacquin had it a few years earlier. *Root* tuberous, with numerous fleſhy fibres. *Leaves* radical, erect, numerous, two-ranked, linear, bluntiſh, channelled; ſheathing at the baſe. *Stalk* ſolitary, about a foot and a half or two feet high, roundiſh, ſimple, bearing a looſe *umbel* of from ten to fifteen ſpreading or drooping *flowers*, whoſe *partial ſtalks* are near an inch and a half long. Each flower is rather ſmaller than a Harebell, oppreſſively ſweet in an evening. *Corolla* green or ſlightly glaucous. *Nectary* purpliſh-brown. *Seeds* black. The whole plant, when ever ſo ſlightly bruiced, exhales a rank ſmell of garlick, ſtill perceptible in the old dried ſpecimens of the Linnæan herbarium, whenever they are touched or moved.

2. *T. cepacea*. Purple Tulbagia. Linn. Suppl. 194, excluding the ſynonyms. Willd. n. 2. Ait. n. 2. Thunb. Prodr. 60.—Flowers erect. Nectary of three diſtinct cloven leaves, half as long as the limb of the corolla.—Native of the Cape of Good Hope, from whence it was ſent by Mr. Maſſon to Kew garden in 1795. A ſmaller plant than the foregoing, with much narrower *leaves*. *Umbel*, in our only ſpecimen, of ſeven *flowers*, whoſe *corolla* is purple, or crimſon. Of the colour of the *nectary* we cannot judge, but its length is about half that of the ſegments of the petal.

There can ſcarcely be a greater example of confuſion than the hiſtory of theſe two plants in the *Supplementum* of Linnæus, nor could it be unravelled without the original ſpecimens. If in the character and deſcription of the firſt, we read *folia ſubeniſiformia*, inſtead of *ſubſiliſiformia*, it may be intelligible. The *root* moreover, in one ſpecimen, *ſeems* bulbous. All the reſt anſwers tolerably well. In the
ſecond

second species, the *leaves* are perfectly linear; the *root* by no means fasciculate, except its fibres, being exactly like the former; to which the synonyms, even of Linnæus himself, undoubtedly belong. A figure of *T. cepacea* is much wanted. The plant is said to flower at Kew in April.

3. *T. hypoxidea*. Short-crowned Green Tulbagia.—Flowers drooping. Nectary very short and obtuse. Segments of the limb of the corolla taper-pointed.—This hitherto non-descript species flowered in March 1792, in the stove of Messrs. Lee and Kennedy, of Hammersmith, who received the root from Holland. There can be little doubt of its having been brought to that country from the Cape of Good Hope. The *leaves* are linear and very narrow, about one-fourth the breadth of *T. alliacea*. The *inflorescence*, as well as the posture and general aspect of the *flowers*, most resemble that species. The *corolla* is green, but its segments more taper-pointed, and full as long as the tube; while the *nectary* is extremely short and blunt, rising but little above the mouth of the tube, and consisting, if we mistake not, of three undivided lobes.—Mr. Sowerby made a drawing of this species at the period above-mentioned, which, though now mislaid, may one day probably be given to the public.

TULBAGIA, in *Gardening*, contains plants of the tender, herbaceous, exotic kind, among which the species cultivated are, the alliaceous or garlic tulbagia (*T. alliacea*); and the cepaceous or onion tulbagia (*T. cepacea*).

Method of Culture.—In each of these sorts, the young plants may be increased by sowing the seeds, slipping the branches, and offsets from the roots.

The seeds should be sown while fresh in pots filled with light mould, and be plunged into a tan hot-bed any time in the autumn or spring seasons, when they will soon begin to grow. And the slips and offsets may be planted and managed in the same way. The young plants in all the cases must constantly remain in the stove, and have water occasionally given them.

Both these plants afford an agreeable diversity in stove collections.

TULBING, in *Geography*, a town of Austria; 4 miles S.S.E. of Tuln.

TULCZA, a town of European Turkey, in Bulgaria, on the south side of the Danube, opposite Ismail. In the year 1771, this town was taken by the Russians, and again in 1790.

TULCZIN, a town of Russian Poland; 12 miles S.W. of Braclaw.

TULEBRAS, a town of Spain, in Navarre, on the Queios; 7 miles from Tudela.

TULIAN, a town of South America, in the province of Cordova; 110 miles N.W. of Cordova.

TULIPA, in *Botany*, an acknowledged barbarous name, said to be of Persian origin, like the celebrated and popular flower which bears it. The Persian word from whence, with a very little alteration, this name is taken, seems to be nearly synonymous, in that language, with a turban; nor is this article of dress, in a Persian of rank, unlike the swelling form of a tulip.—Linn. Gen. 165. Schreb. 220. Willd. Sp. Pl. v. 2. 96. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 2. 248. Sm. Fl. Brit. 361. Prodr. Fl. Græc. Sibth. v. 1. 229. Juss. 48. Tourn. t. 199, 200. Lamarck Illustr. t. 244. Gært. t. 17.—Class and order, *Hexandria Monogynia*. Nat. Ord. *Coronaria*, Linn. *Lilia*, Juss.

Gen. Ch. *Cal.* none. *Cor.* bell-shaped, inferior, of six ovate-oblong, concave, erect, deciduous petals. *Stam.* Filaments six, awl-shaped, much shorter than the corolla,

taper-pointed; anthers oblong, quadrangular, erect, versatile, distant. *Pist.* Germen superior, large, oblong, bluntly triangular; style none; stigma with three prominent angles, or three divided lobes, permanent. *Peric.* Capsule triangular, somewhat elliptical, of three cells, and three ovate valves fringed towards the edges. *Seeds* very numerous, flat, semicircular, lying horizontally over each other, in a double row, with scales of the same shape (or barren seeds) between.

Eff. Ch. Corolla bell-shaped, of six petals. Style none. Capsule superior, of three cells. Seeds flat. Calyx none.

1. *T. sylvestris*. Wild Yellow Tulip. Linn. Sp. Pl. 438. Willd. n. 1. Fl. Brit. n. 1. Engl. Bot. t. 63. Fl. Dan. t. 375. Curt. Mag. t. 1202. Redout. Liliac. t. 165. (*T. bononiensis*; Ger. Em. 138.)—Flower solitary, somewhat drooping. Leaves lanceolate. Stigma triangular, abrupt, slightly three-cleft. Stamens hairy at the base. Petals acute, hairy at the tip.—Native of Sweden, England, Bohemia, Germany, Switzerland, and France, flowering in April. Root an ovate bulb, flattish at one side, prominent at the other. Stem quite simple, erect, round, smooth, twelve or eighteen inches high; leafy in the middle; tapering at the base. Leaves about three, alternate, lanceolate, acute, keeled, entire, smooth, somewhat glaucous; the uppermost linear and much the narrowest. Flower drooping, till it is fully expanded, of a fine golden yellow, sweet-scented; the three outermost petals greenish at the base; all of them elliptical, acute at each end, and tipped with a little white wool at the summit; three innermost fringed with similar wool at the base. Stamens yellow; their filaments densely woolly at the bottom; anthers linear-oblong. Germen pale yellow or greenish, crowned with a triangular, abrupt, not dilated stigma, gradually splitting into three small notches, slightly downy at the top. The Early Yellow Tulip of the gardens, which is figured in the plates of Redouté and Curt. Mag. cited above, can hardly be distinguished from our wild kind, except being larger, with a rather more decidedly three-lobed woolly stigma. Our Bohemian wild specimens are intermediate between the two.

2. *T. Celsiana*. Small Yellow Tulip. Redout. Liliac. t. 38. Ait. Epit. 375. Curt. Mag. t. 717, erroneously named there *Melanthium uniflorum*. (*T. biflora*; Donn. Cant. ed. 5. 75? *T. persica minima*; Rudb. Elyf. v. 2. 112: f. 8.)—Flower mostly solitary, erect. Leaves lanceolate. Stigma triangular, with three short, rounded, downy lobes. Stamens slightly hairy above their base. Petals smooth at the tip.—Native of the south of Europe, and of the banks of the Wolga. We have known this species for above twenty-five years in Chelsea garden, where it was cultivated by the late Mr. Fairbairn, in pots, amongst alpine plants, protected by a frame in winter, and flowered about May. So little was it understood, that the able writer on this tribe of plants in Curtis's Magazine originally mistook this Tulip for *Melanthium uniflorum*; an error corrected at t. 1135 of the same work. It is very nearly allied to the *sylvestris*, but not half so large, and the flower is tinged with red externally. The three innermost petals are slightly fringed at the lower part, but all six are quite smooth at the extremity. The *stamens* are smooth at the base, though they bear a tuft of hairs a little way above it. *Antbers* shorter, and more elliptical, than in *T. sylvestris*. *Stigma* more decidedly three-lobed, rounded, and downy. *Capsule* elliptical. Very rarely there are two flowers on a stem. They have no scent. Each *petal* has sometimes, not always, a green keel.

TULIPA.

3. *T. biflora*. Two-flowered Yellow Tulip. Pallas It. v. 3. 727. t. D. f. 3. Linn. Suppl. 196. Willd. n. 4.—Stem two or three-flowered, with two spreading lanceolate leaves. Stigma triangular, abrupt, downy, scarcely notched. Petals widely spreading, hairy, like the stamens, above their base; smooth at the tip.—Native of salt deserts about the river Wolga, in a stiff clay soil, along with the last, but flowering a few days earlier, and of much shorter duration. This is scarcely half the size of *T. Celsiana*, of which a two-flowered specimen has sometimes been taken for it. The more simple stigma, more elliptical and expanded petals, green at the back, and more oblong anthers, are abundantly different from that species. From the *sylvestris* the present is still more unlike, as to size, smoothness of the tips of its petals, and their flat spreading position, to say nothing of an orange spot at their base. The foliage too is said by Pallas to be more glaucous and succulent. The flowers vary rarely to one or three, and are fragrant.

4. *T. Sibthorpiana*. Yellow Greek Tulip. Sm. Prodr. Fl. Græc. Sibth. v. 1. 229. Fl. Græc. t. 330, unpubl.—Stem single-flowered, smooth. Flower drooping. Petals obtuse. Stigma club-shaped. Filaments hairy all over.—First observed by the late professor Sibthorp, near the ancient Cressa, now *Porto Cavalieri*, in Asia Minor; and afterwards, as Mr. Hawkins informs us, on a small rocky eminence near *Navarin*, in the Peloponnese. The root is a white, roundish, depressed bulb, scarcely an inch in diameter, surrounded by numerous lateral offsets. Stem a span high, bearing two alternate erect smooth leaves, of which the lowest is largest and most ovate. Flower entirely yellow, pendulous, an inch long. Petals apparently smooth in every part. Stamens whitish as well as the pistil. Anthers linear, beaked, nearly as long as the filaments, which are clothed from top to bottom with short dense prominent hairs. Germen short, obtusely triangular, smooth. Stigma twice or thrice the length of the germen, triangular-club-shaped, obtuse, slightly three-lobed, almost as hairy in every part as the filaments. This is a very distinct species.

5. *T. Clusiana*. Red and White Italian Tulip. Redout. Liliac. t. 37. Ait. Epit. 375. Curt. Mag. t. 1390. Sm. Prodr. Fl. Græc. Sibth. v. 1. 229. Fl. Græc. t. 329, unpublished. (*T. persica præcox*; Cluf. Cur. Post. 9, with a figure. *T. persica*, flore rubro, oris albidis, elegans; Ger. Em. 142. *T. persica*; Park. Parad. 52. t. 53. f. 6. *T. variegata persica*; Rudb. Elyf. v. 2. 111. f. 7.)—Stem single-flowered, smooth. Flower erect. Petals acute, smooth. Leaves linear-lanceolate.—Native of Italy, Sicily, and Persia, flowering in March. About the size of *T. sylvestris*, but the stem bears four or five leaves, gradually smaller and narrower upwards, most glaucous beneath, smooth, somewhat undulated, at least the lower one; all taper-pointed. The three inner petals are white on both sides, sometimes bluntish; three outer rather larger, acute, white or bluish-coloured within, crimson at the back, with white edges, and a green tip; all of them marked at the base internally with a dark-violet spot, and all quite smooth in every part, as are the violet-coloured stamens, and green pistil. The stigma consists of three rounded, compressed lobes, each marked with a downy furrow, like the Garden Tulip hereafter described.

6. *T. suaveolens*. Early Dwarf Tulip. Roth. Catal. v. 1. 45. Curt. Mag. t. 839. Willd. n. 2. Ait. n. 2. Redout. Liliac. t. 111. (*T. Pumilio*; Lob. Ic. 127. Ger. Em. 142. *T. Pumilio latifolia*; Rudb. Elyf. v. 2. 109. f. 2.)—Stem single-flowered, downy. Flower erect. Leaves ovato-lanceolate; downy above. Petals and filaments smooth.—Supposed to be a native of the south of Europ.

Commonly cultivated in Holland, by the name of *Duc Van Thol*, from whence the best roots are brought to us. They flower in the open ground in March or April, but in a room, whether in water, sand, or earth, about January. The whole plant is of a dwarf stature, and glaucous hue. Flower broad-bell-shaped, sweet-scented. Petals scarlet, edged with yellow, more or less acute. Stigma like the last, but rather larger.

7. *T. Oculus solis*. Agen Tulip. "St. Amans Rec. Soc. d'Agr. d'Agen, v. 1. 75." Redout. Liliac. t. 219. Ker in Edw. Bot. Regist. t. 204. (*T. bolonienfis*, five bombycina, flore rubro, major; Park. Parad. 51. t. 53. f. 1.)—Stem single-flowered, smooth, as well as the petals and filaments. Flower erect. Leaves ovato-lanceolate, finely fringed.—Found about Agen, in France, and several places in the southern part of that kingdom, flowering in April, and lately imported into England, by Messrs. Whitley and Co. of Fulham. This differs from the last in the particulars contained in our specific character, and more nearly approaches the following. The coat of the bulb is said to be internally woolly. Leaves broad, slightly glaucous. Flower large and bell-shaped, of a fine scarlet red, each petal marked with a broad, black, yellow-edged spot at its base. Stigma like the following.

8. *T. Gesneriana*. Common Garden Tulip. Linn. Sp. Pl. 438. Willd. n. 3. Ait. n. 3. Curt. Mag. t. 1135. "Sowerb. Fl. Luxur. t. 5, 6. 11. 17." (*Tulipæ*; Rudb. Elyf. v. 2. 102—108.)—Stem single-flowered, smooth, as well as the petals and filaments. Flower erect. Leaves ovato-lanceolate, glaucous, smooth. Lobes of the stigma decurrent, deeply divided.—Native of the country bordering on mount Caucasus, where it flowers in April, and from whence Dr. Fischer has sent us a wild specimen. Conrad Gesner reports, that it was brought from Cappadocia into the European gardens, in 1559. Nothing is now more common or more famous, particularly the many varieties in form and colour, which florists, especially in Holland, have so much cultivated, and in some cases so highly prized. The old botanical writers, in their wooden cuts, represent many of these, and almost all the supposed species in Bauhin's *Pinax*, are really, as Linnæus indicates, mere varieties. In a wild state, the petals are crimson, yellowish at the base, about an inch and a half long; by cultivation they increase in size, become streaked in colour, and sometimes assume a jagged and spurred appearance, with every variety of scarlet, yellow, purple, and even green, in their colouring. This we first called the Parrot Tulip, a name now generally adopted. It is Rudbeck's *T. flore luteo rubro variegato, petalis laciniatis*, Camp. Elyf. v. 2. 108. A plain yellow Tulip, the blunt points of whose petals are somewhat recurved, and whose whole flower is of a handsome ovate figure, seems to us possibly a distinct species; but this must be decided by cultivation from seed.

TULIPA, in *Gardening*, furnishes plants of the bulbous-rooted, showery, perennial kind, among which the species cultivated are the Gesner, Turkey, Cappadocia or common garden tulip (*T. Gesneriana*); and the wild or yellow tulip (*T. sylvestris*).

The first is distinguished from the other sort, according to Martyn, by its pubescent scape, spreading sweet-smelling corolla, the earliness of its flowering, and the smallness of its size.

And in respect to the varieties, the editor of Miller's Dictionary observes, that the old authors divided tulips into *præcoces* or early-blowers, and *serotina* or late-blowers, with an intermediate division of *dubie mediæ*, doubtful or middle-blowers, which flowered between the two others, and for the

the most part rather belonged to the late-blowers. Modern florists, he asserts, have almost neglected the early-blowers. The first sort, according to him, are not near so fair, nor do they rise half so high as the late ones; they are chiefly valued for appearing early in the spring; some of them will flower the middle of March, in mild seasons, if planted in a warm border near a wall or other shelter, and others will succeed them, so that they will keep flowering until the general season for these flowers is come, which is towards the end of April.

It is said that the several varieties of these early-blowing tulips rise to different heights in their stems, and scarcely any two of them are equal. The Duke Van Toll, which is one of the first that appears in the spring, is generally very short-stalked, and the others, in proportion to their earliness, are shorter than those which succeed them; and the late-blowers are all considerably longer in their stems than any of the early-blowers.

The late-blowing tulips producing much finer flowers than the early ones, have engrossed almost the whole attention of the florists. It would be to little purpose to enumerate all the varieties, since there is scarcely any end of their numbers; and what some value at a considerable rate, others reject; and as there are annually many new flowers obtained from breeders, those which are old, if they have not very good properties to recommend them, are thrown out and despised.

It is observed further, that modern florists in Holland and Flanders, and our English florists from them, boast a prodigious variety of late-blowing tulips. And that Mr. Maddock of Walworth, in his catalogue of flowers for the year 1792, has no less than about six hundred and sixty-five of these admired beauties, all ranged under their proper families and colours, with their names and prices: besides the early sorts, *double tulips*, *parrot-tulips*, *French tulips*, and *breeders*. And moreover that the late-blowers are distributed into five families: 1. *Primo Baguets*, very tall; fine cups, with white bottoms, well broken with fine brown, and all from the same breeder. 2. *Baguets Rigauts*; not quite so tall, but with strong stems, and very large well-formed cups with white bottoms, well broken with fine brown, and all from the same breeder. 3. *Incomparable Verports*, a particular kind of *Bybloemens*; with most perfect cups, very fine white bottoms, well broken with shining brown, and all from the same breeder: some of these are from two to five guineas a root. 4. *Bybloemens*; with bottoms white, or nearly so, from different breeders, and broken with a variety of colours: those of the Verports are cherry and rose. 5. *Bizarres*; ground yellow, from different breeders, and broken with a variety of colours. These barbarous terms, used by the Dutch florists, are, it is said, a mixture of Dutch and French. *Baguet* is from the French *baguette*, a rod or wand, so named from its tall slender stem. *Bizarre* is also French, and the tulips of that family have the name from the variety and irregularity of their colours. *Rigauts* are probably from the name of some eminent florist, as *Rigaud*. The other terms are Dutch. Breeders are of one colour, and when broken produce new varieties.

It may be more particularly noticed in regard to each of the principal varieties of these tulips, that they, in every instance, comprehend a great number of intermediate ones, in so far as respects the colours and variegation, which takes place in the flower, notwithstanding each has been originally all of one and the same colour, particularly the seedling-raised bulbs, which after they have arrived to the flowering state, each separate flower is either wholly red, purple, violet, grey, brown, black, yellow, or some other indivi-

dual colour, without any sort of variegation or stripe whatever, consisting simply of one-coloured flowers, with white bottoms, with yellow bottoms; and some with blue bottoms, with purple bottoms, and with blackish bottoms; all of which, while they retain this original sameness in the colour, are, in the peculiar language of the florist, termed *whole-blowers* or *breeders*, as each flower is wholly of one and the same colour. But on the bulbs or roots being planted out for one or two years, in properly prepared soils, in order to breed, or dispose them to gradually produce flowers, that break or run from the original single colour into variegations and stripes, in many different modes and forms, they are denominated *breakers* or variegated tulips, each different variegation constituting a separate and distinct variety, which mostly consists of flowers with white bottoms broken, with brown stripes, with blue stripes, with violet stripes, with rose stripes, with red stripes, and with some other kinds, separated by streaks of white, and other colours disposed in various ways; with yellow bottoms, broken with different reds, crimsons, and golden-yellow flakes, and also a variety of other colours; and some with blackish-purple, and other bottoms broken with stripes of dark colours, yellow, and tints of red; so that, particularly in these sorts of *breakers* or variegated tulips, which have white and yellow bottoms, there are, moreover, white and red striped flowers, white and purple striped, white and violet striped, white and rose striped, white and brown striped, violet and white flaked, red and white flaked, red and yellow flaked; and a great number of other intermediate variegations and stripes, disposed in an almost endless diversity of modes or manners.

The principal of these diversities or varieties are usually distinguished, in the language of the florist, by the names or titles of some great personage, eminent admirer or cultivator of flowers, places where first grown, or some other great mark of distinction; but there is such a multitude of new varieties raised annually from seed and seedling plants in different places, which are designated by new titles, without any relation to the old ones, and the same sort of flower so often characterized by a different name, that it would be utterly impossible to give any satisfactory list of the names of such a vast number of continually changing varieties, as has been suggested above.

It is said that the properties of a fine variegated late tulip, according to the best modern florists, are these: 1. The stem should be strong, upright, and tall; about thirty inches high. 2. The flower should be large, composed of six petals, proceeding a little horizontally at first, and then turning upwards, so as to form an almost perfect cup, with a round bottom, rather wider at top. 3. The three outer petals should be rather larger than the three inner ones, and broader at their base: all the petals should have the edges perfectly entire; the top of each should be broad and well rounded; the ground colour at the bottom of the cup should be clear white or yellow, and the various rich stripes, which are the principal ornament of a fine flower, should be regular, bold, and distinct on the margin, and terminate in fine broken points, elegantly feathered or pencilled. 4. The centre of each petal should contain one or more bold blotches or stripes, intermixed with small portions of the original colour, abruptly broken into many irregular obtuse points. Some florists, it is said, are of opinion that the central stripes or blotches do not contribute to the beauty of the tulip, unless they are confined to a narrow stripe exactly down the centre; and that they should be perfectly free from any remains of the original colour: it is certain that such flowers appear very beautiful and delicate, especially when they have a regular narrow feathering

TULIPA.

feathering at the edge: but it is unanimously agreed, that the tulip should abound in rich colouring, distributed in a distinct and regular manner throughout the flower, except in the bottom of the cup, which should indisputably be of a clear bright white or yellow, free from stain or tinge, in order to constitute a perfect flower.

The colours which are generally held in the greatest estimation in the variegated or striped sorts of tulips, are the blacks, the golden yellows, the purple violets, the rose, and the vermilion, each of which being varied in different ways; but such as are striped with three different colours, in a distinct and unmixed manner, with strong regular streaks, with but little or no tinge at all of the breeder, are supposed the most perfect. However, though it is extremely difficult to meet with such as possess all these estimable properties of good flowers of this sort, yet many are found which have sufficient perfection to become of high value as fine flowers. The double and parrot tulips are, it is said, held in no sort of esteem among florists. Among the first sort, however, there are many distinct varieties, in so far as regards the colouring of the flowers; as the yellow-flowered, the yellow and red-flowered, the white and red-striped, the white and blush-coloured, besides a great number of intermediate variations. And in the latter, those with long hooked petals of flowers, consisting of yellow-flowered, red-flowered, red-striped, and other kinds.

The second species has the bulb ovate, and gibbous in the shape; the stem is quite simple, nearly upright, round, smooth, leafy in the middle, and attenuated at the base, with the flower always yellow in its colour, but a little greenish on the outside.

And it is further noticed, that it has most of these characters in common with the garden species; but the circumstances that abundantly distinguish this sort are, the narrow leaves, the nodding flower, the hairiness at the base of the filaments and on the tips of the petals, and especially the simple obtuse form of the stigma, which is totally different from that of the garden tulip: the flower too is fragrant; the pollen yellow, not black; and the anthers remarkably long. But in the *Flora Danica* they are represented as short and round.

As this sort of tulip is of much inferior beauty to those of the other and its several varieties, it is of course not nearly so much known and cultivated in flower-gardens, though it was formerly held in considerable estimation by some, before the Turkey kind became so very general; and it is still to be found in some of the older gardens of this nature, and is not undeserving of a place in those of the modern ones, among the other sorts of tulips and spring flowers, for the purpose of its early blowing and increasing the variety.

Method of Culture.—All the different sorts of tulips may be increased by offsets from the roots, and by sowing seeds to produce new varieties. The offsets should be separated from the old roots every year in June, especially for the fine sorts, on taking them up when the flowering is over, planting them in nursery-beds, in rows six inches apart, and to the depth of three, four, or five in the beginning of autumn, to remain for one or two years, until they attain the flowering state, and are proper for being set out regularly. They may also, in the old root, be planted in beds, or in the borders or other parts where they are to remain and blow, in patches of four or five, placed regularly; and to have a succession, they may be planted at different times; they are usually planted with a blunt dibble: the new roots should always be planted by themselves.

In this way the most approved sorts are propagated and

continued always the same, and the stocks of any good varieties multiplied and increased as may be necessary and convenient to the growers of them.

The early and late sorts should likewise be each put in, in places by themselves; and it is advised that the roots of the early-blowing kinds should be planted the beginning of September, in a warm border, near a wall, paling, or hedge; as, when they are put into an open spot of ground, their buds are in danger of suffering by morning frosts in the spring. The soil for these should be renewed every year, where it is intended to have them fair. The best soil for this purpose is that which is taken from a light sandy pasture, with the turf rotted amongst it, and to this should be added a fourth part of sea-sand. This mixture may be laid about ten inches deep, which will be sufficient for these roots, as they need not be planted more than four or five inches deep at the most.

The offsets should not be planted amongst the blowing roots, but in a border by themselves, where they may be set pretty close together, especially when they are small; but these should be taken up when their leaves decay, in the same manner as the blowing roots, otherwise they would rot if the season should prove very wet, as they are not so hardy as the late blowers, nor do they increase half so fast, so that more care is requisite to preserve the offsets of them.

When these sorts come up in the spring, the earth upon the surface of the beds or borders should be gently stirred and cleared from weeds; and as the buds appear, if the season should prove very severe, it will be of great service to cover them with mats, for want of which many times they are blighted, and their flowers decay before they blow, which is often injurious to the roots, as is also the cropping of the flowers soon after they are blown; as their roots, which are formed new every year, are not at that time arrived to their full magnitude, and are of course deprived of proper nourishment or support.

When these flowers are blown, if the season should prove very warm, it will be proper to shade them with mats, &c. in the heat of the day; and when the nights are frosty, they should be covered in the same manner, by which means they may be preserved a long time in beauty: but when their flowers are decayed, and their seed-vessels begin to swell, they should be broken off just at the top of the stalks, as when they are permitted to seed, it injures the roots greatly.

In these sorts, when the leaves are decayed, which is usually before the late-blowers are out of flower, their roots should be taken up, and spread upon mats in a shady place to dry; after which they should be cleared from filth, and put in a dry place where vermin cannot come to them, until the season for planting them again, being very careful to preserve every sort separate, that it may be known how to dispose of them at the time of planting.

For this purpose, it is a good method to have large flat boxes made, which are divided into several parts by small partitions, each of which is numbered the same as the divisions of the beds; so that when a catalogue of the roots is made, and the numbers fixed to each sort in the beds, nothing more is necessary in taking the roots, but to put every kind into the division marked with the same number in the bed. This saves a great deal of trouble in making fresh marks every time the roots are taken up, and effectually answers the purpose of preserving the kinds separate and distinct.

In raising these plants from seed, it is, from the time of sowing, seven or eight years before they produce flowers; and after all, they at first appear only single-coloured, often requiring two, three, or more years longer before they break

into different colours or variegations ; so that the tediousness of raising seedling tulips to a flowering state often deters from the undertaking. It is, however, the method by which all the fine varieties were first obtained, and by which new varieties are still annually gained ; as many persons sow some every year, in expectation that after the first six or seven years a new show of flowers will be produced, out of which many new varieties may annually discover themselves in each parcel. It is by this process the Dutch are so famous for furnishing such an infinity of fine varieties, supplying almost all other countries.

In effecting this business, great care should be used in the choice of the seed : the best is that which is saved from breeders which have all the good properties before related, for the seeds of striped flowers seldom produce any thing that is valuable ; and the best method to obtain it is to make choice of a parcel of such breeding tulip roots as are wished to save seeds from, and place them in a separate bed from the breeders, in a place where they may be fully exposed to the sun, planting them at least nine inches deep, as when they are planted too shallow their stems are apt to decay before their seed is perfectly ripened : the flowers should be always exposed to the weather, as when they are shaded with mats, or any other covering, it prevents their perfecting the seed. About the middle of July, according to the season, the seeds will be fit to gather, as shewn by the dryness of their stalks and the opening of the seed-vessels, at which time they may be cut off, and the seeds be preserved in the pods till the season for sowing, being careful to put them up in a dry place, otherwise they will be subject to mould and be rendered useless. The beginning of September is the proper season for sowing the seed ; for which there should be provided a parcel of shallow seed-pans, or boxes, which should have holes in their bottoms to let the moisture pass off ; these should be filled with fresh sandy earth, laying the surface very even, upon which the seeds should be sown thinly as regularly as possible ; some of the same light sandy earth being sifted over them, about half an inch thick. These boxes or pans should be placed where they may have the morning sun till eleven o'clock, in which situation they may remain till October, at which time they should be removed into a more open situation, where they may enjoy the benefit of the sun all the day, and be sheltered from the north winds, where they should remain during the winter season ; but in the spring, when the plants appear with grassy leaves, they should be again removed to their first situation ; and if the season be dry, they must be refreshed with water while the plants remain green ; but as soon as their tops begin to decay, no more should be given. The boxes should be placed in a shady situation during the summer season, but not under the drip of trees. The weeds and moss should be kept constantly cleared off from the surface of the earth in the boxes, and a little fresh earth be sifted over them soon after their leaves decay ; and at Michaelmas they should be fresh-earthed again, and as the winter comes on, be again removed into the sun as before, and treated in the same manner, until the leaves decay in the spring, when the bulbs should be carefully taken up, and planted in beds of fresh sandy earth, which should have tiles laid under them, to prevent their roots from shooting downward, which they often do when there is nothing to stop them, and are destroyed. The earth of these beds may be about five inches thick upon the tiles, which will be sufficient for nourishing the roots while young. The distance of planting them need not be more than two inches, nor should they be planted above two inches deep. Toward the end of October it will be proper to cover the beds over with a little fresh earth about an inch deep, which will preserve

the roots from the frost, and prevent moss or weeds from growing over them ; and when the winter is very severe, it may be proper to cover the bed either with mats or pease-haulm, to prevent the frost from entering the ground, as these roots are much tenderer while young, than after they have acquired strength. In the next spring the surface of the ground should be again gently stirred to make it clean, before the plants come up ; and when the spring proves dry, they must be frequently refreshed with water in small portions during the time of their growth ; and when the leaves are decayed, the weeds should be taken off, and the beds covered with fresh earth, as before, which should also be repeated again in the autumn. When the bulbs have been managed in this way two years, they should in the summer following, when their leaves decay, the roots being by that time considerably improved in growth, be again taken up, and planted in a fresh prepared bed, in drills three or four inches asunder, in which to remain two years longer ; then, at the decay of the leaf, be again planted out into fresh beds, in rows as before, where they should be let remain to blow, being afterwards ordered as the flowering bulbs. When they are in full flower, they should be examined, in order to mark such of them as discover the best properties, that they may be separated from the others at the proper lifting season, and be replanted in beds by themselves for breeders ; removing them annually at the proper season into different beds of opposite or contrary soils, as one year in poor hungry earth, the next in a much richer mould ; continuing them so till they break into variegations and stripes of different colours, which are the only modes by which it can be assisted. When the leaves and flower-stems are decayed and withered, and the roots have ceased growing and drawing nourishment from the earth, it is the proper period for lifting or taking the old roots out of the earth, to reserve them till autumn for planting, being preserved in the manner which is directed for them above.

It may be noticed in addition, that all the sorts and varieties of tulips will grow pretty well and succeed tolerably in any soil where the earth or mould is moderately light and dry in the winter season, but that they delight most in such as are of a sandy vegetable earthy nature, and in an open sunny exposure. They are most injured by such as are of a retentive and wet damp quality, in which it is constantly necessary to have the beds in which they are put raised four or five inches above the common level of the rest of the ground. It is customary, however, with florists to have the beds for this purpose composed of and prepared with different kinds of materials of the sea sandy and earthy sorts, particularly for their finest kinds. But such trouble and expence are often quite unnecessary, as they succeed well enough without it ; only care must always be taken not to plant them more than one or two years together, especially these fine sorts, in the same earth or bed, without changing the quality of the soil, in some measure, either altogether or in a partial manner, by some removal of the old and addition of new fresh portions of light mould, garden earth, or compost, or by a complete clearing away of the former earthy matter and the supplying of wholly new ; thus rendering the blow of the tulips more strong as well as fairer. But as this is only practised for the particularly fine sorts in beds, those which are to be planted in the open border may be placed any where in the common soil, without any fear of their not flowering well.

In preparing the beds, or other parts, for the more choice sorts, the ground is to be well dug to the depth of one or two spits, and they are to be formed three or four feet in width, having alleys or intervals of one or two feet

TULIPA.

width between them: the top or surface of each bed being raked quite even and smooth, in order for the bulbs or roots being put into it.

When they are in this state of readiness for being planted, a dry day is to be selected for setting out or planting the bulbs or roots, which is to be done in rows, either in the bedding method, drilling in rows, or that of dibble-planting, a blunt-edged instrument being employed in the last, by way of making the holes for the bulbs as sufficiently wide below as above, and perfectly clean quite to the bottom, making out the lines lengthways of the beds at eight or nine inches distance from each other, the roots being then set in singly to the depth of three or four inches, and at the distance of six from each other in the lines. The work of planting being thus finished, the upper parts of the beds are to be raked even and smooth, which completes the whole.

The tulips intended for the open borders may either be planted in a regular line at a foot or eighteen inches distant from the edge, irregularly along it, or be disposed in separate small patches and clumps of three or four roots together in each, occupying spaces of about eight inches, some of which being placed more forwards, and others backwards, in order to afford greater diversity and variety.

When the old roots or bulbs have been thus planted out in the autumn, as they bear the winter well, nothing farther is required in their culture until the vernal and summer months, when they should be preserved in quite a clean state of growth, and in some cases the buds of the more choice sorts in the beds be sheltered and guarded from cold and severe weather in the nights, and at some other times by mats, supported archways on hoops, or other convenient means, though this is seldom absolutely necessary; or when the bedded sorts are come into flower, to preserve their beauty and duration, to shade and screen them from the excessive noontide sun, heavy rains, and stormy winds, by an awning of canvas or mats raised across the beds, and, in some instances, formed in a tent-like manner, in order to walk under and view the flowers at pleasure; but the flowers will blow in great perfection without these coverings and trouble, only by means of them these fine sorts will blow and continue for a longer time in full beauty than would be the case if they were openly exposed. However, as soon as ever the flowers begin to fade, all such coverings should be carefully removed, in order to permit a free circulation of air, and have the full influence of rains, dews, &c. for the nourishment and support of the root-bulbs. But when the flowering is quite past, and the flowers begin to die away, it is necessary and proper to cut off the heads or seed-vessels, especially of the fine sorts and varieties, that the roots may not be deprived of the proper quantity of nutriment for their full and perfect growth.

And in the middle of summer, when they are at rest, or have ceased growing, and the flower-stems and other parts are quite decayed, it is time to lift or take up the old bulbs or roots, which should be done for the most part every year for the fine sorts, and every other year for the other kinds, not only for the purpose of separating the suckers or young bulbs, but also for preserving both them and the old ones without any sort of growth out of the ground until the autumn, which is the time of planting them again in fresh or newly prepared beds for the future year's bloom. At this period, therefore, when the weather is dry, the work of lifting or taking them up should be begun, which should be done with a garden-trowel, as being the best and easiest method, digging them up singly in a perfect and careful manner; and afterwards spreading them out in a shady, dry,

airy place, where they may remain for a few weeks, without being acted upon by the sun or wet, and then become gradually dry and hardened; when the suckers or young bulbs, the adhering earth, and the outer decayed skins or husks, should be taken away and removed from them, after which both the old and the young offset bulbs should be again exposed to further drying, and more effectual hardening, in the same or other more proper situation, and be ultimately put safely into some dry receptacle separately, to be kept until the proper season of planting them out again takes place. Each sort of bulbs should be planted out in a separate manner, as already noticed. See BULB and ROOT.

It may be remarked, that although the tulip may be said to be a plant of the perennial kind, yet that after the bulb of it has arrived at the flowering state or stage, the same individual old root or bulb does not always remain and continue to flower anew, but gradually wears or wastes away, as is evident by its remains at the lifting season; but previously to its dissolution it affords from its sides a new supply of suckers or young bulbs, which perpetuate the kind, one of which, being large and similar to the parent bulb, is capable of flowering equally strong for the succeeding year; so that at the end of many years, that which is often supposed to be the same individual bulb, is in reality in every way another, or new one. In common, it is, however, termed the old bulb or root, by those who are unacquainted with the nature of such roots.

All the sorts and varieties of the tulip have flowers, which are succeeded by plenty of ripe seed in the later summer months, that is contained in the cells of an oblong capsule, the different seeds being placed on each other in double rows.

In order to save good seed, some heads of the best and stoutest plants of each sort should be selected and left in a proper situation to stand until they become in a perfectly ripe state, which is easily known by the stems taking on a fine hard dry appearance, and the parts containing the seeds opening themselves, when they should be cut away, and the seed be taken out, and wrapt up carefully, or left to remain in them until the time of its being sown, preserving it in either way quite dry and free from any thing of a mouldy nature.

In order to promote the acquisition of the vast and wonderful diversity of colouring which often takes place in tulips, and which, in many instances, is effected in a great measure by nature only, the natural process is sometimes greatly assisted and expedited by means of proper culture and management. Thus, in the first place, when the young seedling bulbs of the whole blower or breeder have reached the full size, and have flowered once, by transplanting or removing them into beds of any sort of weak, poor, unfruitful earths, which, by their want of nutrient properties, may check and restrain the natural luxuriant tendency of the plants, and induce a weak enfeebled general growth, a change may be gradually produced in their general state, whereby they may break out into new variegations in the first, second, or third years. And accordingly, as this happens, they should be planted out into beds of good earth, as has been directed above.

Another means of assisting nature in accomplishing this object is, that of making as great a change in the quality of the soil as possible, as if they were this year planted in a weak poor sort of earth, they should in the following be set out in a highly rich garden mould, and afterwards in a compost of several sorts of earth: or they may be removed and transplanted from one part of a garden to another; and

into different gardens; or in any other similar methods. All these various ways contribute in a great degree to assist in, and promote the production of, this desirable diversity of colours and variegations.

The roots of all the sorts and varieties of the tulip are kept for sale in large collections by the nursery and seedsmen, who have them every year in great quantities from Holland and other places, each variety of which is distinguished by some appropriate name, as has been already noticed, and arranged in regular catalogues, the prices being charged in proportion to the estimation in which they are held, which were formerly very extravagant, but are now more moderate, on account of their abundance, as from seven or twelve shillings, to as many pounds the hundred, and not unfrequently considerably more for scarce, curious, and capital sorts. The most eligible and proper season for buying or laying in a collection is in the early part of the autumn, as from August to November.

For the main collection of flowers to blow in the spring and early summer, the most proper time of planting the roots or bulbs is in the autumn, from the end of September to December; but to have a later bloom in succession, some may be planted out about the close of the year, and in the two beginning months of the new one. These last, however, will seldom grow so strong as those of the autumn planting.

The roots of the late sorts of tulips may be planted in any common beds, or in the borders, as they are not much liable to be injured by bad weather. But those of the fine or more valuable sorts of the early, as well as the late kinds, are in general, for the most part, disposed together, as has been seen, in beds by themselves, in order to exhibit a grand blow, and be defended in the manner which has been explained.

However, some of the inferior common sorts, and even any of the capital varieties, may occasionally be distributed about the ordinary borders, in assemblage with other spring flowers of the bulbous-rooted and other kinds, in the ways which have already been directed, where they have often a fine effect when in their blowing state.

The double variety of the common tulip is very beautiful, though not held in such estimation by the florist as the common single variegated sorts, from their not possessing that profusion of variegations in their colours, or such a regularity of stripes. They, however, exhibit an elegant ornamental appearance in their upright, tallish, firm stems, and the crowns of large double flowers at the tops, formed somewhat as in those of the double pæony, but far more beautiful in their diversity of colours, variegations, and stripes of white and red, or yellow and red, &c. On these accounts they certainly deserve to be cultivated either alone in beds, at a little distance from the other sorts, for the sake of increasing the variety; or in patches about the borders, in assemblage with the common large variegated tulips, as blowing nearly about the same time in the later spring months.

The early dwarf sorts are the most proper for forcing for early blowing, and also for being placed in glasses, in rooms, &c.

These sorts are sometimes rendered more early in their blowing than would otherwise be the case, by planting the roots or bulbs in pots or boxes in the autumn or winter season, and placing them in the stove, or a hot-bed of tanner's bark, thereby bringing them into bloom in the month of January, or sooner, and continuing successions of them, until the natural ground blooms are ready. A quantity of bulbs is also sometimes placed upon phial-glasses containing

water, a single bulb in each, during the same seasons, which are then put into a warm light room in the house, near the windows, or into a greenhouse or stove, in which way they often flower very agreeably in the winter and early spring, as they are well suited to such modes of cultivation.

These sorts of roots or bulbs are likewise kept by the nursery and seedsmen for the purpose of sale in pretty large collections of the different kinds, under titles which are chiefly French or Dutch, as may be seen by the catalogues of these flowers which they exhibit.

Roots of these sorts may be planted out in any good, light, rich, earthy soil, where the situation is warm at the season, and in the manner stated above, in speaking of the general culture of tulips, when they will rise soon in the vernal months, and reach the blowing state about March, continuing until the late tulips come into flower. They, however, succeed best when allowed a sheltered sunny situation, as they rise and flower so soon in the spring while the weather is often cold and pinching. Some of them look extremely well in the fronts of warm borders, in small patches, in assemblage with anemones, ranunculuses, and other similar kinds.

The second species may be managed in the same manner as those of the common sort, in so far as its culture is concerned, in much the same way, having nearly the same treatment in every respect.

They are all highly ornamental flowers, from their much varied and most beautiful colours; but those of the common garden sort, and its numberless varieties, are the most generally introduced, being admirable ornaments for beautifying the various flower borders and other parts of gardens and pleasure-grounds during some weeks in the spring and summer seasons.

TULIPIFERA, in *Botany*, the Tulip-tree; see **LIRIODENDRON**; see also **MAGNOLIA**, some of whose species are called Tulip-trees.

TULISCHANA, in *Geography*, a river of Russia, which runs into the Podkamenskaia Tunguska, N. lat. 61°. E. long. 97° 34'.

TULISKOWO, a town of the duchy of Warsaw; 16 miles N.N.E. of Kalish.

TULL, **JETHRO**, in *Biography*, a distinguished agriculturist, was a descendant of a respectable family in Yorkshire, educated at one of the universities, and admitted a barrister of the Temple towards the commencement of the 18th century. Returning from the tour of Europe, in which his attention was particularly directed to agricultural subjects, he married, and settled upon a paternal farm in Oxfordshire, which gave him an opportunity of prosecuting a variety of experiments in husbandry. Upon his return from France and Italy, which he was under a necessity of visiting on account of his impaired health, and with a fortune also impaired, he took a farm near Hungerford, in Berkshire, where he pursued his plans for improved cultivation. His grand principle was, that labour and arrangement would supply the place of manure and fallowing, and raise more grain at a less expence. (See **HOEING**, **HUSBANDRY**, and **DRILL-HUSBANDRY**.) Tull, in 1731, printed "A Specimen" of his system; and in 1733, "An Essay on Horse-hoeing Husbandry," fol. which was translated into French by Du Hamel. He pursued his system till his death, which happened in Jan. 1740.

TULLA, in *Geography*, a town of Arabia, in the province of Yemen; 20 miles W.N.W. of Sana.

TULLAGH, a small post-town of the county of Clare, Ireland; 102 miles W.S.W. from Dublin.

TULLAGHAN, a bay of the county of Mayo, Ireland into

into which the river Munry discharges itself, and which is opposite to the northern part of Aebill island.

TULLAMORE, a post-town of the King's county, Ireland, so called from the river Tullamore, which divides it into two nearly equal parts. This is a neat thriving town, owing partly to the well-directed exertions of the proprietor, lord Charleville, whose demesne extends to the suburbs, and partly to the advantage of the Grand Canal passing close to it. Here are a barrack and market-house; and, what is of still greater importance, the linen manufactory has been introduced with a prospect of success. Tullamore is 46 miles W. by S. from Dublin.

TULLE, a city of France, and capital of the department of the Corrèze; before the revolution the capital of Lower Limosin, and see of a bishop suffragan of Bourges; 58 posts S. of Paris. N. lat. 45° 16'. E. long. 1° 51'.

TULLEN. See **TOOLEN**.

TULLINS, a town of France, in the department of the Isère; 12 miles N.N.E. of St. Marcelin.

TULLIS CREEK, a river of Virginia, which runs into the Potomack, N. lat. 39° 33'. W. long. 78° 2'.

TULLN, a town of Austria, on a river of the same name; the see of a bishop, suffragan of Passau; 13 miles W.N.W. of Vienna. N. lat. 48° 18'. E. long. 16° 3'.—Also, a river of Austria, which runs into the Danube, at the town of Tulln.

TULLOARGAUM, a town of Hindoostan, in Viliapour. In 1779, when major-general Egerton was marching towards Poonah, this town was burned by the Mahrattas themselves; 12 miles N.W. of Poonah.

TULLOCH-ARD, a mountain of Scotland, in the south-west part of Roxburghshire. In feudal times, by burning of pitch on this mountain, all the tenants and vassals of Seaforth assembled at the castle of St. Donan in twenty-four hours.

TULLONG. See **PULO-TULLONG**.

TULLOON, a town of Hindoostan, in the circar of Sirhind; 35 miles W. of Sirhind.

TULLOW, a post-town of Ireland, in the county of Carlow, pleasantly situated on the river Slaney, over which it has a bridge of six arches. The castle, which was deemed formidable, and which was reduced by Cromwell, has been converted into a barrack. Here are a neat church and a good market-house; and near the bridge the ruins of an old abbey, which, with all its possessions, was granted by queen Elizabeth to Thomas, earl of Ormond, in 1557. Tullow is 38 miles S.S.W. from Dublin.

TULLUM, **TOUL**, in *Ancient Geography*, a town of Gaul.

TULLUS HOSTILIUS, in *Biography*, was elected king of Rome, after the death of Numa, in the year B. C. 672. He began his reign with rendering himself popular, by dividing a portion of the regal lands among those who had no such property; but deviating from the course pursued by his pacific predecessors, he contrived by a stratagem to engage the Romans in a war with the Albans. The Albans declining a combat, Tullus proposed an union between Rome and Alba, and for the accomplishment of this object, that the principal Alban families should settle at Rome. To this proposal the Albans objected, but it was agreed that the superiority of either city should be decided by a combat between three persons of each city. (See **CURIATI** and **HORATI**.) The superiority of Rome having been thus determined, Tullus proceeded to punish the Fidenates for their alleged misconduct in the Alban war; and having summoned Mettius Fuffetius, the Alban dictator, to join him with the troops of his nation, the dictator apparently complied, but in an engagement that ensued proved trea-

cherous. The Romans, however, obtained a complete victory. Tullus and Mettius practised the same kind of dissimulation: whilst the former courteously received the congratulations of the latter, he sent a body of troops to demolish the city of Alba in the absence of its soldiers, and at the same time ordered the Roman and Alban troops to attend him in his camp unarmed, but he privately instructed the Romans to provide themselves with swords under their garments. Charging Mettius with perfidy, he ordered him to be seized, and to be fastened between two chariots, and thus to be torn asunder, as an emblem of his attempt to dissolve the union of the two states; the first and last example, says Livy, of a punishment in which little regard was paid to human laws! His accomplices were also put to the sword; the rest of the Albans were conveyed to Rome, and henceforth formed one people with the Romans. Alba, with the exception of its temples, was razed; and for the accommodation of these new inhabitants, mount Cælius was taken into the compass of Rome.

Having subdued the Fidenates, Tullus made war against the Sabines and conquered them, and then summoned the Latin towns dependent upon Alba to acknowledge the supremacy of Rome, whose country, on their refusal, he invaded. In his old age, however, he exchanged his military prowess for the weakness of superstition; and terrified by prodigies and apprehended tokens of the displeasure of the gods, he had recourse to a variety of expiatory rites. The manner in which his life terminated has been differently represented. Some say that his palace was struck by lightning, which destroyed him and his family; whilst others have charged his murder on Ancus Martius, his successor, who is also suspected of having set fire to his palace. He died, however, after a reign of thirty-three years, during which he enlarged the size and population of Rome, with little addition to its territories. Livy. Dionys. Hal. Gen. Biog.

TULLY, in *Geography*, a town of Hindoostan, in the circar of Ellichpour; 20 miles E.S.E. of Ellichpour.

TULLY, a township of New York, on the S. line of Onondaga county, 14 miles S. of Onondaga; bounded N. by Otisco, E. by Fabius, S. by Cortlandt county, W. by Spafford, which was erected from the W. half of Tully in 1811. It is now formed of the N.E. quarter of the military township of Tully, the S. half being Preble, in Cortlandt county. Its waters are small, being head-streams of Onondaga creek, and also of Tioughnioga creek, of Chenango, of the Susquehanna, &c. The whole is well watered by springs and brooks. Like Spafford, this town has ridges of hills on the E. and W. boundaries, but its vallies are extensive, rich and productive. Tully flats are much admired. The settlements commenced about 1796, and the lands are held by right of soil, principally by farmers from the eastern states. In 1810, the population was 1092, and the senatorial electors 67; but these aggregates are now diminished nearly one-half by the erection of the town of Spafford from the W. part in 1811. Tully is now about five miles square.

TULLYCLEA, a small river of Ireland, rising in the southern part of the county of Tyrone, and discharging itself into lough Erne, a little to the north of Devenish island.

TULMERO, a town of South America, in the province of Venezuela, situated in the vale of Aragoa, two leagues from Maracay. This town is modern, well built, and the residence of a number of planters; but it is peculiarly the abode of all the officers, factors, and persons employed in the administration of the tobacco cultivated in its vicinity,

vicinity, on account of the king. Here are a handsome church, a vicar for the religious department, and a lieutenant of justice for the civil. Its population consists of 8000 persons.

TULOMA, a river of Russia, which runs into the Ladoga lake, 32 miles N.W. of Olonetz.

TULON, a town of Thibet; 45 miles E. of Tankia.

TULONIUM, in *Ancient Geography*, a town of the interior of Spain, belonging to the Varduli, according to Ptolemy. In the Itinerary of Antonine, this place is on the route from Asturica to Burdigala, between Suiffatium and Alba.

TULOS, a word used by some medical writers to express a callus.

TULOSTOMA, in *Botany*, so named by Perfoon, from *τυλος*, a wart, or other protuberance from the skin, or flesh, and *στομα*, the mouth; which is exactly descriptive of the little orifice, by which the powdery seeds of this fungus are discharged.—Perf. Syn. Fung. 139. (Lycoperdon; Tourn. t. 331. f. E, F. Lamarck Illustr. t. 887. f. 3.)—Class and order, *Cryptogamia Fungi*. Nat. Ord. *Fungi*.

Ess. Ch. Receptacle coriaceous, globular, stalked, discharging the powdery seeds, intermixed with hairs, by a cylindrical cartilaginous mouth.

1. *T. brumale*. Common Stalked-Puff-ball. Perf. n. 1. (Lycoperdon pedunculatum; Linn. Sp. Pl. 1654. Hudf. 643. With. v. 4. 379. Sowerb. Fung. t. 206. Dickf. Dr. Pl. n. 100. Bulliard Fung. v. 1. 161. t. 294.)—Stalk nearly smooth, solid. Orifice flattish.—Found on the mossy tops of walls about Paris and London, in the winter or spring. It may easily be overlooked for some common unexpanded Agaric. The *stalk* is an inch and a half high, cylindrical, not quite straight, of a light brown, or stone-colour, fixed by fibrous annual roots. *Head* globose, smooth, half an inch or more in diameter, with a small, regular, orbicular orifice at the top, whose edges are flat and cartilaginous.

2. *T. squamofum*. Scaly Stalked-Puff-ball. Perf. n. 2. (*T. brumale* β; *ibid.* Lycoperdon pedunculatum; Sowerb. Fung. t. 206, the dissected figure, and some near it. L. pedunculatum axiferum; Bulliard Fung. v. 1. 161. t. 471. f. 2. L. album mammosum, pediculo longo et veluti squamoso, ac fistuloso, donatum; Mich. Gen. 218. t. 97. f. 7.)—Stalk scaly, hollow, with a central thread. Orifice prominent, tubular.—Found by Micheli, on banks near Florence. Mr. Sowerby received his specimens from Norfolk, by favour of the Rev. Dr. Sutton. Bulliard seems to have gathered his in France. We presume this must be a distinct species, well marked by the above characters.

3. *T. giganteum*. Great Stalked-Puff-ball.—Stalk woody, clothed with upright scales.—Gathered at Owhyhee, by Mr. Archibald Menzies. Mr. Sowerby says this is “a gigantic representation, as it were,” of the common kind, the *stalk* being twice as long, and four times as thick, more woody, and sometimes truly squamose, the *squamae* pointing upwards. The size of the *head* is in proportion. We know this fungus only from Mr. Sowerby’s incidental account, but have no doubt of its being a distinct species, in which more particular investigation might discover more decisive characters; and on this account we record it here.

TULOUR, or **TANNA LABU**, in *Geography*, an island in the East Indian sea, about 90 miles in circumference. N. lat. 4° 45'. E. long. 124°.

TULP, **NICHOLAS**, in *Biography*, an eminent physician, was the son of an opulent merchant, and born at Amsterdam in 1593. Having studied and graduated at Leyden, he settled in his native city, and rose to a high rank, not only in his profession, but as a citizen. Under

the latter denomination he was distinguished by the high posts which he occupied, and by the services which he rendered to his country. As burgomaster, to which station he was advanced in 1652, he resisted the invasion of Holland by Lewis XIV. in 1672, and thus saved his country; on which occasion a medal was struck to his honour with this motto, from the *Æneid*, “Vires ultra fortemque fenebræ.” Having completed his 80th year, he died in 1674. Tulp’s “Observationum Medicarum Libri tres,” 1642, 12mo. have been several times reprinted, and contain many valuable physiological remarks. He is said to have been among the first who observed the lacteal vessels. Haller. Eloy.

TULPEHOCKON, in *Geography*, a township of Pennsylvania, in the county of Berks, which, together with Bern and Bethel, contains 5800 inhabitants.

TULPEHOCKON Creek, a river of Pennsylvania, which runs into the Alleghany, N. lat. 40° 22'. E. long. 76° 58'.

TULSK, a post-town of Ireland, in the county of Roscommon. The promiscuous and indiscriminate ruins of castles and churches, bear ample testimony to its former importance, but it is now a wretched village. Tulske was represented in the Irish parliament, but lost its privilege at the Union. It is 75½ miles W.N.W. from Dublin.

TULSKOE, a government of Russia, bounded on the north by Moskovskaia, on the east by Riazanskoe and Tambovskoe, on the south by Orlovskoe, and on the west by Kaluzskoe; 120 miles long, and from 40 to 100 broad. Tula is the capital. N. lat. 53° to 55°. E. long. 36° to 38°.

TULUM, a town of Persia, in the province of Ghilan; 10 miles S. of Reshd.

TULUN, a town of Russia, in the government of Irkutsk, on the Ija; 44 miles E. of Niznei Udinsk.

TUMAGURRA, a town of Bengal; 18 miles N. of Toree.

TUMANSKOI, an island of Russia, in the Frozen ocean, of a triangular form, lying north of the isle of Kirlach, from which it is divided by a narrow channel; about 360 miles in circumference. N. lat. 71° 50' to 73° 15'. E. long. 119° to 126°.

TUMANUNA, in *Ancient Geography*, a municipal town of Africa, in Mauritania Cæsariensis, according to the Table of Peutinger.

TUMARRA, a town of Africa, in Mauritania Cæsariensis. Ptolemy.

TUMB, or **TOMBO**, or *Petombo*, or *Cotombo*, or *Slangen*, or *Great Tomb*, in *Geography*, an island in the Persian gulf, about three miles in length from east to west, and much frequented by trankees from the Arabian shore, which reside here a week or ten days for the benefit of fishing. A sandy bay on the east side seems a good landing-place. N. lat. 26° 24'. E. long. 55° 38'.

TUMB Namiu, or *Little Tomb*, a small island in the Persian gulf; 10 miles S.W. of Tomb.

TUMBABA, a word used by chemists to express *sulphur vivum*, or crude sulphur.

TUMBACH, in *Geography*, a town of Bavaria; 17 miles N.N.W. of Amberg.

TUMBADO, a small island among the Bahamas. N. lat. 26° 24'. W. long. 79° 30'.

TUMBALA, a word used by some authors, to express the *squamae*, or scales, of any metal.

TUMBALI, in *Geography*, a town of Hindoostan, on the coast of Malabar; 25 miles S. of Cochin.

TUMBELAN ISLANDS, a cluster of small islands in the East Indian sea. N. lat. 1°. E. long. 107° 58'.

TUMBERIDIPAL, a town of Hindoostan, in Myfore; 22 miles N. of Daraporum.

TUMBEZ,

TUMBEZ, a town of Peru, in the jurisdiction of Piura, near a river of the same name, which discharges itself into the bay of Guayaquil, almost opposite to the island of St. Clare. Barks, boats, balzas, and canoes, may go up and down this river, being three fathoms deep, and twenty-five broad; but it is dangerous going up it in the winter season, the impetuosity of its current being then increased by torrents from the mountains. At a little distance from the Cordillera, on one side of the banks of the river, stands the town of Tumbez, in a very sandy plain, interspersed with some small eminences. The town consists only of seventy houses, built of cane, and thatched, scattered up and down, without any order or symmetry. In these houses are about 150 families of Mestizos, Indians, Mulattoes, and a few Spaniards. There are, besides these, other families living along the banks of the river, who having the conveniency of watering their grounds, continually employ themselves in rural occupations. The heat is excessive; nor have they here any rain, for several years successively; but when it begins to fall, it continues during the winter. The whole country, from the town of Tumbez to Lima, contained between the foot of the Cordillera and the sea, is known by the name of *Valles*. Tumbez was the place where, in 1526, the Spaniards first landed in these parts of South America, under the command of Don Francisco Pizarro, and where he entered into several friendly conferences with the princes of the country, but vassals to the Incas. If the Indians were surpris'd at the sight of the Spaniards, the latter were equally so at the prodigious riches which they every where saw, and the largeness of the palaces, castles, and temples, of all which, though built of stone, no vestiges are now remaining; 280 miles N. of Truxillo. S. lat. 3° 13'. W. long. 80° 6'.

TUMBLER, a name given to a particular species of pigeon, called by Moore the *columba revolvens*. See PIGEON.

It has its name from its peculiar property of tumbling when it is in the air, which they are very fond of doing; and effect exactly in the same manner as our posture-masters do it; by throwing themselves over backward. It is a very small pigeon, and is always short-bodied, full-breasted, thin-necked, narrow-beaked, and has a small short head; the iris of the eye in this species is usually of a bright pearl-colour.

The English tumbler is usually of one plain colour; black, blue, or white: the Dutch is much of the same make, but has different colours, and is sometimes feathered on the legs; it has also a larger head, and thin skin round the eye. Some of the finest pigeons of this sort are bred from a mixture of the Dutch and English kinds. These pigeons are remarkable for the height to which they fly; they never ramble far from home, but will rise almost perpendicularly, till they appear no larger than a sparrow, or become quite out of sight; they will often keep at this height five or six hours, and then come gradually down again: they never tumble when they are at any great height, but only as they ascend or come down again. There are particular times also, at which these birds will take much higher flights than at others; but they ought to be kept by themselves, and practis'd to it by the company of one of their own species; for if they mix while young with other pigeons, they will learn to fly as they do; a flight of a dozen of these birds sent out together, will keep so close, as to be all in a compass that might be covered with a handkerchief; but they should never be turned out in foggy weather, or in high winds; in the first case, they lose sight of their home, and perhaps never find it

again; and in the other, they are blown away; and if they return, it is not till another day; in the mean time lying out, they are in danger of cats, and other accidents.

Lastly, the hen should never be turned out with egg, for she is then sick, and not fit for flying; and beside often drops her eggs, and the breed is lost by it. Moore's *Columbarium*, p. 39.

TUMBLER is also a sort of dog, called in Latin *vertagus*, from his quality of tumbling and winding his body about, before he attacks and fastens on the prey. See DOG.

This species took its prey by mere subtlety, depending neither on the sagacity of its nose, nor its swiftness; if it came into a warren, it neither backed nor ran on the rabbits; but by a seeming neglect of them, or attention to something else, deceived the object till it got within reach, so as to take it by a sudden spring.

These dogs are often less than hounds; being lank, leaner, and somewhat prick-eared; and by the form of their bodies, they might be called mungrel greyhounds, if they were a little bigger. They seem to answer to our modern lurchers.

TUMBLING-BAY, in a *Canal*, is the same with *over-fall* or *weir*; which see.

TUMBLING Dam, in *Geography*, a place on the river Delaware; 20 miles above Trenton.

TUMBLING-Home, the inclination of the top-sides of ships from a perpendicular towards the centre or middle line of the ship. The top-sides of three-decked ships have the greatest tumbling-home, not only from their being loftier, but for the purpose of clearing the upper works from the smoke and fire of the lower guns. The advantages and disadvantages of tumbling-home sides will be found discussed in *Ship-building*; which see.

TUMBREL, TUMBRELLUM, a ducking or cucking-stool, an engine of punishment, which ought to be in every liberty, that has a view of frank-pledge, for the correction and cooling of scolds, and unquiet women.

TUMBREL, in *Artillery*, is a kind of carriage with two wheels, used to carry the tools of the pioneers and miners, and sometimes likewise the money of the army.

TUMBREL is also a common name for a dung-cart.

TUMBRIL, SHEEP, a contrivance of the basket kind for the purpose of keeping different sorts of food for the use of them. It consists of a sort of circular cage or basket made of osiers, willows, or any other plants of the brushwood kind. It is about ten feet in circumference in the whole, and closely wattled to the height of about one foot, above which it is left open for the space of eighteen inches; it is then wattled again to the height of eight or ten inches more, and an opening, about eighteen inches in breadth, is left at the top, for putting in the hay, roots, or other sorts of food, whether green or dry. The staves which form the skeleton of it are put ten inches asunder, so that twelve sheep may feed at it at the same time.

Considerable advantage may be derived from this simple contrivance in the feeding of these animals, as it not only effects a material reduction in the consumption and expence of the provender, which is by this means prevented from being trodden under foot, or soiled by the dung; but in this state of separation the stronger sheep cannot drive away the weaker, as each is secured by the head. And as the construction of such tumbrils is attended with no difficulty, they may be easily provided and conveyed to any part of a farm, and with due care be kept in constant use for eight or ten years, or even much longer.

TUMBUK, in *Geography*, a town of Africa, in Kordofan; 180 miles S.W. of Sennaar.

TUMEFACATION, the act of swelling, or rising into a tumour.

Inflammations and tumefactions of the testes frequently happen in the gonorrhœa; either from the weakness of the vessels, violent motion, unseasonable use of astringents, a neglect of purging, or the like.

TUMEN, in *Geography*, a town of Persia, in the province of Ghilan; 18 miles W. of Reshd.

TUMERIZ, a town of Moravia, in the circle of Brunn; 6 miles W. of Nicolsburg.

TUMEX, in the *Materia Medica of the Ancients*, a name given by authors to a sort of tutty, the same with the *cadmia placitis* of Dioscorides and the Greeks. This was a worse kind than the botrytis. See **TSAPHARI**.

TUMMARRAH, in *Geography*, a town of Africa, in Sahara.

TUMMEL, a large river in Perthshire, Scotland, rises on the confines of Argyleshire. Near its source it forms a broad lake, called Loch Rannock, at the termination of which the river assumes the name of the Tummel. In its progress it forms another lake, called Loch Tummel, in which is a small island, with an old fortress or castle, formerly the residence of the chief of the clan of the Robertsons. The whole course of the Tummel is rapid and furious, and in several places forms very romantic and picturesque cascades. One of its falls, near its junction with the Garry, is particularly grand, as its whole water is precipitating over the broken rocks with astonishing violence. After its union with the Garry, the character of the Tummel seems entirely changed: before, it was an impetuous torrent; it now becomes a quiet and placid stream. The banks below the junction are extremely rich, and the river meanders through a fine valley; now dividing its stream, and forming small islands, now running in a broad sheet. Though the Tummel is smaller than the Garry, it gives the name to the river formed by their union, because it can trace its origin farther back than the Garry, which is composed of the waters of the neighbouring hills, while the source of the Tummel is a considerable lake, in its course from which several distant streams contribute to its importance. The Tummel pours its waters into the river Tay at Logierat.—Garnet's *Tour through the Highlands*, 4to. 1800. *Beauties of Scotland*, vol. iv. Perthshire, 1806.

TUMMEROO, a town of Meckley; 25 miles S.E. of Munnypour.

TUMMOO, a town of Meckley; 45 miles S. of Munnypour.

TUMOURS. The meaning of the word tumour, in *Surgery*, is exceedingly comprehensive; for it applies generally to the growth of all distinct superfluous parts, or substances, which did not make any portion of the original structure of the body, as well as to every morbid increase in the bulk of other parts, which naturally and always existed in the human frame. Within this definition will come the greater number of diseases; as *ascites* or *dropsy*, *bronchocele*, *œdema*, *fungus hæmatodes*, *hydrocele*, *ganglions*, *inflammations* of various organs, *white swellings*, *aneurisms*, *abscesses*, *hemorrhoids* or *piles*, *exostoses*, *excrescences*, *polypi*, *herniæ* or *ruptures*, *scirrhus*, *warts*, &c. &c. (See these words.) Had it, therefore, entered into our arrangement to consider, in the present article, all the diseases which may be classed as tumours, we should have had a very tedious and laborious task indeed, namely, that of writing out and presenting to the reader, in this part of the *Cyclopædia*, a description of the nature and treatment of at least two-thirds of all the diseases usually considered as surgical. Our plan, however, has been different; and for the sake of avoiding all occasion

for so long a production, we have treated of numerous kinds of tumours in separate articles, which are alphabetically distributed in this *Dictionary*.

In the present article, we propose to offer a few general remarks on the formation of tumours; to describe particularly those of the encysted and sarcomatous kinds; and to give some account of the manner of removing tumours in general.

It is difficult to give altogether an unobjectionable account of the formation of tumours, the secrets of which process will perhaps never be disclosed. We know that parts become thickened and enlarged by inflammation; but the causes of the origin and growth of all such swellings as consist of some new production, which made no part of the original composition of the body, may be said to be totally unknown. In Mr. Abernethy's surgical works will be found some remarks upon this subject, which are far more rational and interesting than those generally advanced.

"The incipient state of tumours," he observes, "will naturally first engage our attention; and those which perhaps form the best example and illustration of the subject, are such as hang into cavities from the membranous surfaces, which form their boundaries. The cause of tumours having a pendulous attachment attracted the attention of Mr. Hunter, who made the following remarks on the formation of one on the inner surface of the peritoneum, as is related by sir E. Home, in the *Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge*, vol. i. p. 231. 'The cavity of the abdomen being opened, there appeared lying upon the peritoneum a small portion of red blood recently coagulated: this, upon examination, was found connected to the surface, upon which it had been deposited, by an attachment half an inch long; and this neck had been formed before the coagulum had lost its red colour.' Now had vessels shot this slender neck, and organized the clot of blood, as this would then have become a living part, it might have grown to an indefinite magnitude, and its nature and progress would probably have depended on the organization which it had assumed. I have," says Mr. Abernethy, "in my possession a tumour, doubtless formed in the manner Mr. Hunter has described, which hung pendulous from the front of the peritoneum, and in which the organization and consequent actions have been so far completed, that the body of the tumour has become a lump of fat, whilst the neck is merely of a fibrous and vascular texture. There can be little doubt, but that tumours form every where in the same manner. The coagulable part of the blood, being either accidentally effused, or deposited in consequence of disease, becomes afterwards an organized and living part, by the growth of the adjacent vessels and nerves into it. When the deposited substance has its attachment by a single thread, all its vascular supply must proceed through that part; but, in other cases, the vessels shoot into it irregularly at various parts of its surface. Thus, an unorganized concrete becomes a living tumour, which has at first no perceptible peculiarity as to its nature: though it derives a supply of nourishment from the surrounding parts, it seems to live and grow by its own independent powers; and the future structure, which it may acquire, seems to depend on the operation of its own vessels. When the organization of a gland becomes changed into that unnatural structure, which is observable in tumours, it may be thought in some degree to contradict those observations; but, in this case, the substance of the gland is the matrix, in which the tumour is formed.

"The structure of a tumour is sometimes like that of the parts near which it grows. Those which are pendulous into joints

joints are of a cartilaginous or osseous fabric; fatty tumours frequently form in the midst of adipose substance; and I have seen some tumours growing from the palate, and having a slender attachment, which in structure resembled the palate. Sometimes, however, they do not resemble in structure the parts from which they grow. The instance, just mentioned, of the pendulous portion of fat growing from the peritoneum, will serve as a proof: the vessels, which had shot into it, made the tumour into fat, whilst the neck was a fibrous and vascular structure. I have seen osseous tumours unconnected with bone, or periosteum; and, indeed, in general, the structure of a tumour is unlike that of the part in which it is produced. Therefore, we seem warranted in concluding, that, in many cases, the nature of the tumour depends on its own actions and organization; and that, like the embryo, it merely receives nourishment from the surrounding parts.

"If, then, the coagulable part of the blood be from any cause effused, if the adjacent absorbents do not remove it, and the surrounding vessels grow into it, the origin of a tumour may be thus formed." It may be right," says Mr. Abernethy, "to reflect a little on the causes which may occasion a deposition and consequent organization of the coagulable part of the blood; as such reflections throw light on the nature and growth of tumours, and lead to the establishment of principles, which are applicable to tumours in general. The deposition of the coagulable part of the blood may be the effect of accident, or of a common inflammatory process; or it may be the consequence of some diseased action of the surrounding vessels, which may influence the organization and growth of the tumours.

"In the former cases, the parts surrounding the tumour may be considered simply as the sources from which it derives its nutriment, whilst it grows apparently by its own inherent powers, and its organization depends upon actions begun and existing in itself. If such a tumour be removed, the surrounding parts, being sound, soon heal, and a complete cure ensues. But if a tumour be removed, whose existence depended on the disease of the surrounding parts, which are still left, and this disease be not altered by the stimulus of the operation, no benefit is obtained: these parts again produce a diseased substance, which has generally the appearance of fungus; and, in consequence of being irritated by the injury of the operation, the disease is in general increased by the means which were designed for its cure. It appears, therefore, that, in some cases of tumours, the newly formed part alone requires removal; whilst, in others, the surrounding substance must be taken away, or a radical cure cannot be effected.

"There is yet another circumstance deserving attention," says Mr. Abernethy, "before I proceed to the particular consideration of the subject; which is, that a tumour, once formed, seems to be a sufficient cause of its own continuance and increase. The irritation which it causes in the contiguous parts, is likely to keep up that increased action of the vessels, which is necessary to its supply; and the larger it becomes, the more does it stimulate, and of course contribute to its own increase.

"Suppose then a tumour to have formed and increased; it will continue to grow, and to condense the surrounding cellular substance, and thus acquire for itself a kind of capsule. Tumours are more closely or loosely connected to the surrounding parts; which circumstance seems to depend upon the degree of stimulus which they occasion, and the inflammation which they thus excite. This irritation perhaps may be the cause why some tumours, which are slow in their first increase, grow rapidly after they have acquired a

certain size." See the Surgical Works of John Abernethy, F.R.S., &c. vol. ii. p. 7, et seq.

We regard the preceding account of the formation of tumours as the most rational and probable which has hitherto been offered.

All tumours, which are such as may be termed new-formed parts, and did not enter into the original structure of the body, appear to be endued with inferior powers of life, and are much sooner destroyed by inflammation than other parts, which always naturally existed in the animal frame. The knowledge of this fact has led to the method of curing several kinds of tumours, by the application of stimulating substances to them; but it is not a plan of treatment which will invariably answer. Some tumours are so large, that the constitutional illness, which would arise from the inflammation and sloughing of the whole of their mass, would in all probability be fatal. Some swellings are of a malignant, irritable character, so that applying stimulants to them is more likely to exasperate than cure the disease. Hence, it is generally deemed imprudent to apply caustics to cancerous affections; because unless every particle of such diseases, and a good deal of the surrounding substance, be destroyed by the action of these violent remedies, the case will not be benefited, but rendered ten times worse. Indeed, we may lay it down as a general maxim, that the plan of attacking tumours with stimulants and caustics is a bad one, unless it be certain that every particle of the disease can be in this manner easily and quickly destroyed, without too much local and constitutional irritation being produced.

Encysted Tumours.—In the midst of the subcutaneous cellular substance, of that which separates the muscles, or even of that which enters into the texture of different organs, tumours are observed to form, whose circumference presents a particular structure, and whose cavity is filled with unusual kinds of matter. The parietes of these tumours are composed of a sort of membrane, named a *cyist*, and are connected with the surrounding parts by means of the neighbouring cellular substance. This latter circumstance appears to have attracted the attention of a great many writers, who have conceived the formation of cyists, by supposing that a cavity of the cellular membrane, in consequence of disease, may have all its communications with the other cavities of the cellular membrane destroyed; that it may acquire the property of secreting matter entirely different from that which it secretes in the natural order of things; and that the accumulation of the deposited substance may produce a progressive distention of the small cavity. The layers of the cellular substance, in which the tumour develops itself, are afterwards supposed to undergo a kind of condensation; and by such theories, it is attempted to explain the considerable thickness of some cyists, the extraordinary appearances of their organization, and the possibility of resolving them into cellular substance by maceration, inflammation, suppuration, &c. It is difficult, observes M. Delpech, to adopt this opinion, and reconcile it to the following observations.

1. There are some thin transparent cyists, which have been termed *serous*, whose inner surface is villous, and whose cavity is filled with a sero-mucous secretion, resembling synovia. In the same cavity, hairs are frequently observed, which are of different lengths, and always curled; the roots being implanted into the sides of the cyist.

2. There are other cyists, which are generally of a thin, but much more compact, texture than cellular membrane, being, as it were, almost horny and half opaque. Their inner surface is pulpy, and sometimes irregular. Their cavity

cavity is filled with a fluid, that has more or less consistence, is pultaceous, and of a white or yellowish colour, being compared sometimes to pap, sometimes to liquid honey, and in other instances to suet imperfectly melted. Hence, the names of *atheroma*, *meliceris*, and *steatoma*, by which they are commonly distinguished. The contents of these encysted swellings have different proportions of fat; and hairs are also frequently found in the cyst, their insertions into it plainly admitting of demonstration, notwithstanding the difficulty arising from the tenacity of the contained matter.

3. We observe some cysts formed of albumen converted into a fibrous texture, and whose organization is more or less imperfect. Particular cysts of this latter kind are composed of several concentric layers, which are only slightly adherent together, and the organization of which is unequally advanced. In such a case, M. Delpech has found the external layers made up of a perfectly fibrous texture; while the vestiges of an organized structure were much less evident in the subjacent layers, and altogether wanting in those most deeply situated, which were purely albuminous. The contained matter is of an albuminous or gelatinous quality.

4. Other cysts are what Delpech calls fibro-cellular; their sides are very thick, extremely compact, and sometimes even ossified in certain parts. The contents are almost like serum, occasionally tinged with blood.

5. Excepting this last sort of cyst, which is closely connected with the surrounding cellular membrane, and almost identical with it, there is, of every kind of cyst, a portion of the surface which scarcely has any adhesion to the circumjacent parts. In extirpating such tumours, if the surgeon makes a perpendicular cut through the parts, covering their external surface, he can afterwards completely detach them with the utmost facility. In short, they can be separated with a spatula, or any other blunt instrument, without any dissection.

6. Sometimes inflammation attacks the cellular membrane around the cyst, and terminates in suppuration. One or more spontaneous openings serve at first for the discharge of the abscess; but these are at length joined together by the effect of ulceration, and the whole mortified cyst sloughs away. The same thing is occasionally seen, when caustic has been applied to the skin covering the most prominent part of the swelling. The application not only produces an eschar of the integuments, it causes also an acute inflammation of all the cellular substance around the tumour, and mortification of the whole cyst, which comes away in a mass. Likewise, when the surgeon has been fearful of cutting out every portion of a cyst, and only opened it, or removed a part of it, with the design of completing the destruction of the rest by local applications, it has often happened that the remainder of the cyst has spontaneously sloughed away, while the surrounding cellular membrane was in a state of acute inflammation.

7. Lastly, an encysted tumour, treated in the preceding manner, has often presented phenomena resembling those of cellular substance, and admitted of being cured in the way which was desired. Healthy suppuration has been established; granulations have arisen; the cavity has been gradually lessened; and a solid cicatrix has at length been formed. But it has much more frequently happened, that the cavity has not been obliterated; but become filled with painful, bleeding, fungous excrescences, which have caused an apprehension of cancer, and a necessity for no longer deferring the extirpation of the disease.

These reflections appear to M. Delpech to justify the conclusion, that encysted tumours do not proceed from an

accidental or mechanical modification of the cellular membrane; but that they are so many new-formed organs, which are not endued either with the same degree or the same mode of vitality as the surrounding parts.

The causes of the formation of encysted tumours are entirely unknown: it is observed, however, that a strongly marked propensity to be afflicted with many such swellings exists in particular individuals, which is a fact that would lead one to suspect the operation of constitutional causes. For instance, it is common for those firm cysts, which contain a pappy matter, and which have received the appellations of *atheroma*, *meliceris*, and *steatoma*, to be very numerous in the scalp, or other particular situations. It is well known also that the fibro-cellular cysts, usually named dropsy of the ovary, are sometimes prodigiously numerous, either in one or both of these organs together. It is superfluous to remark, that external violence, to which encysted tumours have been often ascribed, has in reality no concern with the disease. Besides the evident disproportion between this species of cause and so great an organic change, it may be observed, that if a blow can sometimes be cited, as having preceded the formation of an encysted tumour, the same cause cannot be specified in other cases, where twenty or more of these swellings originate in succession.

An encysted tumour, at its commencement, is always exceedingly small, and of a perfectly indolent nature. It is not known whether, in this early state, the cavity of the cyst already exists. The swelling usually grows with remarkable slowness: indeed, it is often many years before it attains a considerable size. It even frequently happens, that after the tumour has become large enough to be manifest, the cyst remains stationary for years, until some irritation occurs, which renders the disease painful, and accelerates its progress. It appears that, in these circumstances, the latter enlargement of the tumour does not depend upon a brisker secretion of the kind of matter originally contained in it, but rather upon suppuration of the cyst. In fact, the inside of the sac is then found to be inflamed or ulcerated, and a certain quantity of pus blended with the pappy matter, with which the swelling had no doubt been previously filled. This change, however, seldom happens, unless the tumour be, by its situation, exposed to repeated external violence.

An encysted swelling is ordinarily of a spherical shape, except when this form is altered by the disposition of the surrounding parts. The tumour is moveable in a degree proportioned to the mass of cellular substance around it; and its surface is in general smooth and regular. Sometimes, however, bands of aponeurotic fibres press upon certain portions of it, as it enlarges; and thus it is rendered irregular. The same alteration may be produced by great inequality in the thickness and consistence of the sides of the cyst, or by their being weakened by internal ulceration. It is not uncommon in the beginning, and even sometimes in an advanced stage, for the swelling to have a very firm feel, either because the cyst is still of considerable thickness, and the contained matter not copious; or else because the cyst is exceedingly tense, not having yielded to the distention of the matter within it. In this circumstance, the swelling is not compressible; and if, at the same time, its surface should chance to be irregular and tuberculated, and especially if the disease should also be painful, the surgeon may easily make a mistake, and imagine the case to be cancer. The resemblance, indeed, is very great; and M. Delpech assures us, that he has seen practitioners of the highest merit deceived by it. But it more usually happens, that an encysted tumour presents, from the first, a soft, fluctuating,

TUMOURS.

fluctuating, doughy feel. The fluctuation is obvious enough, when the cyst is thin, and the contained matter almost all liquid. This symptom, however, is absent, when the sides of the swelling are very thick and firm, and its cavity is occupied by a pappy sort of matter; but, in this last kind of case, the shape of the mass may be altered by compression, and the tumour will retain every impression made in it. If to these circumstances we add, that the tumour is every where soft and compressible, we have all the proper symptoms of this class of swellings; symptoms by which they may be most frequently distinguished from every other disease that has any resemblance to them.

The stationary condition of an encysted tumour may last during life, if the disease be not exposed to external violence, and it be free from every complication. But, as we have already explained, an accidental irritation may cause an inflammation, and suppuration, and ulceration, of the cyst. The consequence may also be inflammation and ulceration of the integuments. In both cases, the cyst may spontaneously burst, the contents escape, the cyst slough away, and the ulcer heal; or else soft, painful, fungous granulations may shoot from the inner surface of the cyst, and render cicatrization impracticable. With regard to complications, a cancerous affection, which is sometimes joined with the organization of an encysted swelling, is the most afflicting: in this case, when ulceration occurs, the carcinomatous symptoms immediately make rapid and dangerous progress.

Encysted tumours, like aneurisms, may destroy the parts of bones, upon which they make considerable pressure. Delpech, *Précis Élémentaire des Maladies Chirurgicales*, tom. iii. sect. 8.

A curious appearance is sometimes the consequence of an encysted tumour being filled with a substance resembling horn in consistence; for, when the cyst bursts, the indurated contents gradually protrude, and sometimes form an appendage very much like horn. Some years ago, we saw a complete horn removed from the scrotum, by sir J. Earle, in St. Bartholomew's hospital. It had begun as a tumour, which, after bursting, emitted from its inside the horny excrecence. The preparation is now in Mr. Abernethy's museum.

In the British Museum is preserved a curious specimen of a horn, which grew from a woman's head, and, in all probability, was formed by a process similar to that which we have mentioned. In Mr. A. Cooper's possession is a still more remarkable specimen, which was given to him by Dr. Roots of Kingston, and which in shape and size bears a close resemblance to a ram's horn! It also grew from the head, and had been preceded by another horny excrecence, similarly situated and shaped, which had likewise been removed. We have subsequently been informed, that the patient, who was a gardener, had afterwards a third horn, which grew in the same identical place. In this case, we must suppose that a portion of the cyst had not been extirpated in the previous operations, and that it retained the power of secreting the horny matter. First Lines of Surgery, p. 142. edit. 3. See also *Horny Excrecences*, in this Cyclopædia; and sir E. Home on the same subject, in the *Philosophical Transactions*.

We have already noticed the curious fact of many cysts containing hairs: we have now to mention the more surprising circumstance of teeth having been sometimes found in the cavities of encysted tumours. A remarkable example was lately published by Mr. S. Barnes, surgeon at Exeter. The case was a double encysted swelling in the orbit; in the extirpation of which disease, a sharp bony process was dis-

covered, and removed, together with the remains of the fac which adhered to it.

On examination, it was found to be in structure a tooth, and much resembling in form and size the supernumerary teeth sometimes found in the palate. The part which projected into the fac was conical, and covered by smooth, shining, white enamel; the fac firmly adherent round a contracted portion at the base of the cone, resembling the neck of a tooth; and on the outside of the fac, the appearance of a root, truncated obliquely, with a passage in the centre, evidently containing blood-vessels. It was by this part that it was connected with the floor of the orbit. See *Medico-Chirurgical Transactions*, vol. iv. p. 316, et seq.

Practitioners are not acquainted with any effectual means of stopping the growth of encysted tumours; nor are the endeavours to promote the dispersion of the cyst and its contents by general or topical treatment, attended with any success. It has been alleged, that, in cases of what have been called sero-mucous cysts, the removal of these cysts and their contents might be brought about, by exciting the action of the absorbents with strong discutient topical applications; and instances of this mode of cure have been cited in relation to such swellings formed upon the patella, or at the extremity of the olecranon. But Delpech remarks, that, in these cases, the nature of the disease is mistaken, because, in the situations specified, there constantly exists a synovial membrane, a bursa mucosa, forming a kind of joint betwixt the bony prominence and the integuments. The synovia may accumulate and lodge in the cavity of the membranous sac; and if the membrane be not so thoroughly diseased, as to render the absorption of the synovial fluid impossible, the natural functions of the part may be re-established, and the swelling admit of being slowly dispersed. This is what is sometimes accomplished by different local remedies, particularly those of the discutient class. But if the synovial membrane is more completely diseased, its properties may be so altered, that the secretion from it is altogether of a different nature, and absorption is totally obstructed. This is what sometimes occurs in persons who are in the habit of kneeling a great deal; in them the synovial membrane is often considerably thickened; sometimes it is partly ossified; and Delpech mentions, that he has even found loose substances in its cavity. Here we see, that in the first instance, an immediate cure is possible, since the disease is not an organic alteration. But in the second example, which more resembles the state of encysted tumours, although it be only the change of a pre-existing organ, the affection cannot be cured without destroying the dis-tempered part. Delpech, with a view of opposing evident facts to such as are wrongly interpreted, or doubtful, adverts particularly to those sero-mucous cysts which so often form in the substance of the eye-lids. The apprehension of a fear upon the face, says he, constantly leads to a trial of topical resolvers, before extirpation is attempted. Surgeons know, however, that the tumours are not removed by absorption; and that, if the local applications sometimes accomplish the cure of the disease, it is by producing an irritation of the skin, which irritation extends itself to the cyst, where inflammation, suppuration, ulceration, and sloughing, are the consequences. But, generally speaking, these effects are not excited, and when they are, a cure of the disease is not uniformly the result. The inflammation, carried to the requisite pitch to produce ulceration of the cyst, may only affect some points of it, and perhaps merely that portion which is next to the integuments. Every where else the inflammation may be very slight, and quite insufficient to cause ulceration and sloughing of the deeper part

part of the cyst. Then, external ulceration taking place, the tumour empties itself; and the part either heals up, with the exception of a fistulous opening; or things are brought into their original state by the formation of a perfect cicatrix, so that the encysted tumour makes its appearance again.

Some practitioners have thought that encysted tumours might be cured by the employment of irritating injections, like those so successfully used in the treatment of hydrocele. The experiments which have been made with them, however, have not generally answered; and, if we reflect upon the comparative state of things, it will appear that, in these cases, the object aimed at should not be the same. In the example of hydrocele, it is unnecessary to destroy the tunica vaginalis, and the obliteration of its cavity is all that is needed. Experience also proves, that, in consequence of a very mild degree of inflammation, the cavity of the tunica vaginalis is filled with lymph, which becomes organized, and connected with the adjacent membranous surfaces. This suffices to render all exhalation for the future impossible. But encysted swellings have a peculiar organization, different from that of any originally formed parts. We have no reason for supposing, that any slight inflammation will make them pour out coagulating lymph that is capable of becoming vascular. They even seem so indisposed to be thus affected, that nothing at all resembling it happens, unless the cause of the inflammation is kept up with considerable perseverance. The inflammation also, when it is excited, more readily produces mortification of the cyst, than the other kind of alteration. In fact, it is observed, that while some portions of the inflamed cyst become covered with fungous granulations, others mortify and separate in the form of sloughs. The whole of a cyst has not always the same structure, and ossified parts of it, for instance, are not likely to admit of that process, by which a hydrocele is usually cured. The hairs often growing in the cavity of an encysted tumour, must generally have their attachments destroyed by the inflammation following the use of an irritating injection, and they would then probably operate as extraneous substances.

These circumstances tend to shew, that the practice of making an incision into the swelling must be at all events preferable to that of employing irritating injections. By an incision, all the contents may be discharged, the whole cavity of the cyst exposed, and such applications constantly made as are calculated to keep up the requisite degree of inflammation. This method, also, gives the surgeon an opportunity of destroying particular portions of the cyst with caustic, if necessary. In this way, he is sometimes obliged to destroy the large fungi, which frequently originate from the thickest parts of the cyst, after it has been opened and cauterized, or merely irritated by the dressings. Too often, however, the superficial use of caustic is insufficient to lessen the size of these fungous growths, and not adequate even to restrain their daily increase; while deep cauterizations produce acute long-continued pain, fever, loss of rest, and great irritation of the whole extent of the disease. The train of symptoms, indeed, which the repeated free use of caustic may occasion, must seem still more alarming, when it is recollected that the cyst of the tumour sometimes becomes the seat of cancer; and that all the ravages of the latter disease in the ulcerated state may be the consequence. In this circumstance, the practitioner is obliged to have recourse to the extirpation of the swelling, and this sometimes a long while after the cyst has been opened, and not before the patient has suffered a long series of other painful, unavailing measures. Nor can these dangerous effects be avoided by opening the tumour with caustic instead of with

a cutting instrument. The more certain inflammation of the cyst thus aimed at, is by no means sure of ensuing; and it will never follow, unless the caustic act strongly on the cyst. Besides, the action of caustic is too variable to justify the calculation, that its effects will reach to a precise depth, and always effectually destroy the cyst. See Delpech, Précis Élémentaire des Maladies Chir. tom. iii.

The inconveniences of opening an encysted tumour ought to make us give a decided preference to extirpating or amputating the whole of the swelling, whatever may be the nature of the cyst. Indeed, this method of treatment is superior to all others. The art of doing the operation skillfully, consists in detaching the tumour from the surrounding parts without wounding the cyst. If the latter accident occur, the contents frequently flow out, the cyst collapses, and the continuance of the dissection is attended with more difficulty. It is a great point to remove every particle of the cyst; and hence it is satisfactory to take it out entire, that is, without wounding it. When any portion remains behind, the wound will frequently not heal, in consequence of fungous granulations arising from the diseased part. Unless the swelling be large, a single incision through the skin is sufficient; but in other instances, it is advantageous to

make two semicircular cuts in this manner, ; first, because it facilitates the removal of the tumour; and secondly, because it prevents a redundancy of skin, which would take place if none were removed, and which would have the effect of seriously retarding the cicatrization of the wound.

After the operation, the edges of the wound are to be brought together with sticking-plaster, and a compress and bandage applied.

The excision of encysted tumours, superficially situated, is mostly very easy, as the cyst is only slightly connected with the surrounding cellular membrane. But there may be more difficulty when the swellings have been in a previous state of inflammation; when they are very large, or when a portion of the cyst is deeply situated, or closely adherent to other parts. First Lines of Surgery, p. 144, edit. 3.

We must not quit the subject of encysted tumours, without making a few remarks on those of the scalp.

The encysted tumours met with in this part, are situated between the integuments and the aponeurosis of the occipito-frontalis muscle. Their cysts are mostly of a hard, horny consistence, and filled with a pultaceous matter, being what are termed cases of *atheroma*. It is very common for such swellings to grow in great numbers. The intimate union between the aponeurosis and the skin causes the latter to be considerably stretched by the growth of tumours underneath it; but notwithstanding this effect, and that the integuments are also sometimes rendered very thin from the same cause, they are seldom altered in appearance, excepting occasionally their exhibiting a livid colour, which is a sign of their being about to ulcerate. When encysted tumours of the scalp have slowly attained an immense size, the skin covering them is distended in such a degree, that it is either quite bald, or at most only has a very few hairs upon it, so widely separated are the bulbs. It rarely happens that the pressure of the swelling produces an absorption of the part of the skull underneath the disease; but examples of this kind have sometimes been observed.

Encysted tumours on the top of the head, even when they have acquired a considerable size, may be easily concealed by a hat, cap, or the head-dress; and, unless in a painful, inflamed, or ulcerated state, cause but little inconvenience. But when they are situated at the sides of the cranium, they render the wearing of hats, or any kind of head-dress, less

TUMOURS.

convenient, and are much exposed to frequent causes of irritation, by which their enlargement, and even external ulceration, may be promoted.

The solidity and simple structure of the surrounding parts make the extirpation of these tumours very easy of accomplishment. A great portion of the skin which covers them, thin as it may be, ought to be saved and laid down immediately upon the subjacent parts. It is only when the skin has been enormously distended, that it becomes necessary to cut away the redundant quantity of it. No endeavour should ever be made to cure encysted swellings of the scalp by opening them, or applying caustic. The safest method is to remove them altogether with the knife. The surgeon need not be afraid of extending his incisions under the deepest part of the swelling; for if he be careful to cover the denuded part of the cranium with the skin which he is to save, no exfoliations will generally follow. They do not necessarily follow, even when the pressure of the swelling has caused an absorption of some of the subjacent bone. Delpech is of opinion, that, as the scalp is very disposed to erysipelatos inflammation after wounds, surgeons ought not to cut out encysted tumours of that part, unless they produce serious inconvenience. On this point, however, we think differently; because we regard the objection to the operation, on the score of the danger of erysipelas from the wound, as exaggerated, and by no means sufficiently valid to justify leaving the tumour to itself. The disease would then continue to increase; the operation required hereafter would consequently be more serious; and, in the event of the tumour ulcerating, both more difficult in its execution, and more uncertain in its event.

In another part of the *Cyclopædia*, the reader will find a few observations on the encysted tumours which frequently form upon the eye-lids. See *EYE-LIDS, Encysted Tumours of*.

Of Fatty Tumours, Adipose Sarcoma, or Lipoma.—Fatty tumours, often termed also *lipomatous*, or *adipose*, are formed by an accumulation of fat in a limited, and generally very circumscribed, extent of the cellular substance. The structure of a lipoma is absolutely the same as that of the adipose substance, such as it appears to be in those situations where fat naturally collects; with this difference, however, that the interstices of the cellular membrane, thus affected, are of considerable size, and obviously enlarged. The integuments, which are distended, and rendered much thinner, constitute a true sac spread over the mass of fat, of which the tumour is composed; nothing appearing to be interposed between them and the swelling itself. There are some cases, where the partitions of the cellular substance, which separate the cavities in which the fatty matter is deposited, are thicker and more compact than in the natural state; and when a section is made of these swellings, the exposed surface presents a marbled appearance of a yellow and white colour. Delpech remarks, that this species of lipoma is more disposed to become cancerous, than the common forms of it; but of this, very rational doubts may be entertained. In fact, our experience teaches us that true adipose tumours have as little tendency as any sort of swelling to change into true carcinoma, or that disease which is characterized by the peculiar alteration of structure, seen only in feirrhous affections.

Fatty swellings are mostly of an oblong pyramidal shape, and have a narrow pedicle, which is itself of a fatty texture; but sometimes they have a base, which is as broad as the whole mass of the tumour.

Lipomatous or fatty tumours are met with in persons of all ages; but they are most frequently observed in adults. The shoulders, the back, and the neck, are very common

situations for these swellings. But their occurrence is so frequent, that there are few surgeons who have not had many opportunities of seeing them in almost every region of the body. We once saw an adipose tumour which grew on the thigh, and after it had been removed by Mr. Cline, in St. Thomas's hospital, was found to weigh between fourteen and fifteen pounds. Sometimes adipose tumours are formed in parts where there is naturally but a small quantity of fat: thus Delpech has seen a fatty swelling formed in the labia pudendi, the structure of which is very different from fat. Sometimes adipose swellings are formed betwixt the peritoneum and the parietes of the abdomen, in which circumstance the tumours make their way outwards under the integuments, drawing along with them the part of the peritoneum to which they are attached. Such cases have been improperly named by the French surgeons "hernies graisseuses."

The causes of the growth of adipose tumours are not known: the disease has been sometimes ascribed to blows, and other kinds of external violence; but we agree with M. Delpech in believing, that this doctrine is altogether incorrect and unfounded.

The shape and slow growth of adipose tumours might suffice to indicate their nature; but they present other characters, amongst which the consistence of the mass of the swelling deserves particular notice. These tumours are not elastic, but of a peculiar soft feel, resembling what is perceived on handling a bag filled with cotton. Their surface is unequal, but the irregularities which are distinguishable through the thin integuments have no firmness, and are obliterated by compression. These circumstances, however, are only strongly marked in such adipose tumours as have not yet acquired an immense size, and which remain free from every complication. When the swelling has become exceedingly large, its weight, its magnitude, its pressure on the surrounding vessels and integuments, materially obstruct the circulation; and an œdema then taking place between the skin and adipose substance, the consistence of the latter part may appear to be increased. A manual examination, however, made by a surgeon of experience, will still detect the kind of softness which is peculiar to all fatty tumours, and discriminate it from the firmer feel of the cellular membrane immediately under the skin. Any previous attacks of inflammation may produce the same effect, and this even in a more remarkable degree. Such attacks are very common in those adipose swellings whose situation particularly exposes them to frequent causes of irritation. Thus, M. Delpech once saw a large lipoma growing in one of the labia pudendi, the incessant motion of which swelling, together with the friction of the thighs against it, and the irritation of the urine, had frequently made the skin inflame, and caused deep ulcerations in the sides of the tumour. The swelling was heavy and indurated; the irregularities of its surface were much firmer than usual; but in handling the mass attentively, the peculiar consistence of lipoma could be distinguished in the deeper part of the tumour, and be discriminated from the hardness of the integuments and cellular substance. Such induration is accidental; it seldom affects the whole of an adipose tumour; when it occurs, it is always confined to the layers of cellular membrane in which the adipose substance is lodged; it originates from repeated external irritation; and it should always be well discriminated from the hardness arising from a cancerous disease.

Adipose tumours, for the most part, grow in a regular, slow, and progressive manner; and their vessels are generally neither large nor numerous. Hence the removal of these swellings is attended with little danger of any serious degree

of hemorrhage, and they are very easily separated from the surrounding parts. The detachment of the tumour, however, may be more difficult when there have been previous attacks of inflammation in the part. An adipose tumour, even when large, may continue a great many years without producing any material inconvenience, provided no complication attend the disease. The swelling may grow with more or less rapidity, or remain stationary; but it has never been observed to disappear spontaneously; and every means which has been hitherto tried with a view of dispersing it, has proved ineffectual. The only method of cure consists in cutting away every part of such a swelling, which ought to be done before the diseased mass is of very large size.

Of some other Kinds of Sarcomatous Tumours.—It is extremely difficult to name and describe, clearly and unobjectionably, all the different varieties of sarcoma. Mr. Abernethy has proposed naming them according to their anatomical structure, or their supposed resemblance in texture to particular organs. Thus he adopts the terms *common vascular*, or *organized sarcoma*; *adipose sarcoma*, which we have already described; *pancreatic sarcoma*; *cyctic sarcoma*; *masloid* or *mammary sarcoma*; *tuberculated sarcoma*; *medullary sarcoma*, &c.

Under the title of common vascular, or organized sarcoma, Mr. Abernethy comprehends all tumours which appear to be composed of the gelatinous part of the blood, rendered more or less vascular by the growth of vessels through it, without having any distinguishing peculiarity of structure. Mr. Abernethy conceives that this kind of organization in tumours is the most simple, and, perhaps, may always precede other descriptions of structure. Vascular sarcoma not only makes its appearance as a tumour, which is altogether extraneous in regard to the original conformation of the body, it also enlarges natural parts, especially the testis, mamma, and absorbent glands.

When this sort of swelling has attained a considerable size, the superficial veins become quite varicose. If left to itself, the tumour generally grows till the skin is so distended, that it ulcerates and exposes the new-formed substance, which sloughs and falls out.

In this manner the disease might be got rid of; but such are the constitutional irritation attending it, and the fetor and frightful appearance of the part, that the surgeon generally waits no longer, but removes the whole mass of the disease with his knife.

Pancreatic sarcoma is the name which Mr. Abernethy applies to those fleshy tumours which resemble the pancreas in structure. The substance of which they consist is composed of irregularly-shaped masses, connected together by a fibrous kind of texture. This species of sarcoma is sometimes formed distinctly in the cellular substance; but most commonly occurs in the female breast, perhaps originating in the lymphatic glands. The tumour increases slowly, and generally has little tendency to inflame and suppurate. The morbid structure in question frequently takes place in the breast, a little above, and on that side of the nipple which is next to the arm. In general the disease is chronic, and does not involve the neighbouring absorbent glands. But, in a few instances, this species of sarcoma, when situated in the breast, deviates from its ordinary indolent nature, and occasions severe, lancinating pain, an inflammatory state of the integuments, and an adhesion of them to the tumour, the axillary glands also becoming enlarged. Pancreatic sarcoma is sometimes so irritable a disease, that Mr. Abernethy thinks it may frequently be considered as bad as cancer. When the glands in the axilla become affected, one generally first swells, and is extremely tender and painful; afterwards

the pain abates, and it remains indurated; another then becomes affected, and runs through the same course.

Those sarcomatous tumours which contain cysts or cells, Mr. Abernethy distinguishes by the term *cyctic*. The disease sometimes occurs as a distinct swelling; but it is more commonly observed in the testicle and ovary. The cysts are very vascular, so that they admit of being made quite red with an anatomical injection. They generally contain a ferous fluid; but sometimes a caseous substance. Mr. Abernethy believes that this species of sarcoma is peculiarly intractable when situated in the testicle.

The *masloid* or *mammary* sarcoma is so named from its resemblance to the mammary gland in structure. Mr. Abernethy has not frequently seen this kind of tumour, and his attention was called to the nature of the disease by a case, in which a swelling, partaking of the above structure, and about as large as an orange, was removed from the front of the thigh. The wound seemed at first disposed to heal; but it afterwards degenerated into a malignant ulcer, which in about two months proved fatal. As this sort of tumour is gradually lost in the surrounding parts, which probably retain a disposition to assume a similar morbid alteration, Mr. Abernethy very judiciously recommends a more extensive removal of them than was practised in the foregoing example.

Tuberculated sarcoma is the name proposed by Mr. Abernethy for those fleshy swellings which consist of an aggregation of small, roundish tumours, of various sizes and colours, connected together by a kind of cellular substance. This gentleman has principally seen the disease in the lymphatic glands of the neck. The tumours ulcerated, became painful sores, and ultimately destroyed the patients. Mr. Abernethy regards the tuberculated sarcoma as an incurable and fatal disease; though, fortunately, its occurrence is unfrequent.

Medullary sarcoma is the term applied by Mr. Abernethy to a malignant and dangerous kind of tumour, which resembles in its structure and appearance the medullary substance of the brain. It is often seen affecting the testis, and has been termed the *soft cancer* of that part. Many surgeons consider this affection and the fungus hæmatodes as the same: we do not therefore deem it necessary to offer here any remarks in addition to those already delivered on the latter disease in another article. See FUNGUS.

Treatment of Tumours.—Surgeons not only remain ignorant of those particular causes which produce the commencement of the growth of the various descriptions of fatty, fleshy, indolent tumours; they also know no effectual means by which the progress of the disease can be stopped, and the patient freed from the inconveniences of continually bearing about with him a mass of redundant matter, which, in a chronic state, is both a deformity and an oppression; and in an inflamed or ulcerated state, is a source of severe pain, and even of fatal mischief. It has been conjectured that topical bleeding and cold applications would check the growth of indolent tumours; but experience teaches us to place no dependence upon the plan. Mercurial frictions, electricity, blisters, and local stimulants, have also been repeatedly tried, with a view of exciting the action of the absorbents, and dispersing the swelling. These methods, however, are not recommended by many examples of success; and they are attended with some risk of irritating the tumour, without lessening it, in which case the disease sometimes changes from an indolent quiet form to an irritable state, in which it inflames, enlarges, ulcerates, emits fungi, and assumes a character as dangerous and intractable as that of cancer itself. Whenever a swelling is suspected of being either a mammary,

TUMOURS.

tuberculated, or medullary sarcoma, it is particularly necessary to abstain from doing any thing which may irritate the part.

Of the Operation of removing a diseased Breast, and Tumours in general.—The operation of cutting away a diseased breast, is done nearly in the same manner as the removal of tumours in general, and is indicated whenever the part is affected with an incurable disease, which admits, however, of being entirely removed with the knife. When the breast is affected with scirrhus, or ulcerated cancer, the imprudence of tampering with the disease cannot be too severely censured. Were the disorder unattended with a continual tendency to increase, some time might properly be dedicated to the trial of those internal remedies, and external applications, which have acquired any character for doing good in these unpromising cases. But, unfortunately, by endeavouring to cure the disease by medicine, we only afford time for it to increase in magnitude, and, at length, to attain a condition, in which even the knife cannot be employed so as to take away the whole of the diseased parts. When the case is marked by the characteristic features of scirrhus, the sooner the tumour is cut out the better. There are also some malignant kinds of sarcoma to which the female breast is subject, which cannot be removed at too early a period after their nature is suspected or known. Indeed, though there is not equal urgency for the operation when the tumour is only an indolent, simple, fatty, or sarcomatous disease, yet as all these tumours are continually growing larger, and little success attends the attempt to disperse them, the practitioner should never devote much time to the trial of unavailing medicines and applications, and let the swelling attain a size, which would require a formidable operation for its excision. Besides, every simple, fleshy, or fatty tumour, is always accompanied with a certain hazard of changing into a malignant or cancerous one.

Certainly there are many swellings and indurations of the breast, which it would be highly injudicious and unnecessary to extirpate, because they generally admit of being dissolved. Such are many tumours which are called *scrophulous*, from their affecting patients of this peculiar constitution: such are nearly all those indurations which remain after a sudden and general inflammatory enlargement of the mamma: such are most other tumours which acquire their full size in a few days, attended with pain, redness, &c.: and of this kind, also, are the hardnesses in the breast, occasioned by the mammary abscess.

In the removal of all tumours, their malignant or cancerous nature makes it necessary to observe one important caution in the operation; *viz.* not to rest satisfied with cutting away the tumours just at their circumference; but to take away also a considerable portion of the substance in which they lie, and with which they are surrounded. In cutting out a cancerous breast, if the operator were to be content with merely dissecting out the disease, just where his eyes and fingers might equally lead him to suppose its boundary to be situated, there would still be left behind white diseased bands, which radiate from the tumour into the surrounding fat, and which would inevitably occasion a relapse. In a vast proportion of the cases also in which cancer of the breast unfortunately recurs after the operation, it is found that the skin is the part in which the disease makes its reappearance. Hence the great prudence of taking away a good deal of it in every case suspected to be a truly scirrhus or cancerous disease. This may also be done so as not to prevent the important objects of uniting the wound by the first intention, and covering the whole of its surface with sound integuments. So frequently does can-

cer recur in the nipple, whenever it does recur any where, that many of the best modern operators always make a point of removing this part in every instance in which it is judged expedient to take away any portion of the skin at all. The surgeon, indeed, would be inexcusable, were he to neglect to take away such portion of the integuments covering scirrhus tumours, as is evidently affected, appearing to be discoloured, puckered, and closely attached to the diseased lump beneath. Nor should any gland in the axilla, at all diseased, nor any fibres of the pectoral muscle, in the same state, be ever left behind. There is no doubt that nothing has stamped operations for cancers with disrepute, so much as the neglect to make a free removal of the skin and parts surrounding every side of the tumour. Hence the disease has frequently appeared to recur, when, in fact, it had never been thoroughly extirpated; the disease, though entirely a local affection, has been deemed a constitutional one; and the operation frequently rejected as ineffectual and useless.

But, strongly as we have urged the prudence, the necessity of making a free removal of the skin covering, and of the parts surrounding every cancerous or malignant tumour, the same plan may certainly be regarded as unnecessary, and therefore unscientific, in most operations for the removal of simple, fatty, or fleshy tumours. However, even in the latter cases, when the swelling is very large, it is better to take away a portion of skin; for otherwise, after the excision of the tumour, there would be a redundancy of integuments, the cavity of which would only serve for the lodgment of matter. The loose superfluous skin, also, would lie in folds, and not apply itself evenly to the parts beneath, so as to unite favourably by the first intention; nor could the line of the cicatrix itself be arranged with such nice evenness as it might be, were a part of the redundant skin taken away at the time of operating.

The best method of removing a diseased breast is as follows: The patient is usually placed in a sitting posture, well supported by pillows and assistants; but the operator would find it equally convenient, if not more so, to remove the tumour with his patient in a recumbent position; and it certainly is better whenever the operation is likely to be long, or much blood to be lost, which circumstances are very apt to bring on fainting. We remember that Mr. Abernethy, in his lectures, used to recommend the latter plan; which, however, without the sanction of any great name, or authority, possesses such obvious advantages, as will always entitle it to approbation.

The arms should be confined back, by placing a stick between them and the body, by which means the fibres of the great pectoral muscle will be kept on the stretch, a state most favourable for the dissection of the tumour off its surface. The stick also prevents the patient from moving her arm about, and interrupting the progress of the operation.

When the tumour is not large, and only a simple sarcoma, free from malignancy, it will be quite unnecessary to remove any of the skin, and of course this need only be divided by one incision, of a length proportionate to the tumour. The cut must be made with a common dissecting knife; and, as the division of the parts is chiefly accomplished with the part of the edge towards the point, the instrument will be found to do its office best when the extremity of the edge is made of a convex shape, and this part of the blade is turned a little back, in the way in which dissecting knives are now often constructed. The direction of the incision through the skin should be made according to the greatest diameter of the tumour to be removed, by which means it will be most easily dissected out.

The direction of the incision is various with different practitioners; some making it perpendicular, others transverse. In general, the shape of the tumour must determine which is the best. In France, it has been said, that when the incision follows the second direction, it heals more expeditiously, because the skin is more extensible from above downward, than laterally, particularly towards the sternum, and consequently allows the sides of the wound the more readily to be placed in contact; and that the action of the pectoral muscle tends to separate the edges of the wound when it is perpendicular. On the other hand, it is allowed that the wound, made in the latter manner, is the most favourable for the escape of the discharge, if suppuration should occur. See *De l'art de guérir* par Bichat, tom. ii. p. 312.

The cut through the skin should always be somewhat longer than the tumour; and as it is, perhaps, the most painful part of the operation, and one attended with no danger whatever, it should be executed with the utmost celerity. Pain is certainly more or less to be dreaded, according to its duration. The fear, however, of giving pain, has probably led many operators to err, by not making their first incision through the integuments large enough, the consequence of which has often been, that there was not room enough to get at the tumour so as to dissect it out with facility: the patient has been kept nearly an hour in the operating room, instead of five minutes, and the surgeon censured by the spectators as awkward and tedious. It is clear, also, that, besides the great deal more blood lost from this error than would otherwise happen, the vessels being commonly not tied till all the cutting is finished, the avoidance of pain, that fear which led to the blunder, is not effected, and the patient suffers much more, and for a much longer time, in consequence of the embarrassment and obstacles in the way of the whole operation.

When the disease is of a scirrhus or malignant nature, the skin covering the tumour should at all events be in part removed. All that portion which is discoloured, puckered, tuberculated, or otherwise altered, should be taken away. Some must also be removed, in order to prevent a redundancy, in all cases in which the tumour is large. We have said too, that in cases of scirrhus and cancer of the breast, the nipple is considered a dangerous part to be left behind. For the purpose of removing the necessary portion of skin, the surgeon must obviously pursue a different mode from that above described; and instead of one straight incision, he is to make two semicircular ones, one immediately after the other, and which are to meet at their extremities. The size of these wounds must be determined by that of the disease to be removed, and by the quantity of skin which it is deemed prudent to take away; for the part which is included in the two semicircular cuts, is that which is not to be separated from the upper surface of the swelling, but taken away with it. The shape of the two cuts together may approach that either of a circle or oval, as the figure of the tumour itself may indicate as most convenient. The direction of the incisions is to be regulated by the same consideration.

In the above ways, the first division of the integuments is to be made in removing tumours of every description covered with skin. The same principles and practice should prevail in all these operations; and, whether the swelling is the mamma, or any other diseased mass, whether situated on the chest, the back, the head, or extremities, the same considerations should always guide the operator's hand.

The incision or incisions in the skin having been made, the next object is to detach every side of the tumour from its connections, and the separation of its base will then

be the last and only thing remaining to be done. When the tumour is a scirrhus, or other malignant disease, the operator must not dissect close to the swelling, but make his incisions on each side, at a prudent distance from it, so as to be sure to remove with the diseased mass, every atom of morbid mischief in its vicinity. But when the tumour is only a mere fatty or other mass, perfectly free from malignancy, the cellular bands and vessels forming its connections may be divided close to its circumference. It is astonishing with what ease fatty tumours are removed, after the necessary division is made in the skin; they may almost be turned out with the fingers, without any cutting at all. When they have been inflamed, however, they are then more adherent to the surrounding parts.

Thus we see, that the first stage of the operation of removing a tumour, is the division of the skin; the second, the separation of the swelling from the surrounding parts on every side; the third and last stage is the division of the parts to which its under surface, or base, is attached. The latter object should be accomplished by cutting regularly from above downward, till every part is divided.

It is a common thing to see many operators constantly embarrassed and confused, whenever they have to remove a large tumour, on account of their having no particular method in their proceedings. They first cut a few fibres on one side, then on another; and turning the mass of disease now to this side, now to that, without any fixed design, they both prolong the operation very tediously, and present to the bystanders a complete specimen of surgical awkwardness. On the contrary, when the practitioner divides the cutting part of the operation into the three methodical stages above recommended, in each of which there is a distinct object to be fulfilled, he proceeds with a confidence of knowing what he is about, and soon effects what is to be done, with equal expedition and adroitness.

Having taken out the tumour, the operator is immediately to tie such large vessels as may be pouring out their blood; indeed, when the removal of the swelling will necessarily occupy more than three or four minutes, it is better to tie all the large arteries as soon as they are divided, and then proceed with their dissection. This was the celebrated De-fault's plan, and it is highly deserving of imitation in this country, not only because many subjects cannot afford to lose much blood, but also because the profuse effusion of this fluid keeps the operator from seeing what parts he is dividing.

The largest arteries being tied, the surgeon should not be immediately solicitous about tying every bleeding point which may be observed. Instead of this, let him employ a little time in examining every part of the surface of the wound, in order to ascertain that no portion of the swelling, no hardened lump, nor diseased fibres remain behind. Even if any part of the surface of the pectoral muscle should present a morbid feel or appearance, it must, on every account, be cut away. Also, if any of the axillary glands are diseased, the operator should now proceed to remove them. After the time spent in such measures, many of the small vessels, which bled just after the excision of the swelling, will now have stopped, the necessity for several ligatures will be done away, and of course the patient saved a great deal of pain, and more of the wound be likely to heal by the first intention.

Some information may be derived, respecting whether any of the tumour is left behind, by examining its surfaces, when taken out, and observing whether any part of them is cut off; for if it is, it may always be found in the corresponding part of the wound.

TUMOURS.

The axillary glands may always be taken out, without the least risk, if the plan pursued by *Desault* in France, and *Mr Charles Blicke*, and other eminent surgeons in this country, be adopted. The method alluded to is, after dividing the skin covering the gland, and freeing the indurated part from its lateral connections, to tie its root, or base, with which it is connected, with the parts on the side towards the cavity of the axilla. Then the indurated gland itself may be safely cut off just above the ligature. Were the gland cut off in the first instance, the artery which supplies it with blood would be exceedingly difficult to tie, on account of its deep situation; and, by reason of its shortness and vicinity to the heart, it would bleed almost like a wound of the thoracic artery itself. In this way, there is also not the least hazard of injuring the latter vessel. It would be a great improvement in the mode of operating for the removal of these glands, if surgeons were always to make the patient lie down, with the arm placed in such a position as would let the light fall into the axilla. How much the steps of the operation would be facilitated in this way, we need not attempt to explain.

The above directions will enable a surgeon to remove tumours in general. They apply also in a great measure to encysted tumours; but in the latter cases, particular care must be taken not to wound the cyst, as it then collapses, and the dissection of it out is much more difficult. One half of each ligature is always to be cut off before dressing the wound. The edges of the incision are to be brought together with strips of adhesive plaster; and, before this can be done with ease, the stick confining the arm back must be removed, and the os brachii brought forward, so as to relax the pectoral muscle and integuments of the breast. No sutures should ever be employed, as they are useless, painful, and irritating. The wound being closed with sticking plaster, and a pledget of simple cerate, a compress of folded linen, or flannel, may be put over the dressings; these are to be secured with a broad piece of linen, which is to encircle the chest, be fastened with pins or stitches, and kept from slipping down by two tapes, one of which is to go from behind forward, over each shoulder, and be stitched to the upper part of the bandage both in front and behind. The arm on the same side as that on which the operation has been done, should be kept at rest in a sling: every motion of the limb must evidently disturb the wound by putting the great pectoral muscle into action, or rendering its fibres sometimes tense, sometimes relaxed.

In the article *SURGERY*, we have adverted to the plan of cutting off both ends of the ligatures applied to the arteries, with a view of lessening the quantity of extraneous substance in the wound, and rendering union by the first intention more probable. This method has been tried by *Mr. Lawrence* after operations on the breast, and also by *M. Roux* and professor *Delpech* in France, who all make favourable reports of the practice.

The removal of tumours from the neck is frequently an operation of delicacy and difficulty, especially when the exact attachments and depth of the swellings are not precisely known. The many large arteries in this part of the body, and its being the situation of the carotid artery, and internal jugular vein, are considerations which ought to deter every surgeon who is not an anatomist, from venturing to cut away swellings from the neck, particularly such as have bases extending more or less deeply, and not very moveable. Unfortunately for the man who is deficient in anatomical knowledge, the neck is as common a situation for tumours requiring the use of the knife, as any part which can be specified.

One of the boldest operations, for the removal of a tumour from the neck, was that lately performed by *Mr. William Goodlad*, surgeon at Bury, in Lancashire, and recorded in the seventh volume of the *Medico-Chirurgical Transactions*, p. 112. In order to do away the danger of hemorrhage from arteries, this gentleman began with tying the trunk of the carotid artery: some conception of the nature of the whole proceeding may be formed from the view which the wound presented after the entire swelling had been removed. "The whole sterno-mastoid muscle was exposed, and its fibres dissected clean, except about half an inch from its insertion into the clavicle. The wound extended backwards from behind the mastoid process to the trachea anteriorly, but became narrowed in the direction of the muscle at the lower part of the neck. The sub-maxillary gland was exposed, and about one-fifth of its substance, not appearing healthy, was removed. The digastric and the greater part of the mylo-hyoideus were exposed, the ramus of the jaw was only covered by periosteum, except where covered by the masseter muscle, part of which, not appearing healthy, was dissected away. The whole of the condyloid process of that bone was laid bare in the same manner, and behind it the pterygoid muscles were also exposed. The membrane of the cheek was only covered by a cellular substance, which did not appear healthy; but sufficient skin was saved to cover the zygoma. The parotid gland was entirely removed!"

This, which is one of the boldest operations on record, proved successful, the wound having completely healed in ten weeks, and no recurrence of the tumour having followed. See *Abernethy's Classification of Tumours*. *Delpech Précis Elémentaire des Maladies réputées Chirurgicales*, tom. iii. *Cooper's Dictionary of Practical Surgery*. *Medico-Chirurgical Transf.* vol. vii. pt. 1, &c.

TUMOUR, among *Animals*, is a preternatural swelling or enlargement in any part, arising either from an external injury, or an internal cause. Tumours in them are of several different kinds, according to the nature of the causes.

Where tumours or swellings are caused by external accidents, such as blows, bruises, and other such means, they should at first be treated with refringent applications; such as having the parts bathed frequently with warm vinegar or verjuice; and where they will admit of bandage, a flannel wetted with the same should be rolled or laid on, and fastened by it. When by this method the tumour or swelling does not give way and subside, a poultice made with red-wine lees, strong-beer grounds, and oatmeal, or with vinegar, oil, and oatmeal, should be applied, especially when on the legs; either of which applications may be used and continued twice a day after bathing the parts in the above manner, until the swelling abates, when, in order to wholly disperse them, the vinegar should be changed for camphorated spirits of wine; to four ounces of which, one of spirit of sal ammoniac may be added; or they may be bathed with a mixture of two ounces of crude sal ammoniac boiled in a quart of chamber-ley, twice a day, and cloths dipped in the same be put on them. Fomentations, too, made by boiling wormwood, bay-leaves, and rofenary, with a proper quantity of spirits, are not unfrequently of use in a high degree.

However, in bruises where there may be extravasated blood, which is not taken up or dispersed by these means, the shortest and most convenient way is to open the skin, and to let out the grumous blood.

The critical tumours or swellings in horses or other animals, which terminate fevers, or other diseases, should by no means be dispersed, except, when in the horse, they fall

upon the pailern or coffin-joint, so as to endanger them; in which cases the discutient fomentation may be applied three or four times a day, and a cloth or flannel frequently wrung out of the same may be bound on the parts.

But when the swellings fix themselves under the jaws, behind the ears, on the poll, the withers, or in the groin, sheath, or other parts of the horse, or any other animal, they should be encouraged and brought forward by ripening poultices, wherever they can be applied: oatmeal boiled soft with milk, to which a proper quantity of oil and lard is added, may answer this purpose; or the poultice composed of linseed-meal, as used in other cases: these should be applied twice a day, until the matter is perceived to fluctuate, by the feel, under the finger, when it should be let out; for which purpose a knife or strong lancet should be used, making an opening the whole length of the tumour, where it can be safely done, as nothing contributes so much to a kind healing of the parts, as the matter having a free discharge, and the opening being sufficiently large to dress it to the very bottom.

After this, pledgets of lint or tow, spread thinly with black or yellow basilicon, or the wound ointment, and dipped in the same, melted down with a fifth part of oil of turpentine, should be laid to the bottom of the fore, and the whole filled up in a very light manner with the same, without any sort of stuffing. It may be dressed in this way once or twice a day, if the discharge be great, until a proper digestion be brought on, when it should be changed for pledgets spread with the ointment with red precipitate, used in the same manner. If the fore should not digest kindly, but look pale, and discharge a thin watery fluid, it should be fomented as often as it is dressed with the above fomentation, and the strong-beer poultice be applied over the dressing, continuing the same until the matter grows thick, and the fore has a florid appearance.

There are other indolent tumours sometimes occurring in animals, but which are noticed under their proper heads.

TUMOURS, Moory, in *Agriculture*, a term applied to the small hilly spots or swells of boggy plots which are formed on the banks of hanging slopes, or dispersed over flatter surfaces, in particular cases and situations. They may be formed in various ways, as in the manner of quicksands, by the waters which fall in their immediate vicinities, but which, to produce certain defects of the wet kind in the lands, find a receptacle sufficient to give the affected tumoury parts a constant supply of moisture, or what is enough for giving the bog plants that take root upon them strength and support. Thus, such rising grounds as are formed of open, porous, or freely conducting materials, having the lower borders of them imperfectly covered with an impermeable soil, are peculiarly liable to be affected with this sort of tumoury defect. They are likewise capable of being caused by masses of impenetrable matters, which are lodged on the sides of the declivities, or at the feet of them; also by internal wetness, descending through the land in partial channels that lead it to the surface; and by the same sort of wetness when confined beneath an impermeable soil, but which is defective, and by reason of the weight thereof above it, admits of the confined moisture rising through veins of the sandy kind, or other conducting substances and passages to the surface where these sorts of tumours are produced.

Wherever lands are troubled with these kinds of tumours, which is not unfrequently the case, they are to be removed by drawing away the wetness in proper methods, and the suitable manuring, stocking, and managing of the ground, by which means they may often be converted into good sound land. See *MOOR* and *WASTE-Land*.

TUMPACH, in *Geography*, a town of Bavaria, in the Upper Palatinate; 32 miles E.N.E. of Nuremberg.

TUMPING, in *Agriculture*, a term applied to the work of moulding up teafel crops, which is done in a close round manner, in order to make them "huddle" out, or throw forth side-shoots, as it is called. It often answers as a kind of fence.

TUMUCHANAIG, in *Geography*, a town of Hindoostan, in Madura; 30 miles S.W. of Madura.

TUN, a town of Sweden, in West Gothland; 24 miles W. of Skara.—Also, a town of Persia, in Khorassan; 25 miles E.N.E. of Pafin.

TUN, or *Ton*, originally signifies a large vessel or cask, of an oblong form, biggest in the middle, and diminishing towards its two ends, girt about with hoops, and used to put up several kinds of merchandizes in, for their better carriage; as brandy, oil, sugar, skins, hats, &c.

Some derive the word from *autumnus*, in regard it is then tuns are most needed. Du-Cange deduces it from *tunna* or *tonna*, words used in the base Latin for the same thing; whence also *tunnare*, to tun.

The term is also used for certain vessels of extraordinary bigness, serving to keep wine in for several years. In Germany, there are many which are scarcely ever emptied: the Heidelberg tun is famous.

The tun we frequently, though improperly, call a *hog-head*.

TUN, or *Ton*, is also a certain measure for liquids; as wine, oil, &c.

The English tun of wine contains 2 pipes, or 4 hog-heads, or 252 gallons. See *MEASURES*, Table XXII.

The standard gauge for foreign wines at the Custom-house of London is as follows: the pipe of Port is 138 gallons; of Lisbon, 140; of Madeira, 110; of Barcelona, 120; of Vidonia, 120. The butt of sherry is 130 gallons, and of mountain, 120. The hoghead of claret is 58 gallons, and of tent, 63. The awm of hock is 36 gallons. The gallon used here is seven inches in diameter and six inches deep. The tun of animal oil is 252 gallons, and of vegetable oil 236 gallons.

The tun of Amsterdam contains six æms or awms; the awm contains 4 ankers, 8 stekans, 21 viertels, 64 sloops, 128 mingels, 256 pints, or 1024 musies; and holds 8966 Dutch, 7705 French, or 9351 English cubic inches, or about 40½ English wine gallons. The tun of beer contains 128 mingels, like the above. A tun of corn is 1¼ mudden, or 1¾ sacks, and holds 5 scheepels, 20 vierdevats, or 160 kooops: 27 mudden are equal to a last of corn, which contains 173208 Dutch cubic inches, 147120 French ditto, or 178549 English.

A tun of Leyden butter weighs 320 lbs., and a Vierendel 80 lbs.; but the Vierendel of common Holland's butter weighs 84 lbs. A Friesland tun is 328 lbs.; and a Mastenbroeck tun, 400 lbs.

At Bayonne, a muid or hoghead of wine contains 320 French pints, or about 76½ English gallons; and 4 muids at Bayonne are equal to 5 at Bourdeaux. The pipe of brandy holds 80 veltes, answering to about 156 English gallons.

At Bourdeaux, a tonneau of wine contains 4 barriques or hogheads, equal to 50 stekans of Amsterdam = 259 stubgen of Hamburgh = 243 English gallons; and weighs with the wood about 2000 lbs. of Bourdeaux. The barrique contains 110 pots, or 32 velts. Brandy is contained in casks of 50 velts, more or less; but it is sold by the barrique of 32 velts, or about 60 English gallons: 5 velts proof of Bourdeaux make 4 velts proof, by which it is sold in London.

don. At Cognac it is fold by the 27 velts; and 11 velts proof of Cognac make 10 velts proof, by which it is fold in London. A tun of butter, great measure, at Bremen, is reckoned at 300 lbs., but a tun of small measure at 220 lbs.; 100 lbs. of Bremen being equal to 110 lbs. avoirdupois. A fuder of wine contains 6 ohms; an ohm, 20 viertels = 45 stubgens = 180 quarters = 720 mingels; 45 stubgens answering to 38 English gallons. Brandy is fold by the 30 viertels. A tonne of beer contains 48 stubgens = 192 quarters. A hoghead of train oil contains 2 tonnes = 12 feckans = 192 mingels.

At Brunswick, a fuder of wine contains 4 oxhofts, or 6 aams; an aam = 40 stubgens = 160 quarters = 320 noffels. A fafs of beer contains 4 tonnes; a tonne 27 stubgens; and 63 stubgens = 61 English gallons.

At Dantzic, a tonne or barrel of butter is = 16 lifponds = 256 lbs. A laft of beer contains 6 faffes = 12 tonnes or barrels = 1080 ftofs; the beer-ftof being 141 English cubic inches. A tonne or barrel of herrings contains 13 wahls, each of 80 herrings; a laft of herrings, Luneburgh falt, honey, pitch, tar, adhes, &c. contains 12 tonnes or barrels; and a laft of French, Scotch, or Spanish falt, when lying together, contains 18 tonnes, and when in feperate tonnes, only 16.

At Elfineur, in Denmark, the tonneau of French wine is reckoned for 4 hogheads, or 24 ankers; the pipe of Spanish and Portugal wine for 2 hogheads, or 12 ankers; 30 Spanish arrobas, or 25 Portuguefe almuds of wine, for 1 regular pipe; the pipe of French brandy for 6 ankers; the poinçon ditto for 9 ankers; the tierçon ditto for 4 ankers.

At Embden, corn is fold in tonnes of 4 verps, 8 fcheffels, or 144 kruefen: 15 tonnes, or 60 verps, make 1 laft, answering to 10½ English quarters.

In France, by the old fyftem, a tonneau of Orleans contains 2 muids of Paris, the muid of wine at Paris being = 71½ English gallons: — a tonneau of Bourdeaux = 4 barriques, each of 216 pintes of Paris, or 53½ English gallons.

In moft parts of Germany, a laft of lime, tar, pitch, train oil, butter, &c. is 12 tonnes or casks; a laft of herrings is 12 tonnes, each tonne containing about 800. See TONNEAU.

At Hamburgh, a tonne of butter, small measure, is 224 lbs.; ditto, great measure, 280 lbs.: a pipe of oil is 820 lbs.; and a small tonne of green soap is 60 lbs.: a tonne of beer contains 48 stubgen; a small ditto, 32 stubgen; a quartel of train oil contains 2 tonnes or 64 stubgen, and is reckoned at 224 lbs. net weight.

In Hanover, a tonne or barrel of honey contains 25½ stubgen, and weighs 300 lbs.

In Holftain, the measure for corn is the fame as that of Copenhagen; viz. the tonne of 8 fcheffels, or 32 viertels, 100 of which tonnes yield about 49 English quarters. A tonne of beer contains 128 quarters, or 25 English beer-gallons.

For the value of the tonne at Konigsberg in Pruffia, fee TONNEAU.

At Lifbon, 13½ quintals make a tun; and each quintal contains 4 arrobas; the arroba 32 lbs., the pound of Lifbon weighing 708¼ grains English troy weight; fo that 83 lbs. of Lifbon are equal to 84 lbs. of avoirdupois weight. The ftandard gauge, at the Custom-houfe of London, of a pipe of Lifbon, is (as above-mentioned) 140 gallons, and this pipe is reckoned at 31 almudes, and the almude at 4½ English gallons nearly.

At Nantes, in France, a tonneau of wine contains 2 pipes; a pipe, 2 barriques or hogheads, or 240 pots; the pot holding 2 Paris pintes, and the barrique containing 59½ English gallons, and a poinçon of wine about 54½ ditto.

At Narva, in Livonia, a laft of corn contains 24 tonnes, and a tonne 4 viertels, or 32 kapps: 26 tonnes of Narva = 15 English quarters nearly: the laft of French and Spanish falt is reckoned at 18 tonnes, each of 34 kapps. The ahm of wine contains 4 ankers, and a pipe of Spanish wine is reckoned at 10 ankers; of Alicant and Portugal wine at 13 ankers, Hamburgh measure: a fafs of beer or brandy contains 128 ftofs, and 44 ftofs answer to about 15 English gallons.

At Oporto, the tun is = 2 pipes = 50 almudes = 2 potes = 12 canadas = 24 quartillos = 8 meios. At Lifbon, both wine and oil are fold by the pipe of 26 almudes; but the pipe of Lifbon wine sent to England contains about 31 almudes, and its ftandard gauge is 140 gallons; and therefore the Lifbon almude is reckoned at 4½ English gallons. At Oporto, the pipe is divided into 21 almudes, but this almude and its fubdivisions are 49½ per cent. greater than thofe of Lifbon. Thus the ftandard gauge of a pipe of port, at the Custom-houfe of London, is 138 gallons, which gives the almude of Oporto equal to 6 English gallons and 5 pintes nearly. Ships are measured by the tun, being a cylinder 6 feet high and 3½ feet in diameter, which gives the contents 57¾ cubic feet nearly. The proportion between the almude of Lifbon and that of Oporto is variously given by different authors; fome make it 30 per cent., others 23, and others from 25 to 40; but the real proportion, fays Dr. Kelly, is 49½ per cent.; but in the common courfe of bufinefs, 2 almudes of Oporto are reckoned equal to 3 of Lifbon.

At Pernau, in Livonia, a laft of corn contains 24 tonnes, the laft containing about 86½ Winchefter bufhels, or 16 lafts = 173 English quarters. But a laft of linfeed is reckoned at 12 tonnes, and a laft of falt at 18 tonnes.

At Revel, in Livonia, a laft of corn contains 24 tonnes, and a tonne of falt is 4 loefs: 19 tonnes of corn in Revel are = 8 English quarters.

At Riga, a laft of rye contains 22½ tonnes; a laft of wheat or barley, 24 tonnes; a laft of oats, malt, or peafe, 30 tonnes: 24 tonnes being = 48 loofs, and 56 loofs of Riga = 13 English quarters.

At Stralfund, a laft of corn contains 8 dromts = 32 tonnes = 96 fcheffels; 46 fcheffels contain 51 English bufhels nearly, or 46 dromts = 76½ English quarters. Kelly's Univ. Cambist. paffim.

The great tun or Rhenish wine-veffel of Heidelberg, made in 1343, contained 672 urnæ, of 4½ English gallons each; being in all 2690 English gallons, or about 42 hogheads, or 21 pipes of wine.

TUN is alfo a certain weight, by which the burden of fhips, &c. is eftimated.

The fea tun is computed to weigh 2000 lbs., or 20 quintals or hundred weight (amounting to 2440 lbs. avoirdupois); fo that when we fay a veffel carries 200 tuns, we mean it is able to carry 200 times the weight of 2000 lbs., i. e. 400,000 lbs.: it being found by a curious obfervation, that the fea-water, whofe room the veffel fills when full loaden, weighs fo much.

To find the burden and capacity of a fhip, they measure the hole or place where fhe is loaden; allowing 42 cubic feet to the fea tun. See BUNDEN, and *Tonnage* under SHIP-BUILDING.

The price of freight, or carriage of merchandizes, is ordinarily fettled on the foot of the fea tun: and yet, though the tun is regularly 20 cwt., there is fome difference made in it, either on account of the cumberfomenefs or bulk of the commodities, the fpace they take up, or the like. See FREIGHT.

Accordingly, at Bourdeaux, 4 barriques of wine, and alfo

of vinegar, honey, and turpentine, are held a tun; 5 of brandy, 3 of syrup, 20 bushels of chefnuts, and the like of corn, beans, linseed, walnuts, &c.; 5 bales (each of 100 lbs.) of cork, 5 bales (each of 100 lbs.) of feathers and skins, and 8 of paper; 10 cubic feet of marble, 20 quintals of iron in bars, or lead in pigs, 3 bales of hemp (each of 200 lbs.), 20 quintals, or 150 rolls of tobacco.

At Stettin, the freight of ships is generally valued by the Dutch ship last, 5 of which are equal to 4 lasts of Stettin; and 4000 lbs. of iron, and other heavy goods, 2000 lbs. of lighter goods, such as hemp and flax, $56\frac{1}{2}$ scheffels of corn, 13 casks of herrings, 8 hogsheds of wine, 5 schocks (each of 60 pieces) of pipe-staves, 7 schocks of hogshhead-staves, 9 schocks of barrel-staves, 65 cubic feet of oak-timber, or 70 cubic feet of fir-timber, are reckoned for a Dutch last.

A tun or load of timber is forty solid feet, if the timber be round; if it be hewed or square, fifty-four.

TUNS, in *Natural History*, a family of univalves. See SHELLS and CONCHOLOGY.

TUN, *Ton*, in the ends of words or names of places, signifies a town, village, or dwelling-place: from the Saxon, *tun*, *sepes*, *vallum*, *villa*, *vicius*, *oppidum*; and this from *don*, or *dun*, a hill, where they formerly built towns.

TUN-GREVE, a name anciently used for a reeve or bailiff, *qui in villis, & quæ dicimus maneris, domini personam sustinet, ejusque vice omnia disponit & moderatur*. Spelman.

TUN-HOOF, in *Botany*. See GLECHOMA.

TUNA, in *Botany*, slightly altered by Dillenius from the South-American or West-Indian appellation of the same plants, *Tune*, *Tunal*, or *Tunas*, is retained by him for the tribe of American Figs, named *Opuntia* by other modern botanists. He contends, with great probability, that *Opuntia* of the ancients must be something very different. Linnæus refers *Tuna* to CACTUS; see that article.

TUNA, in *Geography*, a small island in lake Menzaleh; 8 miles S.E. of Tennis.—Also, a sea-port of Egypt, in the Red sea. The entrance is between rocks, and within the greater part is filled with shoals and rocks, which make the harbour small. On the north side is a tongue of land, which forms good defence against the north-west wind; 52 miles S.S.E. of Coseir.—Also, a town of Sweden, in Helsingland; 3 miles N. of Hudwickswall.—Also, a town of Sweden, in the province of Smaland; 56 miles N. of Calmar.—Also, a town of Norway, on the Glanmen; 2 miles N.N.E. of Frederickstadt.—Also, a town of Arabia, in the province of Hedsjas; 280 miles E. of Medina.—Also, a small island and village of Egypt, in the Tennis lake; 21 miles W.N.W. of Tineh.—Also, a town of Sweden, in Dalecarlia; 10 miles S. of Fahlun.

TUNAL, a town of Mexico, in New Biscay; 74 miles N.N.W. of Durango.

TUNALLUS, in *Ichthyology*, a name given by Albertus, and some others, to the *grayling*, or *umber*.

TUNB, in *Geography*. See TUMB.

TUNBATE, a town of Brasil, in the government of St. Paul; 65 miles N.N.E. of St. Paul.

TUNBO, a town of Sweden, in Sudermanland; 50 miles W. of Stockholm.

TUNBRIDGE, or TONBRIDGE, a market-town in the lathe of Aylesford, and county of Kent, England; is situated in an extensive tract called the Lowey-of-Tunbridge, and is distant 13 miles W.S.W. from Maidstone, and 30 miles S.E. from London. The term Lowey is derived from the Norman French, and signifies an exempt jurisdiction round the castle or chief mansion to which it appertained. In the Domesday book this district was included under the name of Haslow, but no mention is made of a castle; whence it

seems probable it was not erected when that survey was made; though it certainly was very shortly afterwards. It was built by Richard Fitz-Gilbert, afterwards earl of Clare; and under the protection of this fortress the town grew up, and gave its own name to the castle, which name appears to have been derived from the bridges over the different streams of the Medway, which flow on the south side of the town. Of these streams, which have each a bridge, and are five in number, the southernmost was anciently the principal, as the northern now is; though the latter was originally formed to supply the inner moat of the castle. This fortress has been at different periods the scene of war and of festivity. Gilbert Rufus, who possessed it in the reign of Henry III., joining the rebellious barons, was besieged by prince Edward, when the garrison burnt the town to prevent its being useful to that prince, who, however, took the castle: but Gilbert having joined the royal standard, it was restored to him. Here he entertained Edward, then become his sovereign, in a splendid manner for many days, on his return from Palestine. Prince Edward, afterwards Edward II., also made Tunbridge his temporary residence. In the next reign, the castle and manor passed by marriage to Ralph, earl of Stafford, whose descendants rose to a rank that eclipsed all other subjects, having five earldoms vested in them, and being at length advanced to ducal honours. In the reign of Henry VIII. the castle became forfeited to the crown by the attainder of Edward, duke of Buckingham. Queen Elizabeth granted the lordship and castle to her cousin Henry Carey, lord Hunsdon, from whom they descended to the Berkleys: having passed through various possessors, they are now the property of the Woodgates of Summerhill. The remains of the castle stand on the south-west side of the town, but are principally confined to an entrance-gateway, flanked by round towers, and tolerably perfect, (probably rebuilt in the 14th century,) and the artificial mount on which the keep stood. The castle was environed by three moats, within the outermost of which the ancient town was chiefly confined. At a short distance was a priory of Austin canons, founded by Richard de Clare, first earl of Hertford, about the end of the reign of Henry I. The buildings were all destroyed by fire in 1351; but were soon afterwards rebuilt. This was one of the houses suppressed in 1525, to endow Wolsey's intended colleges at Ipswich and Oxford. From the foundations, yet visible, this priory appears to have been very extensive: but only a few fragments now remain, besides the refectory or hall, which is used as a barn.

The town of Tunbridge principally consists of one long and wide street, kept remarkably clean, and containing many respectable houses. At the entrance from London is a stone causeway, the gift of John Wilford, citizen of London, in 1528. The principal bridge was erected in 1775, at the expence of 1100*l.*, from a design by Mr. Milne: near it is a wharf for the reception of the timber brought hither from the Weald, and afterwards sent down the Medway. The church, which is a spacious fabric, was new pewed and ornamented, with a bequest of 500*l.*, made by the late John Hooker, esq. It contains some good monuments of various families. Weever mentions "the portraitures of lord Hugh Stafford, kneeling in his coat-armour, and his bow-bearer, Thomas Bradlaine, by him," as remaining in his time in the north window. Many bequests have been made by different persons for the use of the poor inhabitants of this district; but the principal charitable foundation is the free grammar-school, a capacious edifice at the north end of the town, which was founded and endowed by sir Andrew Judde, a native

of Tunbridge, and lord-mayor of London in the fifth year of Edward VI. He died in 1558; and by his will directed that certain lands, of the annual value of 5*l.* 6*s.* 4*d.*, and situated in various parishes in London, should be vested in the company of skinners of London, for the perpetual maintenance of this school, for the free education of the boys inhabiting this town and the parts adjacent. Sir Thomas Smith, who married Sir Andrew's daughter, considerably increased the endowments, and founded six exhibitions to the university; and several others were endowed by different persons. The skinners' company, who are the governors, visit this school every year in May, attended, as the statutes direct, by some eminent clergyman, who is required to examine into the progress made by the different classes. The examination is conducted with much ceremony; and honorary rewards are distributed to the best scholars. The masters have, in general, been men of eminent abilities. The learned Dr. Viceimus Knox, well known for his literary productions, succeeded his father in this office in 1778. Though the annual income arising from the respective endowments of this school is very great, the number of boys educated on the foundation is very few: which, among other instances, points out the necessity of a parliamentary revision of our ancient charitable establishments. Immediately opposite the school is the seat of George Children, esq. to whose respectable family a very large and valuable tract of land belongs in this vicinity. The population of Tunbridge, as ascertained by the act of the year 1811, amounted to 5932, the number of houses to 958. Four fairs are held annually, and a market weekly on Friday. The adjacent roads have of late years been much improved, and that leading from the town to the Wells particularly so, by a laborious excavation on Quarry-Hill, by which the former steep ascent over it has been reduced to a very easy draught. It appears, from the "Notitia Parliamentaria," that two members were returned in the 23d year of Edward I. for the borough of Tonebrigg.

About a mile and a half to the south-east of Tunbridge is Summerhill, an ancient and celebrated seat, now the property of William Woodgate, esq. The venerable mansion was erected by Richard de Burgh, earl of St. Albans, at a vast expence, in the reign of James I.; of the style of building in whose days it forms a complete specimen; though its external appearance has, in some respects, been injured by injudicious alterations. It is a very extensive and interesting structure, and stands on a commanding eminence amidst romantic scenery.

On Quarry-Hill, about a mile and a half from Tunbridge, on the road to the Wells, is the seat of James Burton, esq. recently erected with the appropriate materials of the country, as the fragment of a castle, but replete with modern conveniences.

Within a mile, on the same road, is Bounds Park and House, now the property of the earl of Darnley. The demesne surrounds the park, and consists of about a thousand acres of well-wooded land.—Hasted's History of Kent, vol. ii. Beauties of England and Wales, vol. viii. Kent; by E. W. Brayley.

TUNBRIDGE-Wells, a hamlet in the west half hundred of Washlington, late of Aylesford, and county of Kent, England; consists of several villages within five or six miles from the town of Tunbridge, and situated in the three parishes of Tunbridge, Frant, and Speldhurst, at the distance of 18 miles S.W. from Maidstone, and 35 miles S.E. by S. from London. The principal villages are, Mount-Ephraim, Mount-Pleasant, Mount-Sion, and the Wells, properly so called. The *springs*, to which this neighbourhood is wholly

indebted for its origin, rise in the parish of Speldhurst, and were accidentally discovered in the reign of James I. (See *Tunbridge Waters*.) Their salubrious quality being soon ascertained, wells were sunk, paved with stone, and inclosed with rails in a triangular form. Hither came the afflicted, and returned healthy: but as no accommodations were nearer than the town of Tunbridge, the number was few. Henrietta Maria, queen of Charles I., being much indisposed after the birth of prince Charles, staid here six weeks; but as no house was near, she and her suite remained under tents pitched upon Bishop's-Down. The splendid court formed a fine contrast to the country, every where rude, and in the unadorned attire of nature. In honour of her majesty, the Wells changed their name from Frant to that of Queen Mary's Wells, which afterwards gave place to Tunbridge-Wells. During the civil war the Wells were neglected, and almost forgotten; but at the Restoration, recovered their former fame. Their celebrity was greatly increased in 1664, by queen Catherine being recommended to drink the waters after a dangerous illness. She continued here about two months, in great splendour: hence may be dated an assembly-room, bowling-green, and other appropriate places, at Ruffhall; and another bowling-green and a coffee-house at Southborough. The surrounding country was spotted with neat rural habitations; till whim, and some altercation between the lord of the manor and the tenants, varied the scene. Ruffhall was now deserted for Mount-Ephraim, and that for Southborough, which was soon eclipsed by Mount-Sion. At this changeable era, many of the houses were wheeled on sledges from one site to another, as the caprice or interest of the owners dictated. The town of Tunbridge was now left to its original quiet; for the Wells became a complete village, with houses sufficient to accommodate all the visitors. A chapel and a school were erected by subscription, and the former being found too small for the increasing congregation, was enlarged a few years afterwards. This chapel stands in the three parishes; the pulpit is in Speldhurst, the altar in Tunbridge, and the vestry in Frant. A Presbyterian and also a Methodist meeting-house have been since built. During the last century, the buildings have gradually increased; and many persons of rank and respectability have houses for constant or occasional residence. Trade is carried on similar to that of the Spa in Germany, and consists chiefly in the manufacture of a variety of articles in wood of various kinds: the goods are well known by the name of Tunbridge-ware, as tea-chests, dressing-boxes, snuff-boxes, punch-lades, children's toys, and many other articles. The air of this district is very pure and salubrious, and probably aids the efficacy of the waters, which are of the chalybeate kind, and nearly of equal strength to those of the German Spa. They are considered to be of great use in removing complaints arising from sedentary occupations, weak digestion, and nervous and chronic disorders. During the last and present reigns, Tunbridge-Wells has been frequently visited by different branches of the royal family. The *Wells*, properly so called, form the centre of the place; near which are the markets, the medicinal water, chapel, assembly-rooms, and public parades, called the Upper and Lower Walks; the Upper Walk was formerly paved with brick, but in 1793 with Purbeck stone, at an expence of 71*0*l.**; the other is unpaved, and used chiefly by country people and servants. On the right of the paved walk, in the way from the Wells, are the assembly-room, library, coffee-house, and post-office, with shops for Tunbridge-ware, millinery, and different kinds of toys. A portico extends the whole length of the parade, supported by Tuscan pillars, where the company occasionally

occasionally walk. On Mount-Sion, Mount-Pleasant, Mount-Ephraim, and Bishop's-Down, are dispersed some neat villas. That of the late celebrated writer, Richard Cumberland, esq., is on Mount-Sion, and was his retreat for many years.

The High Rocks, about a mile and a half south-westward from the Wells, are much celebrated, and certainly form a very romantic and striking picture. This spot is said to have been first brought into notice by James II., who, when duke of York, came hither with his duchess and his two daughters, afterwards the queens Mary and Anne.—Burr's History of Tunbridge-Wells, 8vo. 1766. Beauties of England and Wales, vol. viii. Kent; by E. W. Brayley.

TUNBRIDGE, a township of Vermont, in the county of Orange, containing 1640 inhabitants; 20 miles N.N.W. of Hanover.

TUNE, the title of a short melody, or series of notes, in some specific measure. If vocal, it is a ballad; if merely instrumental, it is a country-dance, a jig, or a hornpipe. Our parochial psalmody consists of *psalm* tunes. The music of the "Beggar's Opera" is a medley of tunes selected from the streets of all nations, that are never honoured with the name of airs. See BALLAD.

Scotch, Irish, and Welsh songs and dances, are called *national* tunes. The tonadillas and seguidillas of Spain are likewise national tunes; as are the elegant little street-songs of Venice, called Venetian ballads; and such are the pleasing and popular Provençal and Languedocian melodies, very different from the *Vaudevilles* and ballad tunes of the Pont-neuf and streets of Paris.

Thus far concerns tune as a substantive: as a verb, *to tune*, is a preparation for the performance of music. A found may be sweet, clear, and very perfect in itself, yet agree with none of its relatives on any instrument, or in any key: it is then said to be *out of tune*. The regulator of all sounds in a musical composition is the key-note of a diatonic scale, in which every found must be *in tune* with all the intervals. "Tune your harps to cheerful strains;" that is, render your harps fit for tune or song. This belongs to *intonation*, sound, musical tones. *Intonazioni perfide*, in Italian, is an expression for false intonation, *out of tune*, in singing or playing. So in French, *intonation vraie*, *intonation fausse*, are musical expressions for true or false intonation. *Entonner*, in Romish cathedrals, is to give the tone of an anthem, a hymn, with the organ; and in our cathedrals, of the responses.

Our great lexicographer, though no musician himself, has defined the expression, *to tune*, with true technical accuracy, in saying that it is "to put instruments into such a state, as that the proper sounds may be produced." Dr. Holder well defines the word *tunable*, when he says, "all tunable sounds, of which the human voice is one, are made by a regular vibration of the sonorous body, and undulation of the air, proportionable to the acuteness or gravity of the tone."

Cause and Measure of Tone, or that on which a Tone of a Sound depends.—Sonorous bodies, we find, differ in tone:

1. According to the different kinds of matter; thus the sound of a piece of gold is much graver, than that of a piece of silver of the same shape and dimensions; in which case, the tones are proportional to the specific gravities.
2. According to the different quantities of the same matter in bodies of the same figure; as a solid sphere of brass, one foot in diameter, sounds acuter than a sphere of brass two feet in diameter; in which case the tones are proportional to the quantities of matter. See GRAVITY.

Here then are different tones connected with different specific gravities, and different quantities of matter: yet cannot the different degrees of tone be referred to those quantities, &c. as the immediate cause. In effect, the measures of tone are only to be sought in the relations of the motions that are the cause of found, which are no where so discernible as in the vibrations of chords.

Sounds, we know, are produced in chords by their vibratory motions; not, indeed, by those sensible vibrations of the whole chord, but by the insensible ones, which are influenced by the sensible, and, in all probability, are proportional to them. So that sounds may be as justly measured in the latter, as they could be in the former, did they fall under our senses: but even the sensible vibrations are too small and quick to be immediately measured. The only resource we have, is to find what proportion they have with some other thing: which is effected by the different tensions, or thickness, or lengths of chords, which, in all other respects, excepting some one of those mentioned, are the same.

Now, in the general, we find that in two chords, all things being equal, excepting the tension, or the thickness, or the length, the tones are different; there must, therefore, be a difference in the vibrations owing to those different tensions, &c. which difference could only be in the velocity of the courses and recourses of the chords, through the spaces in which they move to and again. Now, upon examining the proportion between that velocity, and the things just mentioned, on which it depends, it is found to a demonstration, that all the vibrations of the same chords are performed in equal times.

Hence, as the tone of a found depends on the nature of those vibrations, whose differences we can conceive no otherwise than as having different velocities; and as the small vibrations of the same chord are all performed in equal time; and as it is found true in fact, that the found of any body arising from one individual stroke, though it grows gradually weaker, yet continues in the same tone from first to last; it follows that the tone is necessarily connected with a certain quantity of time in making every single vibration; or that a certain number of vibrations, accomplished in a given time, constitutes a certain and determinate tone: for the frequenter those vibrations are, the more acute is the tone; and the slower and fewer they are in the same space of time, by so much the more grave is the tone; so that any given note of a tone is made by one certain measure of velocity or vibration, *i. e.* such a certain number of courses and recourses of a chord or string, in such a certain space of time, constitutes a determinate tone. See SOUND.

This theory is strongly supported by our best and latest writers on music, Dr. Holder, Mr. Malcolm, &c. both from reason and experience. Dr. Wallis, who owns it very reasonable, adds, that it is evident the degrees of acuteness are reciprocally as the lengths of the chords; though, he says, he will not positively affirm, that the degrees of acuteness answer the number of vibrations, as their only true cause: but his diffidence arises hence, that he doubts whether the thing has been sufficiently confirmed by experiment. Indeed, whether the different number of vibrations in a given time be the true cause, on the part of the object, of our perceiving a difference of tone, is a thing which we conceive does not come within the reach of experiment; it is sufficient the hypothesis is reasonable.

TUNE by Water, *To*. See LASUS, HYPPASUS, and WATER.

TUNEKA, in *Geography*, a town of Russia, in the government of Irkutsk, on the Ilim; 84 miles N. of Bala-ganskoi.

TUNES, in *Ancient Geography*, a town of Africa, mostly on a hill, to the W., and on the border of the port named Stagnum by Procopius, situated S.E. of Carthage, and surrounded by lakes and marshes. See **TUNIS**.

TUNG, in *Natural History*, the name given by the Indians to a little insect, called by the Spaniards *pique*, which is very common and very troublesome in some parts of the East and West Indies.

It is of the size of a small flea; its place of laying its eggs is within the skin of the human body, and it diligently searches opportunities of doing this, and often succeeds in the attempt, to the great pain and trouble of the person who suffers it.

The creature, knowing that it shall be soon crushed to death under the skin, generally makes its way either under the nails, or where there is some callus on the surface; there it eats its way along, and, in fine, lays its eggs, which hatch into so many young ones, and spread themselves between the flesh and skin all over the finger and hand, if not prevented by taking out the old one in time.

The person often does not perceive the creature's getting in, it enters so gradually and easily; but he is soon adverted of the place where it is by a violent gnawing pain, the creature really eating its way as it goes along. The only remedy in this case, is to enlarge the orifice at which it entered, and take it out whole; the wound soon heals up, and there is an end of the matter. This may often be done with the point of a needle; but if not, it is much better to submit to the opening it with a lancet than to the ill consequences which otherwise will attend it. *Observ. sur les Coutumes de l'Asie*, p. 184.

TUNGA, in *Geography*, a town of Africa, in the kingdom of Tunis.

TUNGEBADRA, a river of Hindoostan, which runs into the Kistnah, 7 miles E. of Rachore, in the country of Golconda.

TUNGERSHEIM, a town of the duchy of Wurzburg, on the Maine; 9 miles N. of Wurzburg.

TUNGINSKOI, a town of Russia, on the Irkut; 80 miles S.W. of Irkutsk. N. lat. 51° 18'. E. long. 103° 14'.

TUNGONG, a town of Meckley; 16 miles S.E. of Munnypour.

TUNGRI, or **TONGRES**, in *Ancient Geography*, the name of a people who, according to Tacitus, succeeded that of German, by which were designated the first people who from the other side of the Rhine had abandoned their territory to the Gauls. But according to other authors, the Tongres inhabited the country of Liege for a long time before the entrance of the Romans into the Gauls. Conquerors of the Eburons, they succeeded them, so that they were entirely forgotten. Their conquests were very extensive; and though they were subjugated by the Franks, and Attila, commanding the Huns, completed their extermination, yet their bishops long after retained their title.

TUNGSTEN, in *Mineralogy*; *Scheelin calcaire*, Haüy. The name tungsten, denoting heavy stone, was given to this mineral on account of its great specific gravity. Its appearance is not metallic, it has a yellowish or greyish-white colour, and is more or less translucent. The structure is lamellar; it is infusible by the blowpipe, but becomes opaque. When powdered and digested with nitric acid, it communicates to it a yellow colour. These properties distinguish it from carbonate of lead, white tin-stone, and barytes. Tungsten occurs both massive and crystallized; the form of the crystals is most frequently the octahedron. The primitive form of the crystal, according to Haüy, is an acute octahedron, having the angle at the summit 62° 24', and the angle

formed by the junction of the planes at the base of each pyramid 113° 36'. The principal planes of the crystals are smooth, the lustre splendid. Tungsten yields to the knife, and is brittle; its specific gravity varies from 5.800 to 6.015. This mineral occurs with wolfram, (see **WOLFRAM**,) tin-stone, magnetic iron-stone, and brown iron-stone: it sometimes forms large or small granular distinct concretions with streaked and shining surfaces. It is found in the mines of Cornwall, Sweden, Bohemia, and Saxony. Its constituent parts are,

Acid of tungsten	-	-	75.25
Lime	-	-	18.70
Silex	-	-	1.56
Oxyd of iron	-	-	1.25
Oxyd of manganese	-	-	0.75

TUNGSTEN, in *Chemistry*, is the metal obtained from the ore of the same name above described. By some of the German chemists it is denominated *Scheelium*, from Scheele, who first pointed out the peculiar nature of one of its oxyds.

Tungsten was first obtained in the metallic state by the Messrs. D'Elhuyart from another of its ores called *wolfram*. New experiments have been since repeated by Vauquelin, Klaproth, Messrs. Allen and Aikin, and others, with various success, and very lately they have been confirmed by Bucholz.

This metal has been obtained by exposing the tungstate of ammonia to a violent heat. It has never been procured in the state of a solid button, or in large panes, but only in small panes as fine as sand, having a strong metallic lustre, a light iron-grey colour, and slightly agglutinated. It is one of the hardest of the metals, and very brittle. Its sp. gr. according to the D'Elhuyarts, is 17.6; according to Messrs. Allen and Aikin, 17.2; and according to the late experiments of Bucholz, 17.4, which is about the mean of the others, and probably very near the truth. Hence, next to gold and platinum, it is one of the heaviest metals.

This metal requires a heat of at least 170° of Wedgwood (probably much higher) to melt it. It is not attracted by the magnet. Exposed to heat in an open vessel, it gradually absorbs oxygen, and is converted into an oxyd. Two oxyds of this metal were formerly known, *viz.* the dark blue or black, and the yellow or tungstic acid; but besides these, Bucholz has lately described another of a dark brownish-red or reddish-brown colour, and which he considers to be intermediate to the other two. Of these, the best brown and most important is the yellow oxyd, or tungstic acid. This oxyd is without taste. It is insoluble in water, but remains long suspended in it. It has no active or vegetable colours. It is stated to be composed of

Tungsten	-	-	80
Oxygen	-	-	20
			100

Little is known of the nature and composition of the other oxyds of this metal, so that we cannot with any degree of certainty ascertain the weight of its atom. This metal combines with sulphur and phosphorus, and forms alloys with many of the metals; but these compounds do not appear to be interesting. The yellow oxyd, or tungstic acid, seems capable of forming compounds with all the alkaline, earthy, and metallic bases, though very little is known at present of the nature of these compounds.

TUNGURAGUA, in *Geography*, a mountain of Peru; 21 miles S. of Riobamba.

TUNGURAGUA. See **MARANON**.

TUNGUSES, a branch or division of the Mandshures, or Mandshu, who originally composed one people with them, as appears not only from their mutual resemblance in features, manners, and customs, but chiefly from their agreement in language. The Tunguses call themselves *Cevoces*, probably from the supposed founder of their race; or, like most of the Siberian tribes, from the word which in their language signifies *men*. They are called Tunguses only by the Ostiaks of the Yenissey and the Tartars: By the Mandshu, they are denominated *Solomi*, protectors, or *Orontschon*, people with reindeer. The extensive deserts in which they now nomadize, reach from W. to E. from the Yenissey across the Lena, as far as the Amoor and the Eastern ocean. From S. to N. they keep between about the 53d and 65th degree of N. lat., and accordingly touch neither upon the Soongarian borders, nor upon the coasts of the Frozen ocean. Being of an accommodating disposition, they have admitted into their seats Ostiaks, Samoyedes, and particularly Yakutans. The districts now mentioned lie mostly in the government of Irkutsk; nevertheless, some few races of the Tunguses are reckoned as belonging to the government of Tobolsk. The first accounts which the Russians obtained of these people were received from the Ostiaks of the Yenissey; and in the year 1607, Cossacks were first sent from Mangashey against the Tunguses, to force them into submission. On occasion of these Russian attacks, the Tunguses displayed a greater degree of courage than the other Siberians; nor were they brought to the imperfect state of submission in which they are now held, till the latter half of the last century. By the enumeration of the year 1766, they consisted of 12,000 males; but besides these, distinct Tungusian stems wander among the Siberian nations, who together amount to about 1700 youths, or families. Although they constitute one of the most numerous nations of Siberia, yet, on account of their roaming mode of life, few stems of them can be actually registered. The Tunguses who nomadize about the coasts of the Eastern ocean, are known under the name of "Lamuts." Of these, in the forementioned year, only about 400 men were enrolled to the payment of tribute.

The Tunguses are indefatigable in the chase, and are constantly changing their habitation. In the seasons of fishing and of collecting berries, they remain for some time nearly stationary; and then they remove their tents, leaving their supplies of dried fish and berries in large boxes, constructed on trees or poles, for the benefit of themselves and their tribes, in travelling during the winter. They seem callous to the effects of heat or cold; their tents are covered with shamoy, or the inner bark of the birch, which they render as pliable as leather, by rolling it up, and keeping it for some time in the steam of boiling water and smoke. Their winter dress is the skin of the deer, or wild sheep, dressed with the hair on it; a breast-piece of the same, which ties round the neck, and reaches down to the waist, widening towards the bottom, and neatly ornamented with embroidery and beads; pantaloons of the same materials, which also furnish them with short stockings, and boots of the legs of reindeer, with the hair outward; a fur cap and gloves. Their summer dress only differs in being simple leather without the hair. They are religious observers of their word, punctual and exact in traffic; some few are christened; but most of them are Demonolatrians, have their forcerers, and sacrifice chiefly to evil spirits. They commonly hunt with the bow and arrow, but some have rifle-barrelled guns. Instead of burying the dead, they place the body, dressed in its best apparel, in a strong box, and suspend it between two trees. The implements of the chase belonging to the deceased are buried under the box. Except a forcerer is very near, no ceremony

is observed; but in his presence they kill a deer, offer a part to the demons, and eat the rest. They allow polygamy, but the first wife is the chief, and is attended by the rest. The ceremony of marriage is a simple purchase from her father; and the price is from 20 to 100 deer, or the bridegroom works during a stated time for the benefit of the bride's father. The unmarried are not remarkable for chastity. A man will give his daughter for a time to any friend or traveller to whom he is attached; if he has no daughter, he will give his servant, but not his wives. They are in size somewhat below the common stature, very active, and have lively inviting countenances, with small eyes; and both sexes are very fond of brandy. The Tunguses wander about the mountains, and seldom visit such plains as are occupied by Yakuts; but frequently resort to the solitary habitations of the Cossacks, appointed to the different stages; as they are there generally supplied with brandy, needles, thread, and such trifles as are requisite among them and their women, who always accompany them in their wanderings. See **MANDSHURES**.

TUNGUSKA, a river of Russia, which rises in lake Baikal, and runs into the Enisei, about 20 miles S. of Eniseisk: in the former part of its course it is called *Angara*, in the latter *Tunguska* or *Yenissey*.

This *Upper* Tunguska, for there are three rivers of the same name, which bears the name of Angara till it unites with the Ilim, takes up several other rivers, as the Koda, the Tshalovetch, the Iriki, the Kamenka, the Olenka, and the Tatarskaia, all on the right; and to the left, the Oka, and the Tshuna or Uda. This Tunguska has for the most part a bed strewed with rocks, and forms several cataracts, five of which are very considerable. Although it be navigable, the navigation is toilsome and difficult. The *Middle* or *Podkammenia* Tunguska rises in the government of Irkutsk, among the Baikal mountains, not far from the origin of the Lena; and after a course of about 800 versts, and after having, on the right, taken up the Tshiuicha and the Tshorna, falls into the Yenissey in 62° N. lat. The *Lower* or *Nivnei* Tunguska takes its source in the same district, but bends its course northward, and after having taken up on the left the rivers Niepa, Svetlaia, with many others, and on the right the Rosmakaika, the Turiga, and the Gorela, and running a course of about 1500 versts, strikes into the Yenissey, not far from Turukansk. In this river are several dangerous whirlpools.

TUNGUSKOI, UST, a town of Russia, in the government of Tobolsk; 24 miles S. of Eniseisk, at the conflux of the Enisei and Tunguska.

TUNGUSLI, a town of Russia, in the government of Tobolsk, on the Oby; 56 miles S. of Tara.

TUNIA, or **TUNJA**, a town of South America, in the viceroyalty of New Granada; 60 miles N. of Santa Fé de Bogota. Tunia, founded in 1539, was formerly an opulent town, but has now declined, the inhabitants not exceeding 400. The edifices retain marks of former splendour, and the parish-church might well serve for a cathedral. Here are three convents, that might answer the purpose of manufactories. N. lat. 5° 5'. W. long. 72° 56'.

TUNIC, in *Botany* and *Vegetable Physiology, the E. *rish* name of the appendage to certain seeds, termed **ARILLUS** in Latin; see that article, where, however, the explanation given by our predecessor, Dr. Woodville, refers only to the use of the term *Arillus* in the genus **CAREX**. The Tunic, or *Arillus*, is attached to the base only of the seed, immediately adjoining to the Scar, *Hilum*, and envelops the rest of the seed more or less completely and closely. Its size and texture, as well as colour, are various. In the Spindle-tree,*

tree, *Euonymus*, the part in question is a pulpy, wrinkled, orange-coloured wrapper; in *Afzelia* a beautiful, firm, close, scarlet cup, embracing great part of the lower half of the black hard seed; in *Hippobæe* a double membranous, but tough, coat, within the pulp of the berry; in *Myrsinica*, the Nutmeg, a jagged, brittle, highly aromatic, complex integument, well known by the name of Mace. *Narthecium*, and great part of the *Orchideæ*, have each of their minute seeds clothed in a lax membranous Tunic, extending beyond them at each end, and probably designed to give them buoyancy, like a sort of wing. *Oxalis* has an elastic pouch-like Tunic, serving to project its polished seeds to a distance, like the hard rigid bivalve Tunic of *Distamnus*, *Boronia*, and their allies. (See *RUTACEÆ*.) That curious genus named by M. Konig, in *Ann. of Bot.* v. 2. 569, *Blighia*, the *Akee* of Guinea and the West Indies, has each seed supported by a large, fleshy, lobed Tunic, for which alone, as a delicate article of food, the tree is cultivated. Some difficulty occasionally arises in discriminating between a real *Arillus* and the *Testa* of certain seeds, or at least the outer coat of the latter. (See *TESTA*.) This difficulty occurs in the order of *Asperifolia*; witness *Cynoglossum*; while the real capsules of *Geranium*, *Pelargonium*, *Malva*, &c. have, on the other hand, been sometimes called *Arilli*.

TUNICA, a kind of waistcoat, or under garment, worn by the ancients, both at Rome and in the East.

The common people ordinarily wore only a tunica; but those of better fashion wore a toga or gown over it. The philosophers wore a gown without a tunica, as professing to go half naked.

The tunica was peculiar to the men; the under garment of the women not being called tunica, but *stola*.

The senators wore their tunica enriched with several little pieces of purple, cut in form of large nails; whence it was called *laticlavata*: the knights had less nails on their tunica, which was hence called *angusticlavata*: the common people wore their tunica without any *clavi* at all. And it was by these three different sorts of tunicas, that the three different orders of the Roman people were distinguished in habit.

It has been a common opinion, that the *angusticlavata* distinguished the knights from the common people, in the same manner as the *laticlavata* did the senators from those of the equestrian rank. But Rubenius avers that there was no manner of difference between the tunics of the knights and those of the commons. As to the persons who had the honour of wearing the *laticlavata*, it may be maintained, says Kennet (*Ant. of Rome*, p. 308.), that the sons of those senators who were patricians had the privilege of using this vest in their childhood, together with the *prætexta*. But the sons of such senators as were not patricians, did not put on the *laticlavata* till they applied themselves to the service of the commonwealth, and to bearing offices. Yet Augustus changed this custom, and gave the sons of any senators leave to assume the *laticlavata* presently after the time of their putting on the *toga virilis*, though they were not yet capable of honours. And by the particular favour of the emperors, the same privilege was allowed to the more splendid families of the knights.

In the declension of the empire, the tunics did not only reach down to the ancles, whence they were called *salares*, but had sleeves too coming down to the hands, whence they were called *chirodota*. And now it was counted as scandalous to appear without sleeves, as it had been hitherto to be seen in them: and, therefore, in the writers of that age, we commonly find the accused persons at a trial habited in a tunic without sleeves, as a mark of disgrace and infamy.

Besides the different sorts of tunicas above-mentioned, there was also the *tunica palmata*, worn by generals in a triumph, and perhaps always under the *toga picta*. It hath its name either from the great breadth of the *clavi*, equal to the palm of the hand, or else from the figures of palms embroidered on it.

Among religious, the woollen shirts, or under garments, are styled *tunicas*, or *tuniques*.

TUNICA, in *Anatomy*, a technical name applied to the membranes which compose various organs; thus the serous and mucous membranes, and the muscular stratum of the stomach or intestines, are called their tunics: in the same way we have the tunics or coats of the eye, the blood-vessels, the testes, &c. &c.

TUNICA, in *Botany*, a name adopted by Dillenius, as he himself avows, from the apothecaries, and perhaps originally corrupted by them from *Vetonica*, or *Betonica*, its synonyms. These names all belong to the *Flos Caryophyllus*, Clove-flower, Carnation, or Pink; and Dillenius was led to the above choice, for the purpose of removing the ambiguity arising from *Caryophyllus*, (see that article,) as properly belonging to the valuable spice called Cloves. Linnæus, not satisfied with either appellation, invented a new one, which has been generally approved. See *DIANTHUS*.

TUNICATED ROOTS, among *Botanists*, such as are formed of a multitude of coats surrounding one another. See *ROOT*.

TUNIOK, in *Geography*, a town of Hungary, on the river Samos; 6 miles E. of Etsed.

TUNIS, a city of Africa, and capital of the country so called, situated on a rising ground, on the west bank of a lake, or rather a shallow in form of a lake, communicating with the gulf by a narrow channel. The situation of Tunis, probably first chosen by some fishermen, to whom that of almost all the maritime cities is to be ascribed, appeared to the inhabitants to be preferable to that of Carthage; as soon as, enriched by rapine, they dared openly to attack the trade of every nation. The eminence on which the ruins of Carthage, N.E. of Tunis, that ancient rival of Rome, advances into the middle of the gulf, and on that account would have exposed the Tunicians to be taken by surprise. This city was called, by Diodorus Siculus, "Léucon Tunéta," that is, White Tunis; perhaps from the chalky cliffs which lie round it, when viewed from the sea; and was founded about 1250 or 1300 years B.C., as appears from Herodotus and the Parian chronicle. It is surrounded by lakes and marshes, which, however, do not render it unhealthy, which is, by Dr. Shaw, attributed to the number of mastich and myrtle trees, rosemary, and other gummy and aromatic plants, with which they heat their ovens and their baths: the water is obtained a mile distant, for the general use of the inhabitants. The infected atmosphere of Tunis is attributed by baron de Tott to the putrid emanations of a channel, which conveys all the filth of the city to a neighbouring lake; which lake likewise produces exhalations that appear no less dangerous; and the salubrity of Tunis, he says, can only be attributed to the depth of the valley, which comes down to the gulf, and which, by attracting the vapours of the channel and the lake, does not allow them to acquire that degree of corruption which would render them hurtful to the constitution of the inhabitants. The Tunicians are the most civilized nation of Barbary, with little of the insolent haughtiness of the Algerines; and affairs with the government are transacted with ease: the English, French, Dutch, and several European states, having consuls here, who are treated with civility and respect. Including the suburbs, Tunis is, by Dr. Shaw, supposed

to be rather more than three miles in circumference, and the number of houses 10,000 or 12,000, and of inhabitants about 50,000. But Bruns, on the authority of Sprengel, reckons the houses at 12,000, and the inhabitants, by an exaggerated statement, at 300,000 or 200,000, of whom more than one-half perished by the plague of 1789. There are few buildings of any magnificence, except the great mosque, the bey's palace, called Barda, at some distance from the city, encompassed with walls and flanked with towers, and a few others: there are five gates, but none of them grand. Near the centre of the city is a piazza of vast extent, which is said formerly to have contained 3000 shops for the sale of woollen and linen goods; in the manufacture of both which this city has been long famous. Here are several colleges and schools, with many learned men and doctors of the Mahometan law, partly maintained by the public; the janizaries are quartered in barracks: other public buildings are, an exchange, a custom-house, and an arsenal. On the side of a canal is the fortress of Goletta, but not carefully supported. The chief defence is the castle. In 1655, Tunis was bombarded by the English under admiral Blake. N. lat. $36^{\circ} 44'$. E. long. $10^{\circ} 20'$.

TUNIS, the central region of Northern Africa, usually dignified with the title of kingdom; bounded on the north and east by the Mediterranean, on the south by Tripoli, and on the west by Algiers. This is the western part of the proper Africa of antiquity, and was formerly the chief seat of Carthaginian power; and in the middle ages, Tripoli was subject to Tunis, which was seized by Barbarossa in 1533. It is now about 200 miles from north to south, and 120 from east to west. According to Desfontaines, this kingdom begins in the east at the isle of Garbi, and terminates in the west at the river Zaine, called also Tusca or Susca. After the decline of the Roman empire, this country came under the power of the Vandals and Goths; and after them, under the Saracens, when they were governed by viceroys, called emirs. It afterwards became subject to the emperor of Morocco. For a space of time it was an independent and powerful kingdom. In the year 1538, it was overrun by Barbarossa; and notwithstanding the endeavours of Charles V. and his successors, the kingdom was made a province of the Ottoman empire, under the dominion of Selim II., by Sinan, bashaw of the Levant. At present the whole kingdom is divided into two circuits, the summer and the winter, which the bey makes in person through his dominions at those two seasons. The summer circuit, or northern district, is by far the most pleasant, fertile, and populous, and has the greatest number of cities, villages, and dowers, and carries the fairest appearance of plenty, prosperity, and cheerfulness of the two; advantages owing to the mildness of its government, and its being freer from tyranny and oppression than that of Algiers. The Tunisiens, in general, are like the Algerines; a mixture of Turks, Moors, Kabits or indigenous inhabitants of the mountains, Arabians, Jews, and Christians, merchants, and slaves; with this difference, that they are here polite and civilized. They are much more kind and humane to their slaves, in general; though they treat the knights of Malta with greater severity. In other respects, the Tunisiens are courteous to strangers; and all affairs with the regency are transacted in a very friendly manner: the consuls that reside here are treated with greater affability and condescension, justice, and dispatch, than in any other court on the African coasts: in a word, this nation hath, for many years, been more intent upon trade, and the improvement of their manufactures, than upon plundering and cruising; upon which account, it hath cultivated the alliance of many Christian

powers. The dress of the Tunisiens, of both sexes, is much of the same fashion with that of the Algerines. The women are handsome, neat, and more familiar: they go, indeed, veiled out of doors, but are allowed to be seen and converse with strangers, their husbands not being tainted with such jealousy as reigns among other Africans. The religion is the same as that of the Algerines. This kingdom, as well as Algiers, and others along the Barbary coast, are very subject to earthquakes, which commonly happen after heavy rains, at the end of the summer, or in autumn, and are often felt at a great distance from land, where the depth of water hath been above 200 fathoms: in other respects, the country is, for the most part, as healthy and fertile as any under the same climate. The northern parts, which are the best cultivated, enjoy a wholesome temperature. The southern part is sandy, barren, and parched by a burning sun; that near the sea is rich in olive-trees, and presents a great number of cities and populous villages. But the western part abounds with mountains and hills, and is watered by numerous rivulets; its environs being extremely fertile, and producing the finest and most abundant crops. The soil is in general impregnated with marine salt and nitre, and springs of fresh water are more rare than salt. The chief river is the Mejerda, or ancient Bagrada, which in summer is not navigable. The chain of Atlas seems here to terminate in Cape Bon, being called the mountains of Megala, Uzelette, &c. The winds are mostly from the sea, consequently refreshing; but those that blow from the southern sandy deserts are quite suffocating, especially as they prevail mostly in July and August: if they continue five or six days successively, the inhabitants are obliged to keep themselves cool by sprinkling their floors with water. The sea-winds, that blow west-north-west and north, bring dry weather in summer, and rain in winter; but the easterly, as well as the southerly, are for the most part dry, though attended with a thick cloudy atmosphere in most seasons. Their first rains commonly fall in September, and sometimes in October; about three weeks after which, the Arabians break the ground, sow their corn, and plant their beans, barley, lentils, and garvancos; their harvest usually begins in May, or the beginning of June, according to the quality of the preceding season. The Tunisiens are much more addicted to agriculture than their neighbours, the Algerines, and are for making the most of every inch of their ground. Mines of metal and minerals they disregard; though Dr. Shaw observed, among the mineral productions of Tunis, alabaster, crystal, boles, plumbago, iron, and lead. The cattle are small and slender, and the horses have degenerated. Here are lions, panthers, hyenas, chakals, and other ferocious animals. The manufactures are velvets, silks, linen, and red caps worn by the common people. The government of Tunis at present, like that of Algiers, is altogether despotic; but with this difference, that there it is elective, and here not only hereditary, but the bey hath power to name which of his sons he pleases for his successor, without regard to eldership; or, in case he doth not think him worthy, he may appoint a brother, or a nephew, to the succession: in all other cases, likewise, they are equally absolute and independent, either on the Porte, or the Douwan or Divan. They were once, indeed, under the protection of the former; and the rapacious extortion and tyranny of its bashaws had, in some measure, obliged them to shake off their yoke, and form a government of their own, which they settled in such a manner, that their deys, as they were then called, could do nothing without the advice and consent of the Douwan or Divan; but they have found means, in time, to rid themselves of this uneasy clog also, though they

they still retain a kind of form or shadow of both. The Porte hath a bashaw residing here, but in power and influence he is a mere cypher, and serves only to remind the Tunifians, that they were once subject to the Turkish sultans. The Douwan, being chiefly composed of friends and creatures of the beys, is rather assembled to give a forced approbation to their resolutions, than to consult them about the justice or expediency of them. At the first settling of this new form of government, the deyship was the supreme dignity, as it is still at Algiers; as that of bey was the next in rank, but wholly subordinate to it. However, having since built their power upon the ruins of the deys, they have, by degrees, raised the deyship to be despotic and independent; and by making it hereditary, have prevented, in a great measure, those frequent depositions, rebellions, and massacres, which are the almost constant concomitants of the regal authority, wherever it is made elective. Yet far from preventing jealousies, cabals, and rebellions, in spite of all their precautions, the dignity oftener falls to the share of that son who has been able, by his address, to form the strongest party, than to him who hath been appointed to it by the father. Hence it is, that whenever the throne becomes vacant, whether in the course of nature, or by open treason and rebellion, it is seldom filled up again without a great deal of bloodshed, rapine, and violence, in proportion to the number of competitors. In the summer the bey of Tunis resides in the northern part, and in the winter retires to the south, where is a lake of considerable extent, the "Palus Tritonis" of antiquity. The authority of the bey extends over a large tract of country, of which he receives the tribute, with a small army, which marches out annually for that purpose. Tunis, which had formerly a considerable commerce with France, exports thither corn, oil, beans, lentils, wax, wool, hides, and Morocco skins; and receives, in exchange, Spanish wool, Languedoc cloths, vermilion, sugar, pepper, cloves, wine, brandy, paper, hardware, iron, and steel. The Italian trade is wholly carried on by the Jews, who send the same commodities to France, and import from thence Spanish cloths, damasks, several sorts of silk and woollen stuffs, gold and silver tissue. The French pay 3 *per cent.* for all the goods they bring from France, and the Jews 10 *per cent.* on their imports from Italy. The Turks and Moors export to the Levant woollen stuffs, lead, gold-dust, and chequins, and a vast number of bales of caps; and bring, in return, silks, calicoes, iron, alum, and vermilion. They send much the same kind of commodities into Egypt; but the oil that is carried thither must be put up in jars, and not in casks, because the greatest part of it is designed for the lamps of Mecca and Medina; and the Arabians would think it polluted, as the vessels might formerly have contained wine. They import, in exchange, from thence, linen, cotton, rice, flax, and coffee. The number of French ships freighted at Tunis, by Turks, Moors, and Jews, has amounted yearly to one hundred and fifty to the Levant, and fifty for France and Italy; as for those of the English, their number is uncertain. All public conventions and instruments are written in the Arabic tongue, but the public commerce is commonly carried on by the medium of the Lingua Franca. Gadames, or *Galames* (which see), had formerly a flourishing commerce; but it has ceased since the caravans passing from Tripoli to Tombuctoo do not stop there, but at Agadez. The caravans of Tombuctoo bring slaves, ostrich feathers, ivory, and amber; those of Sallee, gold, as well as those of Gadames, which also bring Negro slaves. Ruins of ancient monuments are found near Zowan, Spitala, Cassa, Phradifa, Hammamel, and Chaspa. Desfontaines

mentions in particular with admiration a large and beautiful amphitheatre near Elgein. Some vestiges are also found here and there of an ancient Carthaginian aqueduct, which served to draw water from the springs of mount Zowan; but there scarcely exist any other remains of Carthage. Near the river Mejerda are still seen some ruins of Utica, which are, at present, at the distance of about 4000 fathoms from the shore; though this city was formerly a sea-port.

At Tunis, accounts are kept in pialtres of 52 aspers, each asper being divided into 12 burbes. The coins consist of gold sultanins, valued at 100 aspers; of silver nafaras (a square or shapeless coin), valued at 52 aspers; and of doublas, valued at 24 aspers. The burbes are a small copper coin. Gold, silver, and pearls, are weighed by the ounce of 8 termini; and 80 ounces of Tunis = 81 ounces English troy. The cantaro, which is a weight for merchandize, contains 100 rottoli, weighing about 111 pounds avoirdupois. The cassiso, a corn measure, contains 18 weabs, or 216 saws; 53 cassisi = 67½ English quarters. The mattaro, an oil measure, is = 32 rottoli, = 35½ pounds avoirdupois, and is about 5 English gallons. The mattaro, wine measure, is only half that for oil measure. The pic, long measure, is for woollen 298.3 French lines, or 26½ English inches, for silk 24½ English inches, and for linen 18½ English inches.

TUNKAT. See TONCAT.

TUNKERSTOWN. See EPHIRATA.

TUNKHANOCK, a township of Pennsylvania, in the county of Lucerne, containing 884 inhabitants.

TUNKHANOCK Creek, a river of Pennsylvania, which runs into the east branch of the Susquehanna, N. lat. 41° 31'. W. long. 75° 57'.

TUNNA, in *Commerce*, a measure of grain in Sweden, equal to four bushels five quarts Winchester measure.

TUNNAGE, or TONNAGE, a duty or custom due for merchandize brought or carried in tons, and such like vessels, from or to other nations; thus called, because rated at so much *per tun*.

Tunnage is properly a duty imposed on liquids according to their measures; as poundage is that imposed on other commodities according to their weight. See POUNDAGE and CUSTOMS.

TUNNAGE is also used for a certain duty paid the mariners, by the merchants, for unloading their ships arrived in any haven, after the rate of so much *per tun*.

TUNNEL, or FUNNEL, an instrument through which any liquor is poured into a vessel.

Part of a draught of a chimney, above the mantle-piece, is also called by the same name.

TUNNEL is a large subterranean arch, driven through a summit or hill, for the passage of boats upon a canal continued through the same: also, smaller drains or culverts are called *tunnels*; and the execution of making and driving them is called *tunnelling*.

TUNNEL-Pit, a well or shaft sunk to the line of an intended tunnel, through which the stuff excavated from it is drawn up to the surface.

TUNNEL-Kiln, in *Agriculture*, a term applied to a lime-kiln in which coal is burned, in contradistinction to that in which wood, peat, and other such matters are used, termed the *flame-kiln*. See LIME-Kiln.

There is much less waste of heat in the former sorts than in those of the latter, and they have much advantage in the quick dispatch in drawing the lime; as, in the flame-kilns, after the matters are burnt, much time is lost by waiting until the lime be cold, and by emptying it at the mouth

part instead of below. The nature of these different kinds of kilns, and many useful particulars relating to them, may be seen in detail in the Corrected Report on Agriculture for the County of Suffex.

TUNNEL-Net is a kind of net much used for the catching of partridges; thus called from its form, which is a cone fifteen or eighteen feet long.

This net must be made of three-twisted thread, and must not be too thick: it should be dyed green, that the colour may give no suspicion to the birds, and the meshes should be about two inches and a half broad.

Into the hind meshes, at the larger end, there must be put a smooth wooden rod, about the bigness of a gun-rammer; of this must be made a sort of hoop, both ends being tied together; and at different distances from one another, there must be placed many more such, which are to be rounded in the same manner, and are to support the net its whole length in the tunnel form. Two stakes, or strong pegs, must be fastened at the sides of the entrances into the net, and one at the farther end, or narrow part: the two first are to keep the mouth of the net sufficiently extended, and the last is to keep it pulled out lengthwise to its full dimensions, the hoop preventing its falling in.

There must be used with this net two others, of that kind which they call *halliers*. These are long and straight nets, and are to be fastened down to the mouth of the tunnel-net on each side, extending seven or eight fathoms on each side from it, so as to take in fourteen or sixteen fathoms in front, beside the breadth of the mouth of the tunnel-net, and to direct all that shall move forward within that compass into the net.

In order to use this net, a covey of partridges is to be found, and then the net is to be placed at a considerable distance behind them: when this is fixed, the sportsman is to take a compass, and get before the birds with a stalking horse or stalking ox, and then to move forward, driving them towards the net. This is to be done gently and carefully; they are not to be driven at once straight forwards, but the sportsman is to wind and turn about, and at times to stand still, as if the horse was grazing. If the partridges, in the time of driving, make a stand, and look at the machine, it is a sign they suspect it, and are ready to take wing: in this case the sportsman must stand still, or even go back a little; and when they are become composed again, he is again to advance upon them. If any single bird lies remote from the rest, the sportsman must take a compass round him, and fetch him in; for if he takes wing the rest will all follow; in this manner, with patience and caution, the whole covey may be driven like a flock of sheep up to the nets. A real horse, trained to the purpose, is, however, much better than a stalking machine. The halliers, or wings of the tunnel, must not be pitched straight, but in a sort of semicircle; and the birds, when they stop their march, will run along them to the middle, where the mouth of the tunnel is open.

When they come to the mouth of the tunnel, the old ones will make a stand, as if to consider what was before them; but on pressing gently on them with the horse, the young ones will run in, and then all the rest will follow.

The sportsman must then make all the haste he can to the mouth of the net, to secure them from coming back again.

TUNNING, or **TONNING**, a part of the process of brewing, or rather an operation which is the sequel of it.

The tunning of beer, &c. is performed various ways; some being of opinion it is best tunned as it cools, or begins to come; while others let it stand longer to become riper.

The most regular method is, to cleanse and tun just as it comes to a due ferment, and gets a good head; for then it has the most strength to clear itself. What works out of the cask is to be supplied with fresh beer of the same brewing.

TUNNING-Dish, a term applied to a large wooden dish, employed with a funnel, in tunning malt liquor.

TUNNUDTIORBIK, in *Geography*, an island near the coast of East Greenland. N. lat. 60° 45'. W. long. 46° 50'.

TUNNY, in *Ichthyology*, a name given by us to the Spanish mackarel, a large fish of the scomber kind, called by authors *thynnus* and *arcynus*, by Salvia *limosa*, and *pelamys* by Aristotle, Ælian, and the other old writers. See SCOMBER.

In the lochs on the western coasts of Scotland, as well as in the Mediterranean (see SCOMBER *Thynnus*), tunnies are also found in pursuit of herrings, and sold to people, who either carry them fresh to the country markets, or salt and preserve them in large casks. The pieces, when fresh, look like raw beef, but when boiled turn pale, and have somewhat the flavour of salmon. One of them has been found to weigh four hundred and sixty pounds.

TUNS, *The*, in *Geography*, rocks in St. George's Channel, near the coast of Ireland, and county of Wexford; 3 miles N.E. from the Saltee islands.

TUNSLA, a town of Sweden, in the province of Savelax; 52 miles N. of Nyslot.

TUNSTALL, JAMES, D.D., in *Biography*, a learned divine, was born about the year 1710, and educated at St. John's college, Cambridge, of which he was a tutor and fellow. In 1741 he was chosen public orator of the university, and became one of the chaplains to archbishop Potter. It was said of him, that many came to Lambeth humble, but no one left it so but Dr. Tunstall. He was created D.D. in 1744, and in 1757 took possession, upon an exchange, of the valuable vicarage of Rochdale, in Lancashire; but his life terminated in 1772. He had a controversy with Middleton concerning the letters between Cicero and Brutus, of which he had made great use in his "Life of Cicero," and which Tunstall not only suspected, but proved, in the judgment of Markland, to be supposititious. He was also the author of some other publications: the principal of which is his "Academica, Part I., containing several Discourses on the Certainty, Distinction, and Connection of Natural and Revealed Religion," continued, as it is supposed, by Part II. printed after his death, under the title of "Lectures on Natural and Revealed Religion, read in the Chapel of St. John's College, Cambridge." Nichols's Anecdotes.

TUNSTEDE, or **TUSTEDE**, an English D.D., and a learned musician, who flourished in the fourteenth century. Pits, Bale, Tanner, and all our biographical writers, speak of him with respect. And among the MSS. at Oxford, we found, in 1780, a Tract on Music, entitled "Quatuor Principalia Artis Musicæ," by this writer, dated 1351, Bodl. 515. bound up with other tracts.

What this author calls the *four principals of music*, will best appear from his own manner of dividing the work. In the first part or *principal*, consisting of nineteen chapters, he treats of music in general, its constituent parts and divisions. Secondly, of its invention, intervals, and proportions; twenty-four chapters. Thirdly, of plain chant and the ecclesiastical modes; fifty-eight chapters. Fourthly, of measured music or time, of discant, and their several divisions. This last principal is divided into two sections, of which the first contains forty-one chapters, and the second

forty-nine. The whole treatise fills a hundred and twenty-four folio pages: the diagrams, which are very numerous, are beautifully written, and illuminated with different coloured inks; and it seems to be in all respects the most ample and complete work of the kind which the fourteenth century can boast.

TUNUB, in *Geography*, a town of Egypt, on the west branch of the Nile; 6 miles N.N.W. of Amrus.

TUNUPOLON, in *Zoology*, the name of an East Indian species of viper, found principally in the island of Ceylon; it is of a small size, and of a fine fatten-like gloss, beautifully variegated with shades of brown. Ray.

TUONI ECCLESIASTICI, Ital., in *Music*, tones of the church. (See *CANTO Fermo* and *MODI*.) The *modi autentici* are the odd numbers 1, 3, 5, 7; and the *modi plagali*, the even numbers 2, 4, 6, 8.

TUONO, Ital., a musical tone or sound. (See *TONE*.) "Tuoni," says the Crusca, "appresso a' musici, sono i gradi, per cui passano successivamente le voci e i suoni nel salire verso l'acuto, e nello scendere verso il grave colla regolata interposizione de' semitoni a' loro luoghi per riempiere gl'intervalli maggiori consonanti e dissonanti."—"Tones among musicians are those degrees or gradations by which voices and instruments ascend and descend successively from the grave to the acute, and descend from the acute to the grave, with the interposition of the necessary semitones to fill the greater consonant and dissonant intervals." Varchi. In this arrangement of the scale, all the simple and perfect consonances are found, that is, the key-note, the fourth, the fifth, and the diapason or octave.

TUP, in *Rural Economy*, a term often applied to a ram in different districts.

TUPELO TREE, in *Botany*. See *NISSA*.

TUPERSDORF, in *Geography*, a town of Saxony, in the Vogtland; 4 miles N.E. of Oelnitz.

TUPES, a town of Bohemia, in the circle of Chrudim; 8 miles N.W. of Chrudim.

TUPICA, a town of Peru; 30 miles S.E. of Lipis.

TUPINAMBAS, a nation of South American Indians, who inhabited near Rio Janeiro; but after the settlement of the Portuguese, removed towards the river of the Amazons, where the Tapayos are now their descendants.

TUPISTRA, in *Botany*, an unexplained name, used by Mr. Ker, in *Curt. Mag.* t. 1655.—The plant which bears it, *T. squalida*, was imported by Messrs. Loddiges from Amboyna, in whose stove it flowered, for the first time, in April 1814. The learned author did not examine the specimen in a perfect state, so that his ideas, like our's, must be chiefly derived from Mr. Edwards's figure, the accuracy of which there is no reason to doubt, and from which the close affinity of this plant to *Orontium japonicum* is apparent. No botanist however is as yet sufficiently acquainted with the parts of fructification in either to determine their generic character, or to distinguish them generically from *O. aquaticum*. See *ORONTIUM*.

T. squalida has a perennial tuberous root, with thick fibres. *Stem* none. *Leaves* few, erect, equitant, lanceolate-oblong, entire, coriaceous, smooth, about two feet long. *Stalk* solitary, erect, not a span high, simple, cylindrical, smooth, firm, purplish, bearing a dense spike of numerous scentless flowers, of a pale dingy, or brownish lead-colour, quite sessile, with a bractea at the base of each. *Calyx* none. *Corolla* of one petal, bell-shaped; the limb in six or more spreading segments, each bearing on its disk a sessile, two-lobed, but seemingly imperfect, anther. A cylindrical body, four-lobed at the top, in the centre, looks like a *germen* and *stigma*.

TUPMAN, in *Rural Economy*, a term frequently applied to a breeder and dealer in tups, in some districts, as those of the midland parts of the kingdom. See *RAM*.

TUPPA, a name given in Thibet to children, who at the age of eight or nine years are admitted into the monastery at Teshoo-Loomboo, and who are occupied in receiving the instruction suited to their age, and the duties for which they are designed. See *TOHBA*.

TUPPING, in *Rural Economy*, a term applied to the impregnating of ewes by the tups or rams.

TUPPING-Time, the period or season of putting tups or rams to the ewes. It should be done neither too early nor too late, as in the former case the lambs are dropped too much in the cold weather, while in the latter they are liable to be of inferior size for the markets. It is consequently best done according to the nature of the situation and circumstances. See *SHEEP*.

TUQUILIGASTA, in *Geography*, a town of South America, in the province of Tucuman, on the Salado; 4 miles S. of St. Yago del Estero.

TUR RABAIN, a town of Asiatic Turkey, in the government of Mosul; 20 miles E. of Nisibin.

TURA, a river of Russia, which rises about 40 miles W. of Verchotura, in the province of Ekaterinburg, and runs into the Tobol, opposite Turchanskoi, in the government of Tobolsk. See *TOBOL*.—Also, an island in the Grecian Archipelago. N. lat. 39° 34'. E. long. 24° 15'.—Also, a town of Hungary; 24 miles W. of Topoltzan.—Also, a town of the county of Tyrol; 24 miles S.W. of Trent.

TURA Bamba, a spacious plain, in which stands the city of Quito.

TURALINZES, one of the first colonies which constructed for themselves permanent habitations, when the Tartars subjugated Siberia in the 13th century; hence their name (from *Tura*, signifying in the Tartar language a town), which signifies the same with settlers. Ever since their arrival, they have inhabited the region on both sides of the river, which from them is denominated the Tura, between the Tavda and the Iser, in the Ekaterinemburg and Tobolskoi districts of the governments of Perme and Tobolsk. Their oldest fixed seat was the city of Tschinghiden; but when Yermak made the conquest of these parts, the khan Yepanfa resided higher up the Tura in a city, which after their restoration by the Russians was named Turenisk, and bears this name at present, though it is also called by the Tartars Yepantchina.

TURAMIANA, in *Ancient Geography*, a town of Spain, in the eastern part of Bætica, S.W. of Urbi. According to the Itinerary of Antonine, it was on the route from Castulo to Malacca, between Urbi and Murgi.

TURAN, in *Geography*. See *TARAZ*.

TURANCOURCHY, a town of Hindoostan, in Madura; 12 miles N. of Nattam.

TURANNO, a town of Hindoostan, in Malwa; 18 miles N.E. of Ougein.

TURANO, a town of Naples, in Calabria Citra; 3 miles W. of Bisignano.

TURAPHILUM, SIIIH-ELLAH, in *Ancient Geography*, a town of Africa, in Mauritania Cæsariensis, situated in the mountains of the interior, S. of Icoium.

TURATTE, in *Geography*, a town of the island of Celebes, and capital of a powerful kingdom; 180 miles N. of Macassar.

TURBA, in *Ancient Geography*, a town of Novempopulani, belonging to the Aquitains, in Gaul.

TURBAN, **TURBANT**, the head-dreßs of most of the Eastern

Eastern and Mahometan nations; consisting of two parts, viz. a cap, and a fash of fine linen or taffety, artfully wound in divers plaits about the cap.

The word is formed from the Arabic *dar*, or *dar*, or *dal*, or *dul*, which signifies *to encompass*, and *band* or *band*, which signifies *fast*, or *scarf*, or *band*; so that *durbant*, or *turbant*, or *tulbant*, only signifies a *scarf*, or *fast*, tied round; it being the fast that gives the denomination to the whole turban.

The cap is red or green, without any brim, pretty flat, though roundish at top, and quilted with cotton, but does not cover the ears. About this is wrapped a round piece of fine thin linen or cotton, in several wreaths variously disposed.

There is a good deal of art in giving turbans the fine air; and the making of them up constitutes a particular trade, as the making of hats does among us.

The emirs, who pretend to be descended of the race of Mahomet, wear their turbans green: those of the other Turks are ordinarily red, with a white fash. The genteel people have frequent changes of turbans. M. de Tournefort observes, that the turban, all things considered, is a very commodious dress; and that he even found it more easy to him than his French habit.

The grand signor's turban is as big as a bushel, and is so exceedingly respected by the Turks, that they dare scarce touch it. It is adorned with three plumes of feathers enriched with diamonds and precious stones: he has a minister on purpose to look to it, called *tulbentoglan*. See CROWN.

That of the grand vizir has two plumes; so have those of divers other officers, only smaller one than another; others have only one, and others none at all. The turban of the officers of the divan is of a peculiar form, and called *mugenezek*.

The fash of the Turks' turban, we have observed, is white linen; that of the Persians is red woollen. These are the distinguishing marks of their different religions; Sophi, king of Persia, who was of the sect of Ali, being the first who assumed that colour, to distinguish himself from the Turks, who are of the sect of Omar, and whom the Persians esteem heretics.

TURBAN, or *Clavicle*, in *Conchology*, denotes the aggregate, or whole set of the whirls of a shell, and forms its lower part. The flat, or helix turban, is one so slightly prominent, as to be nearly on a level. There are also the short turban, the produced turban, and the long turban.

TURBAN-*Top*, in *Botany*. See HELVELLA.

TURBAN-*Shell*, *Cidaris*, in *Natural History*, the name of a genus of the echinodermata, which are of a hemispheric or spheroidal figure, and have their name from the Latin *cidaris*, a Persian turban, as in some degree resembling that head-dress.

Of this there are several genera, and subordinate species.

This class of the echinodermata is made out by the assistance of the fossil, as well as the recent animals; many of the kinds being now unknown on any shores. Klein's *Echinod.* p. 17. See ECHINODERMA.

TURBANIA, in *Ancient Geography*, a fountain of Palestine, at the foot of mount Gilbon, according to William of Tyre.

TURBARY, TURBARIA, a right to dig turf in another man's ground; from *turba*, an old Latin word for a turf.

TURBARY, *Common of*, is a liberty which some tenants have by prescription to dig on the lord's waste. See COMMON.

TURBARIA is sometimes also taken for the ground where turfs are digged.

TURBARIA *Bruaria*, more particularly denotes flaw-turf, or heath-turf; mentioned in the charter of Hammon de Maffly.

TURBED, in *Geography*, a town of Persia, in the province of Chorasan; 90 miles S.S.W. of Meschid.

TURBELA, in *Ancient Geography*, a town of Hither Spain, situated towards the south, and supposed to be the same with that which Livy calls Turba.

TURBET, in *Geography*, a town of Pennsylvania, in the county of Northumberland, containing 2917 inhabitants.

TURBICO, or TURBIGO, a town of Italy, in the department of the Olona; 18 miles W. of Milan.

TURBINATA OSSA, in *Anatomy*, turbinated bones; certain bony plates belonging to the nose. See NOSE and CRANIUM.

TURBINATED, is a term applied by naturalists to shells which are spiral or wreathed, conically, from a larger basis to a kind of apex.

TURBINES, in *Natural History*. See TURBO.

TURBINITÆ, fossile shells of the turbo kind, or stones found in those shells.

TURBIT, in *Ichthyology*, the same with turbot.

TURBIT *Pigeon*, a particular species of pigeon, remarkable for its short beak, and called by the Dutch *cort bek*, that is, *short beak*. Moore calls it in Latin *columba fimbriata*; and its English name seems no other than a bad pronunciation of its Dutch one. It is a small and short-bodied pigeon, and has a beak no longer than that of a partridge; the shorter this is, the more the pigeon is esteemed. It has a short round head, and the feathers upon the breast open, and reflect both ways, standing out like the frill of the bosom of a shirt. This is called by many the *purle*, and the more the bird has of it, the more it is esteemed; the tail and back are generally of one colour, as blue, black, red, yellow, or dun, and sometimes chequered; the flight-feathers, and those of all the rest of the body, are white; they are a light nimble pigeon, and, if trained to it, will take very high flights, in the manner of the tumblers.

TURBITH, TURPETH, or *Turpethum*, a medicinal root, brought from the East Indies, particularly from Cambaya, Surat, and Goa; though others will have it, that the true turbit comes chiefly from Ceylon.

It is the cortical part of the root of a species of convolvulus, viz. the *convolvulus turpethum* of Linnæus.

The turbit of the moderns bears so little resemblance to that of the ancients, that it is difficult to suppose them the same. That sold by our druggists is a longish root, about the thickness of the finger, resinous, heavy, and of a brownish hue without, and whitish within. It is brought to us cloven in the middle, lengthwise, and the heart or woody matter taken out. The best is ponderous, not wrinkled, easy to break, and discovers to the eye a large quantity of resinous matter.

This root, on the organs of taste, makes at first an impression of sweetness; but when chewed for some time, betrays a nauseous acrimony. It is accounted a moderate strong cathartic, but does not appear to be of the safest or most certain kind; the resinous matter, in which its virtue resides, being very unequally distributed; inasmuch that, as it is said, some pieces taken from a scruple to a drachm purge violently, whilst others in larger doses have very little effect. Lewis.

It is commonly supposed to take its name *turbit* from *turbare*, on account of the violence of its operation, as dis-

turbing the whole economy; and has accordingly been used in the dropsy, palsy, and apoplexy.

It yields a deal of resinous matter in a spirituous menstruum, which Quincy observes does not affect the larger passages much; but is very active in the smaller vessels, and glandulous contortions, which it wonderfully clears of all viscid adhesions.

Some apothecaries, either through ignorance or parsimony, substitute white thapsia, which they call *grey turbith*, or *turbith garganicum*, for the true turbith; though both as to taste, colour, and qualities, they are very different.

TURBITH Mineral, *Turpethum Minerale*, is a name which the chemists give to a yellow precipitate of mercury, now called yellow sub-sulphate of mercury.

For the method of preparing it, see **HYDRARGYRI Sub-sulphas flavus**.

Turbith mineral may also be made by precipitating mercury from its solution in nitrous acid by means of vitriolic acid, or of some vitriolic salt. For this purpose the nitrous acid must be well saturated with mercury.

We may observe that turbith mineral becomes yellow only by being deprived of the adhering vitriolic acid, and that it remains white till it has been washed with a large quantity of water; and, in general, the more perfectly it is deprived of acid, the deeper yellow colour it acquires. Some chemists have supposed, that a portion of vitriolic acid remains united with the turbith, though not enough to render it soluble in water: M. Beaumé affirms, that when sufficiently washed it contains no acid; but the latter experiments of M. Bayen prove the contrary.

This powder is called mineral turbith, from the resemblance it bears to the vegetable turbith of the Arabians, in strongly purging the most internal recesses of the body; for though it be insipid upon the tongue, yet it is possessed of very considerable virtues. Being boiled with water, it loses more of its salts, and thereby grows milder, and more safe; so it does also by being deslagrated twice or thrice, or distilled with spirit of wine.

The powder, prepared in the manner above described, proves, though not corrosive, strongly emetic; operating, in this intention, the most effectually of all the mercurials that can be given with safety. It is used chiefly in virulent gonorrhœas, and other venereal cases accompanied with a great flux of humours to the parts: it is said likewise to have been employed with success in robust constitutions, against leprous disorders, and obstinate glandular obstructions. The dose, as an emetic, is from two grains to six or eight; though some constitutions, habituated to mercurials, can bear larger quantities. It may be given in smaller doses, as half a grain or a grain, as an alterative, after the same manner as the red calx of mercury; and even when intended as an evacuant, it may perhaps, as Malouin observes, be most advisable to give only a small quantity at a time, as one grain, and repeat the dose every hour till the vomiting succeeds. Lewis's Mat. Med. and Dict. Chem. Art. *Turbith mineral*.

Turbith mineral appears to have been the grand secret of Paracelsus, which, in his scarce German book of hospital medicines, he praises so extravagantly for the venereal and all chronic diseases. Sydenham also commends it in venereal cases, given in the quantity of six or eight grains, in strong habits of body, so as to prove emetic; but when imprudently used, it is apt to bring on a dysentery.

Turbith mineral has been used as a sternutatory, and is said to have made wonderful cures in distempers of the eyes. Mr. Boyle relates a cure of this sort, performed by the famous empiric Adrian Glass-maker on Mr. Vatteville, a

Swiss officer of distinction in the French service, and totally blind. This gentleman was ordered to snuff about a grain of turbith up each nostril, which immediately operated in a violent manner, by vomit, stool, sweat, salivation, and the lacrymal glands, for twelve hours together; and also caused his head to swell greatly; but within three or four days after this single dose had done working, he recovered his sight. Boyle's Works, Abr. vol. i. p. 103.

We read of this preparation being given to the quantity of ten grains, with the same quantity of camphor, and fifteen grains of the *pilul. ex duob.* to remove the swelling of the testicles. This medicine, which in the beginning vomited and purged, at last operated chiefly as an alterative. It is said to be successful in obssinate venereal and scrofulous disorders. See Medic. Ess. Edinb. vol. iv. art. 4.

Turbith mineral is an excessive bright true yellow, of a great body like vermilion; will stand equally well, and work with oil or water much in the same manner. These qualities (says the author of the *Handmaid to the Arts*, vol. i. p. 107.) render it very valuable for many purposes; as it is much brighter than any other yellow used in oil, except king's yellow, and is free from its nauseous smell, and cooler. Mixed with Prussian blue it yields a much finer green than from the king's yellow without ultramarine. As it is now procured, it requires levigation in water before it be used.

TURBO, in the *Linnean System of Zoology*, is a genus of the Testacea order of worms. Its characters are; that its animal is a slug; the shell univalve, spiral, and solid; and the aperture straightened, orbiculated, and entire. Gmelin, in his edition of Linnæus, enumerates one hundred and seventeen species, besides several varieties. See **TURBO** under the article **CONCHIOLOGY**.

In Da Costa's system, the turbo is a genus of snails, with a lengthened clavicle or turban; which have generally a perfect round mouth; the columella, or inner lip, not much faced outwards, and the body spire very bellied, so that the turban is suddenly, and not insensibly, produced from it. See **SHELLS**.

The most remarkable species of the turbo, or screw-shell, is that called *scalare* by Rumphius, from its spires running up hollow, or with a space between them. This is a very scarce and valuable shell when large, but is often found small in the Adriatic.

Aldrovand, and many others of the old authors, make no difference between the turbines and screw-shells, though the distinction of the genera is very obvious; the screw-shells having a long, large, and dentated mouth, which terminates towards the base in a narrower aperture than elsewhere; and the shell itself always runs to a very sharp point at the end; whereas the turbines terminate in a less sharp point, and have thicker bodies, and always much wider mouths. The screw-shells are indeed very easily confounded with the buccina; and it requires more accuracy to distinguish them, than has fallen to the share of the generality of writers on these subjects an age or two ago. Aldrovand and Rondeletius have confounded these genera, and have brought in a third among them, by the epithet *muricatum*, which, when applied to the buccinum, is generally observed to bring into that family a shell of the murex class, and which might have been very properly called by that shorter name.

For the sake of distinguishing these, it may be observed, that the screw-shell is of a very long and slender shape, terminating in a very sharp point, with its spires running on imperceptibly, without any great cavity, and the base small and flat, as well as the mouth.

TURBO *Cocblea*, in *Natural History*, a name by which some authors have called the Persian shell, a species of *concha globosa*, or *dolium*.

Many have been puzzled with this shell, not knowing in what class to rank it; and Aldrovand has placed it at the end of his work, saying, that it would seem to belong to the turbinated kinds, but that it wants the turbo.

TURBOT, in *Ichthyology*, a name given to the fish which, in the systems of Artedi and Linnæus, is a species of *pleuronectes*, being the *pleuronectes* of the former, with the eyes on the left side, and a rough body, and the *pleuronectes maximus* of the latter, and the *rhombus maximus asper non squamosus* of Ray. See **PLEURONECTES Maximus**.

Turbots grow to a large size, some of them weighing from twenty-three to thirty pounds. They are taken chiefly off the north coast of England, and others off the Dutch coast. The large turbots (as well as several other kinds of flat fish) are taken by the hook and line, for they lie in deep water; the method of taking them in weirs, or staked nets, being very precarious. When the fishermen go out to fish, each person is provided with three lines, which are coiled on a flat oblong piece of wicker-work; the hooks being baited, and placed regularly in the centre of the coil. Each line is furnished with fourteen score of hooks, at the distance of six feet two inches from each other. The hooks are fastened to the lines upon snoods of twisted horse-hair, twenty-seven inches in length. When fishing, there are always three men in each coble, and consequently nine of these lines are fastened together, and used as one line, extending in length near three miles, and furnished with 2520 hooks. An anchor and a buoy are fixed at the first end of the line, and one more of each at the end of each man's lines; in all four anchors, which are common perforated stones, and four buoys made of leather or cork. This line is always laid across the current. The tides of flood and ebb continue an equal time upon our coast, and, when undisturbed by winds, run each way about six hours; they are so rapid that the fishermen can only shoot and haul their lines at the turn of tide, and therefore the lines always remain upon the ground about six hours; during which time the *mysine glutinosa* of Linnæus will frequently penetrate the fish that are on the hooks, and entirely devour them, leaving only the skin and bones. The same rapidity of tides prevents their using hand-lines; and therefore two of the people commonly wrap themselves in the sail, and sleep while the other keeps a strict look-out, for fear of being run down by ships, and to observe the weather. For storms often rise so suddenly, that it is with extreme difficulty they can sometimes escape to the shore, leaving their lines behind. Besides the coble, the fishermen have also a five-men boat, which is forty feet long, and fifteen broad, and of twenty-five tons burthen; it is so called, though navigated by six men and a boy, because one of the men is commonly hired to cook, &c. and does not share in the profits with the other five.

This boat is decked at each end, but open in the middle, and has two large lug-sails.

All our able fishermen go in these boats to the herring-fishery at Yarmouth, in the latter end of September, and return about the middle of November. The boats are then laid up till the beginning of Lent, at which time they go off in them to the edge of the Dogger, and other places, to fish for turbot, cod, ling, skates, &c. They always take two cobles on board, and when they come upon the ground, anchor the boat, throw out the cobles, and fish in the same manner as those do who go from the shore in a coble; with this difference only, that here each man is provided with double the quantity of lines, and instead of waiting the

return of the tide in the coble, return to their boat and bait their other lines; thus hawling one set, and shooting another every turn of tide. They commonly run into harbour twice a week to deliver their fish.

The best bait for all kinds of fish is fresh herring cut in pieces of a proper size; the five-men boats are always furnished with nets for taking them. Next to herrings are the lesser lamprey. The next baits in esteem are small haddocks cut in pieces, sand-worms, and limpets, here called *stidders*, and when none of these can be had, they use bullock's liver. The hooks are two inches and a half long in the shank, and near an inch wide between the shank and the point. The line is made of small cording, and is always tanned before it is used.

Turbots, and all the rays, are extremely delicate in their choice of baits; for if a piece of herring or haddock has been twelve hours out of the sea, and then used as bait, they will not touch it. Pennant's Brit. Zool. vol. iii. p. 234, &c.

TURBOWKA, in *Geography*, a town of Russia, in Poland; 32 miles S.E. of Zytomiers.

TURBUNNY, a town of Napaul; 60 miles S.W. of Catmandu.

TURCÆ, in *Ancient Geography*, the name of a people who inhabited the environs of the Palus Mæotides, according to Pomponius Mela. See **TURK**.

TURCHANS, or **ROOHANS**, in *Zoology*, a kind of wild horses in the great desert about Azof. They are higher than the *tarfans*, (which see,) moss-grey in colour, with long upright standing ears, their manes and tails thinner and shorter than the common breed, their coats long and thick. They feed by thousands together in one taboon. The Khirges Rhaïfaks shoot them with guns, and eat them.

TURCICA SELLA. See **SELLA**.

TURCICA Terra, *Turkey Earth*, in the *Materia Medica*, a very fine bole or medicinal earth, dug in great plenty in the neighbourhood of Adrianople, and used by the Turks as a sudorific and astringent, and famous among them in pestilential diseases. It is sometimes brought over to us also made up into flattish orbicular masses, of two or three drachms weight, and sealed with some Turkish characters. The earth is of a somewhat lax and friable texture, yet considerably heavy, of a greyish-red colour, but always redder on the surface than within; extremely soft, and naturally of a smooth surface. It breaks easily between the fingers, and melts freely in the mouth, with a considerably strong astringent taste. It adheres but slightly to the tongue, raises no effervescence with acids, and burns to a dirty yellow colour. Hill.

Many authors who have written of the *materia medica*, and of fossils in general, have indiscriminately called the various kinds of Lemnian earth by this name; but the true terra turcica, described by Schroder, Wormius, &c. is a different substance, though not sufficiently characterized by those authors to distinguish it from all the other earths.

TURCKHEIM, in *Geography*, a town of Germany, in the lordship of Mindelheim; 6 miles E. of Mindelheim. —Also, a town of France, in the department of the Upper Rhine, formerly imperial; 3 miles W. of Colmar.

TURCKHEIM Rhein, a town of France, in the department of Mont Tonneur; 4 miles N. of Worms.

TURCO, a town of Peru, in the diocese of La Plata; 60 miles E.N.E. of Atacama. S. lat. 20° 30'. W. long. 68° 20'.

TURCOCORIA, a town of European Turkey, in Livadia; 14 miles N. of Livadia.

TURCOIN,

TURCOIN, a town of France, in the department of the North, and chief place of a canton, in the district of Lille. The unfortunate conflict between the French and the duke of York, who commanded the allies, may be said to have decided the fate of the Netherlands; 6 miles N.N.E. of Lille.

TURCOIS, or TURQUOIS, in *Natural History* and *Mineralogy*, a substance found in Persia and other parts of Asia, and formerly classed with stones. It has a beautiful light-green colour, and is susceptible of a high polish. The surface is smooth and polished; it has also a smooth shining fracture, and is so hard as to scratch glass slightly: the specific gravity is 3.127. It has for a long time been considered as the tooth of an unknown animal impregnated with copper; but by a series of analytical experiments, La Grange has proved that it does not contain a particle of copper, but is in reality bone coloured by phosphate of iron. The constituent parts are as under:

Phosphate of lime	-	-	80
Carbonate of lime	-	-	8
Phosphate of iron	-	-	2
Phosphate of magnesia	-	-	2
Alumine	-	-	1½
Water	-	-	6

Guyton Morveau suspected that the turcois contained silex, but this is supposed by other chemists to have been accidental. This celebrated chemist made some experiments on fossil bones, and found that they assume in the fire the colour of turcois; and when digested in a weak solution of potash, they turn blue, varying from a greenish to deep blue. Messrs. Fourcroy and Vauquelin have also observed that bones strongly calcined often assume a blueish tinge, which they considered to be caused by a small portion of phosphate of iron.

Turcois is employed in jewellery. See GEMS.

The Greeks and Latins seem to have known it under the name *callais*: and it appears to have had a place in the rationale of the high-priest of the Jews.

Some writers mention turcoises both oriental and occidental, of the new rock and of the old. The oriental partakes more of the blue tincture than the green; and the occidental, more of the green than the blue. Those of the old rock are of a finer blue, and those of the new rock are often whitish, and do not keep their colour.

The oriental ones come from Persia, the Indies, and some parts of Turkey; and some even suppose, that it is hence they derive their modern name *turcois*. The occidental are found in various parts of Europe, particularly in Germany, Bohemia, Silesia, Spain, and France.

Turcoises are found of a round or oval figure; they cut easily, and besides seals, which are frequently engraved on them, some are formed into crucifixes, or other figures, near two inches high: though De Boodt mistakenly affirms, that none have been known to exceed the bigness of a walnut; for the specimen exhibited by Mr. Mortimer to the Royal Society was twelve inches long, five inches broad, and in some places near two inches thick.

The turcois is easily counterfeited; and that often is done so perfectly, that it is impossible to discover the deceit, without taking it out of the collet.

In the Memoirs of the Academy of Sciences for the year 1715, we have a very curious account of the formation of the turcois, and the manner of managing its naturally irregular colour, by M. Reaumur. The turcois, he observes, is one of the softest of precious stones, its hardness usually not coming up to that of a crystal, or a transparent pebble;

though some are much harder than others: and still the harder, *ceteris paribus*, the more valuable, by reason of the vivacity of the polish, which is always proportionable to the hardness.

Rosnel, a jeweller, and the author of a scarce treatise, called *Mercure Indien*, estimating the several precious stones, sets a hard turcois, whose blue is neither bright nor deep, on the foot of the most perfect emeralds, that is, nearly on a level with a diamond; but such are scarcely ever met with. Those with any defect, he only values at a French crown the carat.

Tavernier affirms, but erroneously, that there are but two mines of turcoises known in all the earth, and those are both in Persia; the one called the *old rock*, near a town called Necabourg, three days' journey to the north-east of Meched; the other, called the *new rock*, is five days' journey from it. The stones from the latter, he adds, are but little valued; and the king of Persia hath for many years prohibited the digging in the former for any but himself. M. Reaumur takes the old rock to be now exhausted; in effect, the common division of turcoises into the old rock or oriental, and new rock or occidental, is very arbitrary and precarious. All the best, and most perfect, wherever they occur, in India or Europe, are reckoned among the former, and the rest among the latter. Near Simore, in the Lower Languedoc, there are several considerable mines of turcoises; but that fine blue colour, admired in the turcois, is not natural to those of these rocks; the prevailing colour being sometimes white, and sometimes much like that of tripoli of Venice. Other precious stones are dug out of the mine with all their colour, to the force of which nothing can be added, though it may frequently be diminished, as we see fire bring down the too deep colour of the sapphire, and quite take away that of a pale sapphire: these turcoises, on the contrary, are naturally whitish or yellowish, of a colour as ordinary as that of a free-stone; and by opposing them for some time to the action of the fire they assume a blue colour.

It seems a paradox, and yet M. Reaumur has attempted to prove, that turcoises are originally the bones of animals. In the mines in France, pieces have several times been found in the figure of teeth, bones of the legs, &c. And turcoises which are yet imperfect, or half-formed, are apparently composed of laminæ, or leaves, like those of bones, between which some petrifying juice, insinuating itself, binds them close together; and still, the softer, the more imperfect the stones are, the more distinguishable are the different directions of the fibres and laminæ, with their interfections, and the great resemblance they bear to fractured bones, and the lefts to any kind of stones known.

To give them a blue colour, they dry them awhile in the air, then heat them gradually in a furnace made after a particular manner. If they be heated too hastily, the humidity between the laminæ wanting time to evaporate, the whole will separate into scales or slaws. Some of the stones require a greater degree of heat to bring them to their colour than others; and even in large pieces, the several parts ordinarily require several degrees of heat.

On this account a great deal of care is to be taken in the heating of them; for the fire, which gives them their blue by degrees, if they be exposed beyond a certain degree, takes it away again.

M. Reaumur accounts for their taking a blue colour by heat very well; when fresh cut out of the rock, it seems their substance is found sprinkled and streaked all over with spots, veins, little circles, &c. of a dark blue colour; these he takes to be sources of a deep blue matter, which the fire rarefying,

rarefying, spreads and diffuses throughout the whole substance of the stone. This matter, again, he concludes to have been either originally the juice contained in the bones, since mixed and coagulated with the petrifying juice, or some other mineral matter insinuated into the pores of the stone.

According to M. Reaumur's Mem. Par. 1715, nitrous acid will not dissolve that of Persia, though it will that of France, which shews a difference between them.

Dr. Woodward maintains, that the *turcois*, or *callais* of Pliny, is nothing else but fossil ivory tinged with copper; but Mr. Mortimer, who produced a specimen of the turcois to the Royal Society, is of opinion, that those which authors call stones of the old rock, and in which the colour is permanent, are real mineral stones; the form and size of the sample which he produced evincing this; for its shape shews that it could not be part of any animal bone, but its botryoid form seems to prove, that it is the product of fire, which has once melted this substance, and that when it cooled, its surface was formed into blisters and bubbles, in the same manner as the hæmatites botryoides, or blood-stone, whose surface consists of knobs, resembling a bunch of grapes. He apprehends the *elephas εφυκτος*, or *ebur fossile* of Theophrastus, to be what Dr. Woodward calls the turcois, and suspects that it is what De Boode calls the new rock. He thinks that, for distinction sake, all these stones of ivory origin should be called *pseudo-turcheſia*, or *bastard turcois*. By a chemical analysis he concluded, that his stone was a rich copper ore; some of it pounded and dissolved in spirit of hartshorn gave a deep blue; in aqua fortis, a fine green; and an iron wire put into it was in an hour's time incruſted with copper; some of it, being calcined without any flux in a crucible, ran to a slag or half-vitrified substance; whereas the same heat, if it had been ivory or bone, would have reduced it to a white ash, like bone-ashes, for it was exposed to a fire that vitrified the tile which covered it. Its hardness and consistence to an engraver's tool seemed to be the same as that of common white marble; its colour was not improved by heat, and it became brittle when red-hot.

Sir Hans Sloane had several specimens of these oriental turcoises, which are all botryoid, and seem to be copper ores; and in his museum there are also samples of turcoises from Spain and the south of France, which are small, and seem to be pieces of ivory tinged with copper. Phil. Trans. vol. xlv. art. 17.

The great defect of turcoises in general is, that in time they lose their blue colour, and become green; and then cease to be of any value.

The pale blue of the natural turcois gem, is a very favourite colour in the glass-trade, and is given to glass in the following manner. First calcine common sea-salt, and beat it into fine powder; then make a pot of the sea-green glass, of a fair and full colour; to this, when in fusion, throw in at times the powder of salt, till the mass has lost all its transparence, and is become paler and opaque; then add, by very small quantities at a time, more and more salt, till the colour is exactly that of the turcois gem; and when it is so, work it immediately, for the salt is soon burnt off, and the glass becomes transparent, and of its green colour. If it become transparent while working, more salt must be thrown in, and that will reduce it to the same opacity again. Neri's Art of Glass, p. 57. See GLASS.

For making a paste resembling the turcois, see PASTE.

TURCOMANIA, in *Geography*, that part of Armenia which belongs to the Turks.

TURCOMANS. See TURKOMANS.

TURCZYNSKA, a town of Poland, in Volhynia; 38 miles N. of Zytomiers.

TURDE, in *Ancient Geography*, a town of Italy, belonging to the Velumbri, according to Ptolemy.

TURDETANI, or TURDETANS, a considerable people of Spain, in Betica, a great part of which they occupied. The Turdetans were considered as the most distinguished people of Spain. They studied their language; they were in possession of ancient histories, and of laws written in verse: they were regarded as the most polished people of the whole province, on account of the commerce which they carried on with strangers, and particularly with the Phœnicians. When the Phœnicians first landed on the coasts of Turdetania, they found silver so abundant, that all the moveables of the inhabitants, not excepting the meanest and most trivial, were made of this metal. Strabo says, that when the Turdetani became subject to the Romans, they assumed the manners of their conquerors, and forgot their own language, adopting that of the Romans. Their provinces surpassed all others in riches and cultivation, in honesty and religious zeal. This country supplied great abundance of cheese, wine, oil, honey, wax, saffron, vermilion, &c. particularly fine wool.

TURDULI, a people of Spain, in Betica, towards the S.E. According to Strabo, the Turduli and Turdetani were the same people.

TURDUS, THRUSH, in the *Linnean System of Ornithology*, the name of a genus of birds, of the order of the Passeres. The distinguishing characters of this genus are, that the tongue is jagged, and has a rim or margin round it; the bill is of a conic-pointed figure, the upper mandible bent at the apex, and emarginated; the nostrils naked, but half covered above with a small membrane, and the chaps ciliated. Gmelin enumerates 125

Species.

VISCIVORUS. With a brown back, neck with white spots, and a yellowish bill. This is the mistle thrush of Pennant and Latham. Found in the woods of Europe.

PILARIS. With black tail-feathers, the outermost whitish at the apex and interior margin, the head and rump hoary. The fieldfare of Ray, Willughby, Pennant, and Latham. Of this there are four varieties. Found in the woods of Europe, Siberia, and Syria.

AFRICANUS. Blackish, the breast covered with black feathers, with red margin; the bill yellow; and the legs cinereous. Found in Africa.

TRIPOLITANUS. Olive-yellow, whitish beneath; black quills; equal blackish tail and yellow apex. The Tripoli thrush of Latham. Found in Barbary.

BARBARICUS. Green; breast spotted white, rump and tail at the tip yellow. The green thrush of Shaw's Travels, and the Barbary thrush of Latham, so called from its habitation.

AONALASCHKÆ. Brown spotted black; the breast yellow spotted black; the wing-coverts, the greater quills and tail-feathers black, with a testaceous margin. The Unalaska thrush of Pennant, and Aonalashka thrush of Latham, so called from the place of its abode.

ILIACUS. With wings ferruginous beneath, and whitish eye-brows. The red-wing, swine-pipe, or wind-thrush of Ray, Willughby, Pennant, and Latham. An European bird, migrating in large flocks.

MINOR. Light-red, beneath white; breast yellowish, varied with black spots. The little thrush of Pennant, Edwards, and Latham. Found in Jamaica and North America; seven inches long, migrating and feeding on berries.

JAMAICENSIS. Above cinereous; bill, head, and legs brown;

TURDUS.

brown; quill-feathers and tail black; chin and throat white, striated with brown; breast cinereous; abdomen white. The Jamaica thrush of Latham.

GUIANENSIS. Above greenish-brown, underneath ochre-coloured, with black longitudinal striæ. The Guiana thrush of Latham.

MUSICUS. With quill-feathers at the inner base ferruginous. The Mavis thrush or song-thrush of Ray, Willughby, Pennant, and Latham. Found in the woods of Europe, imitating in the mornings of spring the song of the nightingale, and continuing it for almost nine months. Of this there are three varieties.

OLIVACEUS. Brownish; beneath yellow. Found at the Cape of Good Hope.

INDICUS. Olive-coloured; bill and legs blackish; quills brown on the inner side. The Indian thrush of Latham; so called because it is found in India.

CINEREUS. Ash-coloured, with the two intermediate tail-feathers cinereous; the next on both sides black at the margin, and cinereous at the apex; the rest black. The ash-coloured thrush of Latham. Found in India.

MIGRATORIUS. Grey; abdomen red; eye-lids white; the external tail-feather white at its interior apex. The American fieldfare of Forster, and red-breasted thrush of Latham. Found in North America, from Hudson's Bay as far as the bay of Natka and Carolina.

TRICHAS. Olive-coloured; the body beneath yellow; the ocular band black. The Maryland yellow-throat of Edwards, and the yellow-breasted warbler of Pennant and Latham. Found in summer in the moist low woods of Carolina, Maryland, and Pennsylvania.

CANORUS. Brown; beneath ferruginous; with a white line on the sides of the head, and a rounded tail. The crying thrush of Latham. Found in Bengal and China.

RUFUS. Red; beneath spotted whitish, with quill-feathers of the same colour; the tail rounded and red. The ferruginous thrush of Pennant and Latham. Found in America, from Newfoundland to Carolina.

POLYGLOTTUS. Obscurely ash-coloured; beneath palely ash-coloured, with the greater quill-feathers white on the exterior half. The singing-bird, mocking-bird or nightingale of Sloane, the mock-bird of Catesby and Kalm, and the mimic thrush of Pennant and Latham. Found in Jamaica, and the moist woods of America, practising in the way which its name imports.

ORPHEUS. With brown back; breast and lateral wing-feathers whitish; eye-brows white. The polyglott bird of Willughby, the lesser mocking-bird of Edwards, and the mocking-thrush of Latham. Found in Jamaica, and the warmer parts of America. It has two varieties.

SANDWICHENSIS. Above and abdomen brownish; beneath and front cinereous-white. The Sandwich thrush of Latham. Found in the Sandwich islands.

PACIFICUS. Above cinereous; beneath brownish-white; the lori black; the tail black, with a white tip. The Pacific thrush of Latham. Found in the Friendly islands.

SURATENSIS. With the head somewhat crested; the neck, tail, and greater quill-feathers and legs black; the body above amber-coloured; beneath dirty-grey; the wing-coverts and second quills green. The Surat thrush of Latham: named from its habitation.

PHILIPPENSIS. Above olive; neck and breast red, spotted with white; abdomen and vent ochre-coloured. The Philippine thrush of Latham; so called from the islands which it inhabits.

SHANBU. With chin, throat, and the ocular area black, with a large white streak at the ears; the rest of the

head, neck, breast, and abdomen grey; the back and wings greenish-brown. The black-faced thrush of Latham. Found in the woods of China.

NOVÆ HOLLANDIÆ. Blueish lead-coloured; the anterior part of the head, the bill, chin, throat, and legs black; the quill and wing-feathers black, with lead-coloured margin; the intermediate white at the apex. The New-Holland thrush of Latham.

PLUMBEUS. Black, with yellow axillæ, and cuneated tail. The red-legged thrush of Pennant and Latham. Found in North and South America, and in the Bahama islands.

CRASSIROSTRIS. Above from red, and beneath from black to brown, with the quill-feathers acuminate; the two intermediate obscure. The thick-billed thrush of Latham. Found in New Zealand.

ULIETENSIS. From red to brown; quill-feathers black at the margin, and roundish tail black. The bay thrush of Latham. Found in Ulietea.

PALLIDUS. From yellowish to ash-coloured; beneath whitish; tail-feathers from cinereous to brown; the side ones white at the apex. Pale thrush of Latham. Found in Siberia, beyond the lake Baikal.

SIBIRICUS. Black, with yellow mouth; eye-brows and space under the wings white. White-browed thrush of Latham. Rare in the alpine and more northerly woods of Siberia.

RUFICOLLIS. Above brown, below snowy; neck and equal tail-feathers red; the two intermediate cinereous. Red-necked thrush of Latham.

OBSCURUS. Brown; with eye-brows, chin and vent blue. Dark thrush of Latham. Found beyond the lake Baikal, in the woods of Siberia.

PHENICULUS. Above olive, with white eye-brows; ocular band black; tail-feathers and two intermediate quills spadiceous; sides with throat and breast red. The red-tailed thrush of Latham. Found at the Cape of Good Hope.

RUFICAUDUS. Above olivaceous; beneath purplish and white; tail-feathers and quills black; sides for the most part red. The rufous-tailed thrush of Latham. At the Cape of Good Hope.

MALABARICUS. Ash-grey; beneath red-brown; bill and tail-feathers black; legs yellow. The Malabar thrush of Latham. Found in Malabar.

PAGODARUM. Black; back and rump grey; vent white; head crested. The pagoda thrush of Latham. Found in Malabar and Coromandel.

CAYENNENSIS. Cinereous; beneath whitish; vent white; greater wing-feathers and tail-feathers black; throat, bill, and legs black. The Cayenne thrush of Latham.

VARIEGATUS. Above brown; beneath whitish; feathers whitish and black interspersed. Variegated thrush of Latham. Found in Surinam.

STRIATUS. Varied with yellow and grey; a longitudinal streak of the back yellow. Yellow-backed thrush of Latham. Found in Surinam.

FUSCUS. Olivaceous-brown; breast and abdomen whitish, spotted with brown; greater quills and legs black. Brown thrush of Latham and Pennant. In New York.

MUSTELINUS. Beneath white, spotted with black; cheeks brown, spotted with white; rump and greater quills acuminate, and tail-feathers brown. The tawny thrush of Latham. In New York.

CAMTSCHATKENSIS. Brownish; beneath from brownish to white; eye-brows pale; chin and throat caryophyllous-coloured. Kamtschatka thrush of Pennant and Latham. Found in Kamtschatka.

NÆVIUS. With head and pectoral band black; streak from the eyes to the hind part of the head ferruginous; body above cinereous; beneath ferruginous. The varied thrush of Pennant, and spotted thrush of Latham.

HUDSONICUS. From blueish to cinereous; bill and legs black; feathers of the crown, nape, wing-covers and primary quills pale at the margin, red. The Hudsonian thrush of Pennant. Found in Hudson's Bay.

NOVEBORACENSIS. With head, neck, and breast varied from black, and dilutely ferruginous; feathers of the back ferruginous at the margin; with double band above and below the eye, wings, and roundish tail shining-green, and legs black. The New York thrush of Pennant. Found in North America.

CURACUS. Shining-black; bill sub-friated, and tail cuneated. Found in Chili.

NITENS. Green; spot on the wing-covers violet. Shining thrush of Latham. Of this there is a variety, the green merula; beneath violet; throat and rump blueish. Found in Angola, and at the Cape of Good Hope.

ÆNEUS. Shining-green; beneath brassy; head blackish to shining-gold; rump and intermediate tail-feathers purplish; tail wedge-formed. Glossy thrush of Latham. Found in Senegal.

AURATUS. Violet; back and wings green-gold; band of the wings at the internal margin and tail, with the superior wing-covers, blue. The gilded thrush of Latham. Found at Whidah, in Africa.

LEUCOGASTER. Violet; with white belly; blackish quills; bill and legs cinereous. The Whidah thrush of Latham.

ROSEUS. Subincarnate; head, wings and tail black; occiput crested. Merula rosea of Aldrovand, Ray, and Brisson; rose or carnation-coloured ouzel of Pennant, Willughby, and Edwards; the rose-coloured thrush of Latham. Found in various parts of Europe, Siberia, and Syria, migrating in flocks, and feeding chiefly on locusts.

LEUCURUS. Black; rump and tail white; tail-feathers black at the apex. White-tailed thrush of Latham. Found about Gibraltar.

CAFER. Blackish; somewhat crested; rump and belly white; vent red. Cape thrush of Latham. Of this there is a variety, the merula above brownish to cinereous; friated brownish; beneath hoary. Found in China, and at the Cape of Good Hope.

MACROURUS. From purplish to shining-black; beneath from ferruginous to yellow; rump and three tail-feathers on both sides exteriorly white. The long-tailed thrush of Latham. Of this there is a variety with the two intermediate tail-feathers black; the rest half white. Found in Pulo Condore and Malabar.

AMBOINENSIS. Spadiceous; beneath yellow; secondary quill-feathers yellowish from the base to the middle; tail cuneiform; beneath yellow. The Amboine thrush of Latham.

BORBONICUS. From cinereous to olive; black crown; abdomen and vent from olive to yellow; tail brown, with two obsolete bands towards the apex. The Bourbon thrush of Latham. Found in the island of Bourbon.

OCHROCEPHALUS. With the larger quill-feathers, tail, and legs green; vertex and cheeks yellowish; collars black; abdomen and breast cinereous; the latter varied with fagittated spots. The yellow-crowned thrush of Latham. Found in Ceylon and Java.

ORIENTALIS. Black; beneath white; rump cinereous; ocular band black; three tail-feathers on both sides externally white. Ash-rumped thrush of Latham. In India.

NIGERRIMUS. Wholly black; feathers yellow at the margin; cheeks and throat holofericeous. The black-cheeked thrush of Latham. Found in Madagascar.

HISPANIOLENSIS. Olive-coloured; beneath varied from olive to grey; brown tail-feathers, whitish at the interior margin, olive at the exterior; with the intermediate altogether olive. The Hispaniola thrush of Latham.

ALBIFRONS. From black to lead-coloured; beneath yellowish; with the spot on the front white; and brown legs. The white-fronted thrush of Latham. There is a variety black; beneath white, tail beneath cinereous. Found in New Zealand.

CAPENSIS. Brown; abdomen yellowish; vent yellow. A variety has the head and tail black. Found at the Cape of Good Hope.

ATRICAPILLUS. Brown; black head; abdomen and rump red; spot on the wing white. Found at the Cape of Good Hope.

MAURITIANUS. From greenish to deep blue; the feathers of the head and neck narrow and long; bill cinereous; and legs lead-coloured. The Mauritius thrush of Latham.

MINDANAENSIS. Steel-coloured; beneath white; the longitudinal band of the wings white; tail subcuneated. The Mindanao thrush of Latham.

MADAGASCARIENSIS. Brown; abdomen and vent white; tail subfurcated; two intermediate tail-feathers wholly, and the rest at the exterior margin green-gold; the exterior margin of the outmost on both sides white. The Madagascar thrush of Latham.

SENEGALENSIS. From grey to brown; abdomen whitish; bill, tail-feathers, tail and legs brown. The Senegal thrush of Latham.

LONGIROSTRIS. From olivaceous to pale-brown; beneath pale sulphureous; rump and eye-brows yellowish; tail round and yellow; intermediate tail-feathers brown. The long-billed thrush of Latham. Found in the islands of Eimeo and York.

GRISEUS. Grey; crown and neck whitish; breast, abdomen and vent from very pale red to grey. The grey thrush of Latham. Found in Coromandel.

PALMARUM. Green-olivaceous; beneath sub-cinereous; black head, with three white spots on each side. The palm thrush of Latham. There is a variety, viz. merula palmarum atricapilla; found among the palms of Cayenne.

MONACHA. Above yellow, with brown; beneath yellowish; black head; terminating with black on the breast acutely. The nun thrush of Latham. Found in the woods of Abyssinia.

ÆTHIOPICUS. Black; beneath white; with a transverse white band on the wings; tail round, tail-feathers quadrated at the apex. The Ethiopian thrush of Latham. Found in the thick woods of Abyssinia.

ABYSSINICUS. Brown; beneath yellow; brownish throat, and black legs. The Abyssinian thrush of Latham.

COCHINCHINENSIS. Green; with blue spots on both sides at the base of the bill; face, chin, and throat black; the latter encompassed with a yellow arc. Found in CochinChina.

CINNAMOMEUS. Beneath more diluted cinnamon; throat, legs, temples, cheeks, chin, covers of the wings, and breast black; with white nebulous wreath. The black-breasted thrush of Latham. Found in Cayenne.

RUFIFRONS. Brown; beneath, and the front and temples red; vent white; tail and legs cinereous. The rufous thrush of Latham. Found in Cayenne.

CANTANS. From red to brown, varied with transverse black or blackish streaks; beneath whitish; chin, cheeks,

TURDUS.

and throat from red to orange; with black area, spotted with white on both sides of the neck. Musician thrush of Latham. In the recesses of the forests of Cayenne.

CORAYA. Red-brown; beneath more diluted; vertex and sides of the head and neck black; tail grey, varied with blackish lines. The barred-tailed thrush of Latham.

FUSCIPES. Cinereous; beneath red; vertex black; legs and tail-feathers brown; tail sub-cuneated. The buff-winged thrush of Latham; supposed to be found in Cayenne.

ALAPI. From olive to brown; throat and breast black; abdomen cinereous; tail wedge-formed, blackish. The white-backed thrush of Latham. In Guiana.

CIRRIATUS. Cinereous, with wedge-formed tail, white at the margin and apex; crested crown; throat varied with white and black; breast black. The black-crested thrush of Latham. Found in Cayenne.

TINTINABULATUS. Vertex and temples white, spotted with black; eye-brows black; chin white; incarnated breast spotted with black; back, wings and tail brown; rump, abdomen and vent from red to orange. The chiming thrush of Latham. Found in Cayenne and Guiana.

BAMBLA. Spotted; above from red to brown; beneath cinereous; wings black; with a white transverse band. The black-winged thrush of Latham. Found in Cayenne.

AURITUS. Varied from red and olive-coloured; beneath white; vertex and wreath from red to brown; chin and throat black; feathers near the eyes, and at the sides of the neck, shining-white; elongated and more wide. The white-eared thrush of Latham. Found in Cayenne.

COLMA. From red to brown; beneath cinereous; chin and throat white, spotted with black; breast from grey to brown. The rufous-naped thrush of Latham. It has a variety from black to brown; the occiput and neck red. Found in Cayenne.

TINNIENS. Above brown; beneath white; breast spotted with black; equal tail. The alarum thrush of Latham. Found in Cayenne.

LINEATUS. From olive to brown; chin, throat and breast white; the latter spotted with brown; the sides of the neck marked with white lines. The speckled thrush of Latham. Found in Cayenne.

FORMICIVORUS. Above from red to brown; beneath cinereous; chin, throat, and breast black; band varied with white and black. The ant thrush of Latham. Found as the former.

CYANURUS. Spadiceous; beneath varied with blue and yellow transverse alternate streaks; vertex at the nape to the quill-feathers and ocular band black; another orange; pectoral band and wedge-formed tail blue. The blue-tailed thrush of Latham. In Guiana.

REX. From red to brown; beneath more dilute; occiput lead-coloured; front varied from white to brown. The king thrush of Latham. Found in South America, particularly Guiana and Brazil.

SINENSIS. Reddish; head brown striated; white eye-brows; tail-feathers marked with obscure brown streaks, and legs yellow. The Chinese thrush of Latham. Found in China.

ARCUATUS. Above spadiceous; with eye-brows, collars, chin and vent white; cheeks and bow of the throat white; tail rounded, black towards the apex; apex white. The crescent thrush of Latham. Found in China.

MELANOPIS. Grey; back and wings from green to brown; orbits, chin, and throat black; spot on the ears white. The black-faced thrush of Latham. In the woods of China.

VIOLACEUS. From violet to blue; feathers of the head,

neck, breast, and covers of the wings steel-fasciated at the apex; bill and legs black. Found in China.

LEUCOCEPHALUS. Grey; black quill-feathers; the lesser with the covers of the wings and tail green-brassy and shining-violet. The white-headed thrush of Latham. In China.

NIGRICOLLIS. Brown; head, chin and nape white; ocular band and breast yellowish; neck, back and tail-feathers black; tail wedge-formed, lead-coloured. The black-necked thrush of Latham. Found in China.

BUBIL. Of the colour of terra umbra; longitudinal band near the eyes black. The chanting thrush of Latham. Found in the southern part of China.

PERSPICILLATUS. With head and neck cinereous; front and streak under the eyes on both sides black; body above from greenish to brown; beneath ochroleucous. The spectacle thrush of Latham. In China.

FLAVUS. Yellow; white orbits; band from upper mandible produced near the eye black; bill and legs red. The yellow thrush of Latham. In China.

VIROIDIS. Green; with eye-brows, spot below the eye, abdomen and vent white; throat grey, spotted with white; breast reddish. The green thrush of Latham. In China.

ATER. From grey to brown; beneath from greenish to yellow, spotted with black; bill, legs, front, face, chin, and throat black; the latter with a red margin. The black-throated thrush of Latham. In the island of St. Domingo.

DOMINICUS. Brownish; beneath white; with the principal tail-feathers white at the base; the three outer tail-feathers white. The St. Domingo thrush of Latham. Found in St. Domingo and Jamaica.

BRASILIENSIS. Black; beneath from ferruginous to yellowish; rump ferruginous; tail sub-cuneated; outermost tail-feathers wholly, the rest at the apex, white. The yellow-bellied thrush of Latham. Found in Brazil.

MERULA. Black; with bill and eye-lids yellow. The blackbird of Pennant, Ray, Willughby, and Latham. Of this there are the varieties of merula leucocephala of Brisson, merula varia of the same, or pied blackbird of Albin, and merula alba of Brisson. Found in the woods of the temperate parts of Europe.

AURANTIUS. From blackish to brown; throat and abdomen whitish; bill and legs orange-coloured. The thrush of Sloane and Ray; the white-chinned thrush of Latham. The varieties are, merula gula fusca, merula nigra, and merula americana. Found in the woody mountains of Jamaica, in New Caledonia, in Surinam, and the warmer parts of America.

LABRADORUS. Shining-black; with a blue and green tint; bill and legs black. The Labrador thrush of Pennant and Latham.

TORQUATUS. Blackish, with a white wreath, and bill yellowish. The ring-ouzel or amfel of Pennant, Ray, Willughby, Albinus, and Latham. The varieties are, merula torquata alba, merula torquata albo-maculata, merula albo-maculata, non torquata. Found in Europe, Asia, and Africa.

SAXATILIS. Brown; beneath fordidly orange, undulated with brown and white; rump ferruginous; chin white; throat and intermediate tail-feathers brown, the latter in the margin; side ones wholly orange. The greater red-start of Willughby, and rock thrush of Latham. Found in Italy and Spain.

EREMITA. With whitish orbits; olivaceous vertex; the upper feathers of the occiput brown, near the whitish apex black-banded, and the lower ones from red to white; brown at the margin; and cinereous rump. The hermit thrush of Latham. Found in the Philippine isles.

MANILLENSIS. From cinereous to blue; blue rump; tail-feathers and tail red at the margin, blackish; throat and breast spotted with yellow; abdomen orange-coloured, undulated with blue and white. The pensive thrush of Latham. Found in the Manillas.

SOLITARIUS. Brown; spotted for the most part with whitish; and blackish tail. The solitary sparrow of Ray and Willughby, and solitary thrush of Latham. Found in France, Italy, and the islands of the Mediterranean and Archipelago.

CYANUS. With feathers cinereous-blue at the margin; mouth and eye-lids yellow. The Indian mockbird of Ray, the solitary sparrow of Edwards, and blue thrush of Latham. Found in Candia, the Archipelago islands, and the rocks of Italy.

ARUNDINACEUS. Brown-ferruginous; beneath whitish-testaceous; with tail-feathers banded and reddish at the apex. The junco of Gesner, Aldrovand, Ray, and Willughby. The varieties are *T. arundinaceus*, with red rump and tail; the *T. arund.*, above varied with black darts; and least *T. arund.*, above from yellowish to green; with covers of the wings ferruginous. Found among the reeds of Europe.

MORIO. Shining-black, with the greater tail-feathers red, and apex black. The African thrush of Latham. Found at the Cape of Good Hope.

BICOLOR. Brown tinted with green; abdomen and vent white. The white-rumped thrush of Latham. Found as the former.

ERYTHROPTERUS. Black, with red wings; wing-covers and lower quill-feathers of the tail, the intermediate excepted, white at the apex; tail wedge-formed. The rufous-winged thrush of Latham. Found near the Senegal river.

CHRYSOGASTER. Green tinted with orange; beneath orange; bill and legs brown. The orange-bellied thrush of Latham. A variety is from blue to green; beneath orange. Found near the river Senegal, and at the Cape of Good Hope.

UROVANG. Cinereous; vertex greenish-black; rest of the head, neck, breast, and body above varying to olive-coloured; the abdomen and crest yellowish. The cinereous thrush of Latham. Found in Madagascar.

SURINAMUS. Shining-black; vertex, rump, and lateral spot on the breast yellow. The Surinam thrush of Latham.

COLUMBINUS. Green, reflecting different sorts of colours; the rump and vent sometimes white. The pigeon thrush of Latham. Found in the Philippine isles.

DOMINICANUS. Above brown; here and there tinted with violet and steel; beneath from brownish to white; tail steel-coloured at the base, greenish towards the apex. The Dominican thrush of Latham. Found in the Philippine isles.

CANTOR. From greenish to black, shining-blue and violet; with tail-feathers and tail black. The songster thrush of Latham. Found as the former.

MALABARICUS. Shining-green; yellow front; throat, bill and legs black; covers of the wings and streak on the lower mandible blue. The yellow-fronted thrush of Latham. Found in Malabar.

SELEUCIA. With bill and legs yellowish; abdomen and back incarnate; tail, wings, and thighs brown. Found in Smyrna.

ZEYLONUS. Green; beneath yellow; ocular line on both sides extended as far as the black breast. The Ceylon thrush of Latham. Found at Ceylon and the Cape of Good Hope.

TURDUS Aquaticus of Brisson. See *TRINGA Macularia*.

TURDUS Chiappa, the name of a bird of the West Indies, called also *passer faber*.

TURDUS, in *Ichthyology*, the name of a genus of fishes, according to Mr. Ray, of the class of those which have only one back-fin, the anterior rays of which are prickly; the hinder ones soft and smooth.

Of these fish there are several species, which may properly be divided into two orders; the first, of those which are smaller and broad; the second, of those which are larger and oblong.

Of the first order are the *tinca marina*, or *wrasse* (see *LABRUS Tinca*); the *merula*, or *turdus niger* (see *LABRUS Merula*); the *lepras*, and *pira pixanga*; and the *turdus viridis*, or *verdone*. Ray's *Ichthyogr.* p. 320.

Of the second order are the *pavo*, or *peacock-fish* (see *CHAETODON Pavo*); and the *turdus viridis major*, and *turdus fuscus maculofus*.

The *turdus viridis major*, or great green wrasse, is of a fine green on its back and sides, even to the side-lines; and the lower part of the sides and belly are of a pale whitish yellow, variegated with greyish and pale blue spots; its body is long, and not much unlike that of the pike in figure; its back-fin is long, and has thirty-two ribs, the anterior nineteen of which are rigid and prickly, the hinder twelve soft, flexible, and ramose; the scales are large, the eyes small, and the teeth very large and strong.

The *turdus fuscus maculofus*, or brown spotted wrasse, scarcely at all differs from the others, except in colour. It is of a dusky hue on the back and sides, variegated with blue spots; and on the belly blue, with lines and spots of red. All the fins, except those of the gills, are of a red colour, spotted with blue; the tail also is of this colour, and the gill-fins are yellow. Ray's *Ichthyogr.* p. 322.

TURDUS Oculo Radiato of Catesby. See *SPARUS Radiatus*.

TURDUS Primoris Branchialibus Carens. See *LABRUS Griseus*.

TURDUS Flavus. See *LABRUS Rufus*.

TURECUATO, in *Geography*, a town of Mexico, in the province of Mechoacan; 60 miles W. of Mechoacan.

TUREE, a town of Bengal; 40 miles S.S.E. of Curuckdeah. N. lat. 24° 30'. E. long. 86° 56'.

TURENBERG, a town of Prussia, in Samland; 16 miles W.N.W. of Königsberg.

TURENNE, HENRY DE LA TOUR, Viscount of, in *Biography*, a famous general, was the son of Henry de la Tour d'Auvergne, duke of Bouillon, by Elizabeth, daughter of William I. prince of Orange, and born at Sedan in 1611. Destined from his childhood to the military profession, his education and habits were conducted and formed with this view. Having acquired the necessary qualifications, he was placed, in 1634, at the head of a French regiment, in which post he acquitted himself with honour; and having pursued a career of distinguished services, cardinal Richelieu, in 1638, offered him one of his nieces in marriage; but his attachment to the reformed religion led him to decline the proposal. After he had served 17 years in Italy and elsewhere with singular reputation, he obtained, in 1644, the staff of marshal of France, and was entrusted with the command of the army in Germany, the wants of which he supplied out of his own purse. When the war of the Fronde broke out in 1649, he withdrew to Holland, but afterwards returned and engaged with the party opposed to the court. In this connection he was defeated near Rhetel in 1650; and when asked how he had lost this battle, he replied, "By my own fault; but when a man commits no faults in war, it is because he has not been long engaged in it." In 1651 his difference with the French

French court was accommodated, and he was appointed general of the royal army. In 1653 he married the daughter of the marshal duke de la Force, a Protestant, by whom he had no issue. After several campaigns of alternate success and defeat between him and d'Enghein, now prince of Condé, in the service of Spain, Turenne in 1657, having gained the battle of Dunes, captured Dunkirk from the Spaniards, and the greatest part of Flanders; so that Mazarin was enabled to make the peace of the Pyrenées. Upon a renewal of the war with Spain in 1667, Lewis XIV. made choice of Turenne, now marshal-general of the French armies, as his tutor in war; and the result of the first campaign was the conquest of the greatest part of Flanders, and afterwards of Franche Comté. In the following year, Turenne, from motives not satisfactorily ascertained, but not redounding much to his honour, abjured Calvinism, and was reconciled to the church of Rome. In the year 1672, it was determined by Lewis to conquer Holland, and the command of the army was assigned to Turenne; to whose arms resistance was in the course of the campaign ineffectual. The elector of Brandenburg, proposing to relieve the Dutch, was pursued to the gates of Berlin, and obliged to sue for peace. When at this time it was proposed to the marshal to gain 400,000 livres without the knowledge of the court, he thanked the general officer who made the proposal, and told him, that as he had often declined such advantages, he did not intend to alter his conduct at his age. On another occasion, a considerable city offered him 100,000 crowns for not passing through its territory; and his reply to the deputies was, "As your city is not in my proposed line of march, I cannot in conscience take your money." We should exceed our limits, if we detailed his various successful movements during the following campaign. The soldiers reposed confidence in their commander, and to this confidence he owed the prosperous issue of various expeditions. The glory of his conquests, however, was tarnished by his cruel devastation of the Palatinate, which Voltaire has justly reprobated; observing at the close of his account, that "he rather chose to be called the father of the soldiers that were entrusted to him, than of the people, who, according to the laws of war, are always made the sacrifice." The imperial court, determined to make every possible effort to check the progress of Turenne, called forth Montecuccoli, its best general, to oppose him. As these two masters of war were preparing for an engagement, Turenne, whilst he was reconnoitering a fit place to fix a battery, on July 27, 1675, was struck by a cannon ball, which killed him on the spot, in the 64th year of his age; and with him terminated the good fortune of the French in that campaign. His remains were interred with the highest funeral honours at St. Denis. The greatness of Turenne's soul was disguised by a rude and vulgar appearance. His temper was cool, and his manners modest and unassuming. He was not always successful in war, and committed faults, which he had the magnanimity to acknowledge; but, as Voltaire says, (Age of Lewis XIV.) "by always repairing them, and doing much with small means, he passed for the ablest general in Europe, at a time when the art of war was more studied than ever before. Though he was reproached for his defection in the war of the Fronde; though at the age of near sixty, love caused him to reveal a state-secret; though he exercised cruelties in the Palatinate, which seemed unnecessary; he preserved the reputation of a man of worth, wife and moderate, because his virtues and great talents, which were his own, covered weaknesses and faults which were common to him with so many other men."

Ramfay, in his "Life of Turenne," mentions the following anecdote, as an instance of his strict performance of a promise. Being attacked one night by robbers near Paris, and stripped of his money, watch, and rings, he engaged to give them 100 louis d'ors, if they would return him a ring, of no great worth, but which he highly valued. The highwaymen complied; and one of them had the boldness to go to his house the succeeding day, and in the midst of a large company to demand, in a whisper, the performance of his promise. The viscount gave orders for the money to be paid, and suffered the villain to escape, before he related the adventure.

TURENNE, in *Geography*, a town of France, in the department of the Correze; before the revolution, the capital of a viscounty; 9 miles S. of Brive.

TUREVSKOI, a town of Russia, in the province of Ustiug, on the Vim; 60 miles N.E. of Yarensk.

TURF, in *Agriculture*, a term often used to signify the green sward or surface of grass-land. It is of great use and importance to the farmer to have the turf of such land close, firm, and well set, as where this is not the case, it soon declines, grows thin, and becomes of little value either for the purpose of mowing or pasturing. It has been noticed, in the "Georgical Essays" of Dr. Hunter, in speaking of the improvement of the turf of poor pasture land, that, on such, it constantly gets worse a few years after having been laid down for that purpose: the cause of which is plainly this. There are a few spiry grasses, natural to most poor lands, which are denominated *natural* grasses; while those from the seeds of clover, and others of similar kinds, which are introduced, are in general termed *artificial*. The roots of these latter are not very durable, especially on poor land; and as the cattle as well as other sorts of live-stock are greedy of such sown grasses, they constantly crop them, and prevent their going into seed, by which the land is deprived of fresh supplies of young plants; whereas the former sort, or the natural grasses, being, in general, much inferior to the other in quality, are refused by such stock, and the land, consequently, soon becomes plentifully stocked and provided with them.

It is suggested too, that the general method of practice for improving land, when the turf gets thin and bad, is to bring it under a course of tillage. But when that is not proper or convenient, or when the occupier of such land is not inclined to introduce this mode, it may be greatly improved by having fresh seeds of the grass sown upon it; the best season for which is in the beginning of the first spring month. The ground should first be well wrought over with a heavy harrow of the bush kind, which will brush up and raise the soil, and prepare it well for the striking of the seeds in it. Compost earth should then be used as a dressing, and the seeds sown thereon: after which the ground may be lightly brushed over again, and well rolled. When the season proves moist and kind, the seeds will be found to thrive to admiration, and to wonderfully improve both the turf and verdure. And where the turf of land has been greatly cut up by carriages, or much trod up by cattle, it is also capable of being improved in this way, without the dressing of compost earth. Even in paddocks where the turf of the land has been cut up to an extreme degree by rude and wanton horses, a new and verdant turf has been seen to arise, even to amazement, in a few weeks after sowing the seeds. It is, however, necessary that cattle should be prevented from coming upon the land until the turf get well set, and in a firm state.

The turf, in all sorts of land, may be greatly benefited by

by the proper use of manure upon it, and at the same time properly feeding it down with suitable kinds of live-stock. See GRASS, GRASS-Land, and GRAZING.

TURF is likewise a term applied to a blackish fibrous vegetable earthy substance, which is used in many parts of the country as fuel. It varies considerably in its nature and composition in different places, being, in some cases, hard and of a dark or black colour, while in others it is soft and very spongy, and of a brownish colour. It is cut and formed into turves for the purpose of fuel, by means of a particular sort of instrument, employed in a certain manner. See TURFING Spade.

It is a substance which is not only very useful in this way, but for burning calcareous stones into lime, and many other purposes in agriculture.

Turf or peat-earth is capable of extensive use as a manure, but it mostly requires some preparation to properly fit it for this sort of application; as it is found that it is a substance which is held together partly by the intertexture of its fibres, and partly by its natural viscosity; and that when it is allowed to dry steadily in that state, it becomes almost incorruptible; and that it does not yield food to growing vegetables, unless its natural conformation be destroyed, and its parts separated by the intervention of other substances. This strongly shews that its structure or texture should be somehow broken down and reduced, and the water which it originally contains be forcibly discharged from it, as soon as possible after it is taken from its native bed, in order to prepare it for manure. There are different methods of effecting this. It has been suggested, that as this sort of fibrous matter will not ferment unless some substances are mixed with it, which act the same part as the mucilage, sugar, and extractive or albuminous matters, with which it is usually associated in herbaceous and succulent vegetables; a mixture of common yard-dung has been lately properly recommended for the purpose of bringing turf or peat-earth into fermentation: any putrescible or fermentable substance will, however, answer the end; and the more a substance heats, and the more readily it ferments, the better it will be fitted for the purpose. In forming this mixture, it is stated, that one part of dung is sufficient to bring three or four parts of the turf or peat into a state in which it is fitted to be laid upon land; but that, of course, the quantity must vary with the nature of the turf and the dung. In circumstances where some living vegetables are mixed with the turf or peat, the fermentation will be more readily accomplished.

Turf or peat of this sort, after being reduced in its parts, may also be prepared for this use by being soaked in the urine of cattle, in putrid water, and other such liquids; likewise by the action of lime, and by being ridged up and mixed in the manner below.

This material, both in mixture with dung and lime, has been used with great success and advantage in Cheshire. The method of preparing it there, in the practice of some, is, before the winter sets in, to trench and throw it up into narrow ridges, that it may be dried and reduced into a powdery state by the action of the atmosphere. After some time it is turned over and laid flat, being then usually found much lighter than when first dug up. It is now covered over with dung, in the proportion of a fourth or fifth part of the weight, and left so for about three weeks, when it is turned over, mixed perfectly with the dung, and thrown into heaps. A fermentation commonly soon takes place, that varies in its duration in proportion to the moisture in the turf. When it has subsided, the mixture is

turned over again, as before, and the turf or peat at the same time broken very small, that it may mix the more intimately with the dung. This often produces another fermentation, more powerful than the first. The mixture is mostly ready for use in the beginning of the spring. If lime be used, the quantity is very much less than that of the dung, but the process otherwise much the same.

If, for this purpose, the turf or peat were thrown up in long narrow ridges, and a little quick-lime dusted between the different layers, it would, it is supposed by some, expedite its separation, and dispose it sooner to incorporate with putrid matters.

This substance has likewise been used with great benefit in both of these mixtures, as well as in its simple reduced state in different instances, in Lancashire, by Mr. Paterfon and others. See a paper in the third volume of the Transactions of the Highland Society of Scotland, and Lord Meadowbank's Directions.

TURF, in Gardening, the green sward cut from pastures, &c. for the purpose of laying down grass-grounds; as lawns, plats, bowling-greens, banks of pieces of water in pleasure-grounds, &c.

It is slayed off with the turfing-iron, in regular lengths of two or three feet, and a foot wide; and being properly laid down close and regular in the places intended, it immediately forms an even grass sward, which quickly strikes root in the ground, in proper growth and verdure. This sort of work may be performed any time in autumn, winter, and spring, in open weather, or occasionally in summer, in a moist season; but the autumn is the best season. The best turf is mostly procured from fine close-fed pastures, commons, or downs, &c. where the sward is close and even; or that of any grass-field of similar close, firm sward, where the grass is not rank and coarse, nor abounding in weeds, or much over-run with the common wild daisy, dandelion, or other similar plants.

In the operation of cutting the turf, a line should be drawn tight lengthways of the grass-ground, and then the cutting-racer be stricken into the surface of the sward, close to the line, pushing it along so as to cut or score the sward in a straight cut the length of the line, about an inch and half deep; and having thus raced out one length, the line should be moved a foot width further to race out another length as before, proceeding in the same manner to a third, and so on to as many lengths of the line, in foot widths, as may be necessary; then, by the same means, the sward is to be raced cross-ways in yard distances, and thus the proper widths and lengths are formed. After the sward has been thus raced out, it should be slayed, or cut up with the turfing-iron, beginning at one side, cutting evenly longways the whole length of each raced line, about an inch or inch and half thick; a person following immediately after to roll them up separately in yard lengths, grass-side inward, as close and tight as possible: having thus cut up one range, proceed with another in the same manner, and so continue with the whole. As the turfs are rolled up, they should be piled close and regular together, ready for carrying away. When cut by the hundred, as is often the case where large quantities are required, they are commonly piled up in tens; four below, three next, then two, and one at top, for the more ready reckoning of the number wanted.

In performing this sort of work, it is constantly necessary to keep a steady even hand, in order that the turf may be cut all of an even regular thickness without any sort of lumpiness, which renders it less difficult and troublesome to lay down, as such lumps cause many inequalities that cannot

not be easily made level, but require so much beating as often to greatly injure and destroy the turf, as well as to be productive of a great waste of time and labour, thereby causing a great deal of unnecessary expence. Besides, such work under these circumstances can never be done so well as where the contrary is the case.

Turf-Ashes, in *Agriculture*, those formed from any sort of turfy or peaty matters. Turf-ashes have been used as a manure on poor thin soils, in some districts, with great effect and advantage, and for potatoe crops; but they are probably, in general, the best when employed as top-dressings for grasses and certain kinds of crops. See *Top-Dressing*.

The ashes formed from turf or peat in Berkshire have lately increased greatly in value, in consequence of their general application as a top-dressing to clovers and other sorts of artificial grasses, as well as to tares, turnips, and occasionally wheat in the young state of its growth. The usual time of applying them is the very early spring. They are there commonly taken in carts, and sown by the hand over the ground, either before or after the seed for the crop is sown. But when used only as a top-dressing, they are merely sown on the surface of the land evenly by the hand. The quantity made use of is mostly from twelve to fifteen statute bushels to the acre, as the soil and crops may be. It is believed, that too large quantities would be hurtful. Some do not hold them in much estimation for grain crops, or those of the pea kind; but they are preferred to all other manures, especially for all sorts of artificial grass. In turnip crops, they are said to assist much in preventing the ravages of the fly; and in those from the seeds of grass, the farmers suppose, that on an acre which is manured with them, the produce in hay will be nearly a ton more than what it would have afforded without them.

On meadow-land too, in some cases, from fifteen to twenty bushels of these ashes may be laid with great improvement to the grass. The effect of them is supposed to be not of longer duration than two years.

Several acres may be gone over with the sowing of the ashes in the course of a day, by one person and a two-horse cart. See *ASHES* and *SULPHATE*.

Turf-Drain, a term applied to that sort which is formed in turfy situations, and filled with turves or peats; and which is done in a useful, neat, and successful manner in many districts, especially in Lancashire, as may be seen in the corrected agricultural report of that county. It also signifies a sod-drain. See *SURFACE-Drain*.

An improved mode of turf or sod-draining may likewise be met with in the report on agriculture for Cheshire.

Turf-Hedge, that sort of fence which is formed by means of sods, or the dug-up turf, and plants of different kinds. For turf-hedges that are to be six feet high when finished, six-foot bases are allowed in some places, as in Cornwall; and as they settle a good deal, half the height is only built at a time, with the filling well ridged up in the middle to throw off the wet. This remains to settle perfectly, when the other half is laid, and the proper plants or cuttings put in. This is thought to be an improvement in the forming of this sort of fence. See *FENCE*.

Turf-House, in *Rural Economy*, that sort which is formed of the turf cut from land, and which is common in the northern parts of the island.

Turf-Moss, or *Bog*, a term applied to a tract or extent of turfy, mossy, or boggy land, from which turf is cut, or which stands in need of being reclaimed and brought into order by suitable draining, and the proper application of weighty earthy substances of different kinds. See *BOG*, *MOOR*, and *MOSS*.

VOL. XXXVI.

Turf-Spade, a tool of this kind, which is used in cutting turf for fuel. It is about four feet in length with the handle, and four inches in breadth, being made sharp in the mouth-part, and having an ear or sharp iron on one side of it, which is bent or turned up to a right angle, that serves to cut and separate one side of the turf from the bed of turfy matter, as the back and mouth of the implement do the other.

The work of cutting the turves for burning by means of this spade, is performed somewhat in this manner: the ground being first marked out on the surface in a straight line, of a length at pleasure, and between three and four feet in width, is then dug level on the surface with a common spade, the whole of the bad and imperfect turfy parts being removed. The turf is then cut by a person standing in the pit or ditch, with the narrow spade described above, which is shod at the lower end with iron, as has been said, in a sharp manner. By this means every turf is cut and formed into a long sort of square, which is then taken from the workman, and spread on the ground in a close manner, until dry, when they are set up on end, three or four together, and afterwards put up into windrows and small stacks, till ready to be led or carried home for use.

The spade which is made use of in cutting the turf or peat for being reduced into ashes in Berkshire, is somewhat of this form too, but it has a considerably greater length of the mouth-part. The turf or peat, when dug by it, is carried from the spot in little wheel-barrows, to a short distance, where it is spread on the ground, and after lying some days, the pieces are turned, which after being several times repeated, a heap is made of it, in the middle of which dry turf is put, which is set fire to, and the whole slowly burnt, additional quantities of turf or peat being occasionally supplied, so as that the burning may be slow and smothering. The heap is mostly of a circular form, and rather flat at top, being small at first, but ultimately sometimes two or three yards in depth, and six or seven in diameter.

The remaining materials, when passed through a riddle, are taken away, in a covered manner, to great distances.

Turf-Sweating, an Indian method of curing diseases, which has been found to succeed very happily on many trials.

Paul Dudley, esq. gives an account of a man of seventy-four years old in New England, who drinking cold water when very hot, had a pain settled in one side and arm, which baffled all art to remove; till after nine weeks' confinement to his bed, when he was given over by every body, it was proposed to try this method of cure upon him.

An oven full of turf was ordered to be cut; the turves were of about eighteen inches square each, and were of the nature of the English turf used in gardens.

The Indian doctor, before the turf was put into the oven, rubbed over their grassy side with some sort of oil or spirit, and then putting the two grass sides together, placed them in the oven. When they had been two hours there, and were well baked, he took them out, and made a bed upon the floor, the place for the head being a little raised; the old man was then taken out of bed without his shirt, but wrapped in a sheet, and being laid on the turf-bed, such another parcel of the hot turf was laid over him. The turf was laid thickest on that side where the pain was, but none of it was put on his breast or head.

He was then covered with a blanket to keep in the heat, and while he was in this warm bath, he was continually supplied with warm cordials to keep him from fainting, of which he was in great danger. After he had lain in this bath about three quarters of an hour, which was as long as

he could bear it, he was put into a bed very well warmed, without his shirt, where he soon fell asleep, and sweated to that degree, that it run through the pillow and bed on the floor. After about two hours' sweat, they rubbed and dried him, and put on his clothes, and the old gentleman found himself much eased and refreshed. The operation was performed in the morning, and before night he walked about the house comfortably, his pain being almost all gone. The cordials were, after this, repeated, and, on the fourth day, the sweating was performed again; the day after which, the old gentleman was well enough to go about his business. He lived eleven years afterwards in perfect health, and free from pain.

Great care is to be taken in this operation that the patient do not lie too long in the turf: in many cases, a quarter of an hour is found to be long enough; and the general rule is, that as soon as the patient begins to fetch his breath short or faint, he must be put to bed immediately, and the cordials must by no means be omitted, for the life of the patient is endangered without them. *Phil. Trans. N^o 384, p. 129.*

TURFAN, in *Geography*. See *TOURFAN Hotun*.

TURFING, in *Gardening*, the operation of laying down turf. In preparing the ground for this purpose, it should, where loose, be well trodden, or occasionally rolled and rammed; then be properly levelled on the surface with the spade, and afterwards raked smooth; when it will be ready for laying. In laying the turfs, they should be unrolled regularly on the ground, each in its place, making them join close edge to edge, so as to form at once a close even sward; beating the whole down close and even afterwards with a heavy wooden beater, to settle the roots of the grass close to the earth, as well as to form the surface equally close, firm, even, and smooth; the turf thus soon strikes root below, and grows above, without any further care in this part of the business, except occasionally beating down any swelling inequalities, and sometimes rolling it with a heavy iron roller. Sometimes, when turf is laid in the summer, or in the early part of autumn, in dry hot weather, it will shrink and open considerably at the joinings, and assume a decayed-like appearance. In this case, a few good waterings would be serviceable; but should this be omitted, the first heavy rain will mostly recover the whole effectually, and swell the sward, so as to close all the chasms, and revive the verdure of the grass plants, when a heavy rolling should be given, to settle the whole firm and even, and to give the surface a neat appearance. The principal circumstance to be regarded in this sort of work, is to have the surface of the ground well levelled before the turfs are laid down, for where this is neglected, it is utterly impossible to do the business so as to look well.

In respect to the after-culture of ground formed with turf, it is chiefly to give occasional mowings, from the spring through the summer till October, and occasionally poling and rolling the surface to keep it even and level. The mowings in these cases should constantly be performed before the grass gets to too high a growth, so as to injure the surface appearance by rendering it tender and of a bad colour.

TURFING-Iron, an implement made use of for slaying or cutting up grass, turf, or sward from land for the purpose of turfing: it is formed with an iron plate for the cutter, from six to seven or eight inches wide, a little rounding forward at the edge, which is thin and sharp for cutting, but thickening gradually behind to the upper part, where it is forged to a long bent iron handle, the bending so formed as to admit of the plate or cutter resting flat with its back on the

ground, in the proper position for readily cutting or slaying the turf or sward evenly off, of a regular depth or thickness; the handle at top being either formed of iron, with an opening like the top of a spade, or a socket in which to fix a short wooden handle of that kind. In using it in cutting the turf or sward, the workman takes hold with one hand in the top handle, the other below, with the latter guiding the tool in the proper position, whilst the upper hand is placed against his knee, &c. which assists him in thrusting it forward into the ground evenly under the sward; and thus he proceeds along in a regular manner, moving the tool gradually along at each stroke, level and even, at an equal depth. Thus, as one range of turf or sward is pared off, another is begun with until the whole work is done.

It is necessary that the edges of the cutting iron should be well steeled, and ground perfectly sharp, as the labour by such means is rendered much less, and the work far better performed.

TURFING-Spade, in *Agriculture*, the name of an implement used to under-cut the turf, after it is marked out with the plough, in the old practice of paring and burning the turfy surface of land.

TURGA, in *Geography*, a town of Bengal; 40 miles S. of Doefa. N. lat. 22° 22'. E. long. 85° 5'.

TURGANA, in *Ancient Geography*, an island on the coast of Arabia Felix, in which was a very magnificent temple dedicated to Serapis, according to Ammianus Marcellinus.

TURGESCENT, **TURGESCENTY**, a swelling or growing bloated.

TURGHE, in *Geography*, a river of Wales, which runs into the Cothey, in Caermarthenshire.

TURGOT, ANNE-ROBERT JACQUES, in *Biography*, an enlightened and patriotic minister of state, was born at Paris in the year 1727, and studied theology at the Sorbonne, where, in his 22d year, he delivered two Latin discourses, "On the Advantages derived to Mankind from the Christian Religion," and "On the Progress of the Human Understanding." At the age of 24 he translated Virgil's *Georgics*, and thus a change took place with regard to the direction of his studies; so that he became attached to the principles of Quesnay, and of the sect called Economists. Having quitted the Sorbonne, he was appointed intendant of Limoges; and in the course of twelve years, during which he occupied this office, his conduct in distributing alms and providing a supply of food in a time of scarcity, and in introducing various improvements in the province, established his character, and commanded for him great respect. With him, it is said, first originated the institution of charitable work-shops. As comptroller-general of the finances, he adopted various regulations, which, without injuring the revenue, encouraged industry, promoted agriculture and commerce, and lightened the burdens of the lower classes. Although many of his beneficial plans of reform were treated with contempt and ridicule, he succeeded to a considerable degree in ameliorating the state of the country. His resolution, diligence, and activity, overcame many obstacles and difficulties, inasmuch that the benevolently disposed Lewis once said, on leaving the council-chamber, "No one loves the people but M. Turgot and I:" nevertheless, the cabals against him prevailed, and he was dismissed from the important office which he occupied with so much advantage to the people. As an incitement to his industry, he alleged, that in his family life was not protracted beyond the age of 50; and, therefore, having but a few years before him, he determined to leave nothing unfinished. Accordingly he died in 1781, at the age of 49. Of the pieces which

which he published, Condorcet has given an account in a "Memoir on his Life and Writings," 1782, 8vo. La Harpe has given us the following sketch of his character. "He was a man of a strong mind, whom nothing could divert from justice, even at court, and in the highest places; of an unalterable equanimity, even in the midst of the oppositions and disfigments of his ministry; of a laborious activity, which disease could not slacken. He had only two passions, that of science, and that of the public good. During the few years in which he occupied the post of minister of finance, he bent all his views to the relief of the people. Attached to the doctrines of the Economists, he developed them in edicts which tended to the encouragement and improvement of agriculture. He was the first among us who changed acts of the sovereign authority into works of reasoning and persuasion; and it is perhaps a question whether this method may be useful or dangerous. His suppressions and reforms in the finance raised him many enemies; but among all who complained against him and reproached him, not one attacked his integrity. No one disputed the purity of his motives, but fault was found with his measures. Perhaps there was something unyielding in his character, which impeded the good which he wished to effect. Further, the courtiers could not pardon a minister who encircled himself with men of letters and philosophers." His innovations in favour of the people created a prejudice against him, on the ground of his being one of the promoters of the French revolution. *Nouv. Dict. Hist. Gen. Biog.*

TURGUT, in *Geography*. See **DURGUT**.

TURHUSSY, a town of Bengal; 17 miles N.N.E. of Palamow.

TURIA, in *Botany*, an Arabic name, retained by Forskall, *Fl. Ægypt.-Arab.* 165, and cited by Jussieu, *Gen.* 395, under *Anguria*. The above name, if wanted, might not be inadmissible; at least, if any such, of barbarous origin, are allowed to remain. But whether the five, partly doubtful, species on which Forskall has founded his genus be really entitled to stand alone, or whether they may be referrible, as Jussieu hints, to *Anguria*, or to any other genus of the Cucumber tribe, no one, conversant with Forskall's works, will, surely, venture to determine. He attributes a pentapetalous *corolla* to these plants, which is unexampled in their natural order, and which, by other parts of his account, appears to be an error. The villous cylindrical *fruit*, tapering at each end, and marked with ten furrows, will scarcely afford a generic character.—Forskall's first species, *Turia* of the Arabs, to which he has given no specific name, is cultivated in Yemen, but we are not told for what purpose. Some of the others are called, in that country, *Lelaja* or *Lua*, *Gijef*, and *Moghadd*.

TURIAMO, *Bay of*, in *Geography*, a bay of Caraccas, three leagues to the windward of Porto Cabello, which extends one league from north to south. Having no shelter from the north wind, and the country round it affording no commodities sufficient for inducing merchants to encounter its inconveniences, scarcely any ships resort to it. The case is the same with regard to Patanemo, Borburata, and Sianega. The whole population of these bays consists of no more than a small party of soldiers, stationed there to prevent smuggling.

TURIANO, a river of Sicily, which runs into the sea, 10 miles N.E. of Mistretta.

TURIAS, the *Guadalquivir*, in *Ancient Geography*, a river of Hither Spain, on the banks of which was built the town of Valentia.—Also, a river or torrent of Italy, mentioned by Silius Italicus (*l. xiii. v. 5.*), and thought to be

the same with that mentioned by Livy, and placed six miles from Rome. But the orthography is much controverted.

TURIASO, **TARACONA**, or *Tarazona*, a town of the interior of Hither Spain, towards the south-west. Pliny speaks with high commendation of its iron. It was municipal. It was situated east of Numantium, and south-west of Calaguris.

TURICUM. See **ZURICH**.

TURIGA, a town of Spain, in Bætica.

TURIGA, in *Geography*, a river of Russia, which runs into the Niznei Tunguska, N. lat. 66° 12'. E. long. 98° 44'.

TURIN, a city of France, capital of the department of the Po, during the revolution, before and since capital of Piedmont, situated at the conflux of the Po and the Grand Doria, about seven miles from the foot of the Cottian Alps, in the road from France to Italy, by the way of Mount Cenis. According to Pliny, the inhabitants derive their origin from the Ligurians, and were anciently called "Taurini." Hannibal, the Carthaginian general, when he invaded Italy, took and destroyed the town, because the inhabitants would not take part with him; which frightened the other people who inhabited the banks of the Po. It was erected into a Roman colony by Julius Cæsar, who gave to it the name of "Julia," and it was called "Augusta Taurinorum" by his successor Augustus. It was successively subjected to the Goths, Huns, Eruli, and Burgundians, who ruined and destroyed it; but it was soon rebuilt, though not so large as before. When the Lombards became masters of the country, it became the capital of one of their principal duchies. Some of the dukes became kings of Italy. After Charlemagne had abolished the kingdom of the Lombards, Turin became subject to the marquis of Susa, who had the charge of guarding the passages of the Alps, and continued in that family to the death of Ulric Manfred, the last marquis of Susa, in 1302; whose daughter, Adelaide, married Odo, comte de Maurienne and Savoy. Turin submitted to him and to his descendants, who since possessed it with little interruption till its union with France; before which Turin was the see of an archbishop, and was said to contain 110 churches or chapels, several hospitals, and about 80,000 inhabitants. The approach to it is magnificent, and the environs beautiful, though thick fogs from the two rivers are frequent in autumn and winter; so that the air of Turin is then very thick and moist. The four gates are highly ornamental; the streets in the New Town are wide, straight, clean, having plenty of water running through them, well built, in a good taste, chiefly of brick stuccoed, and generally terminating in some agreeable object. No inhabitant could rebuild or repair his house but on an uniform plan, laid down by government, for the improvement of the city. The fortifications of Turin were regular, and kept in excellent repair. The citadel is a regular pentagon, consisting of five strong bastions, and is reputed one of the strongest in Europe. At the end next the new gate is the arsenal, which, besides the armouries found in such places, contains a cabinet of minerals, a good chemical laboratory, a library of books in mineralogy and metallurgy, and furnaces for casting cannon: here, also, are mathematical, mechanical, and other masters, for the instruction of engineers, miners, &c. The garrison of Turin was changed at the end of two years, and then there was a general review. The university was founded first in 1405, by Amadeo, duke of Savoy, and consists of schools, wherein 24 professors read lectures, from the 3d of November to the 24th of June; the royal library, in which are about 50,000 volumes of printed books, besides manuscripts, is open every day,

the solution of harmonical problems, which require such intense application as to leave him not a single idea to bestow on any thing else.

TURINSK, in *Geography*, a town of Russia, in the government of Tobolsk, containing a wooden fort, seven churches, and about 350 houses; 144 miles W. of Tobolsk. N. lat. 58°. E. long. 63° 44'.

TURINSKOI, a town of Russia, in the government of Tobolsk, on the Niznei Tunguska; 132 miles E. of Turuchansk.

TURIONES, in *Botany*, the first young tender shoots which plants annually put forth.

TURIRANA, in *Geography*, a river of Brazil, which runs into the Atlantic, S. lat. 1° 30'. W. long. 46° 46'.

TURISSA, in *Ancient Geography*, a town of Spain, at the foot of the Pyrenées, in the country of the Vasconi, N.E. of Pampela.

TURK, in *Geography*, an appellation of very ancient origin and of very comprehensive extent. It is said to be derived from the name of one of the sons of Japhet, the eldest son of Noah, who is generally allowed to be the progenitor of the Moguls and Tartars. This opinion has been adopted by those who have been most conversant with Oriental literature, and the Tartars themselves have expressed their persuasion of its truth. Accordingly it is said, that the progeny of Magog, Meshech, and Tubal, subverted both the Scythias, and consequently the country of the ancient Moguls and Tartars. If it be admitted that the Turks and Tartars were originally the same people, whatever is advanced concerning the first progenitors and early antiquities of the one, must, with the strictest propriety, be applicable to those of the other. It has been alleged as highly probable, that both the present Turks and Tartars are descended from the Scythians of Aristæus Proconnesius, and the Scythian Nomades of Herodotus (lib. iv.) Upon this supposition, the ancient Turks or Tartars cannot be considered as one of the earliest nations of antiquity, nor as occupying a tract for many ages of very considerable extent. For they scarcely made any figure at all before the reign of Cyaxares, king of the Medes, or the time of Ogus Khan, about 637 years B.C., when they drove the Cimmerians from their territories bordering upon the Palus Mæotis into the Upper Asia. Nor could their primitive seat, upon the eastern bank of the Volga or Araxes, have been at that time very extensive; since it is well known that they were then a people of little note, and in the vicinity of some nations who were contending for unlimited empire. In the time of Herodotus, Scythia lay only between the 45th and 57th degrees of longitude, and the 47th and 55th degrees of N. latitude, so that the Scythians at that period cannot be regarded as a very formidable power. The first Scythian king, according to this historian, did not live above 1000 years before Darius Hystaspes invaded Scythia, in the year B.C. 514; or by reducing the calculation of the Greeks and other ancient nations, as sir Isaac Newton has done, it may reasonably be supposed that the first Scythian prince could not have preceded Darius Hystaspes above 800 years. At this early period, therefore, or 1300 years before the commencement of the Christian era, the countries bordering upon the Palus Mæotis, as well as the Euxine and Caspian seas, must have been very thinly peopled. The Tartars, however, though they derive their name from Tatar Khan, pretend that this was not their primitive appellation, but that they are the descendants of Turk, as we have already said, the eldest son of Japhet, whom they call Japhis; and accordingly they maintain that they were originally denominated Turks;

which name they seem to have retained till the time of Genghis Khan. But when that prince reduced all the tribes bearing the name of Turks under his obedience, they, with regard to their neighbours, gradually lost it, and were by them afterwards called Tatars. Nevertheless, though this was the case with respect to their neighbours, most of them have always denominated themselves Turks; nor do they allow, that any other nation has the least title to that denomination. The name of Tatars was at first probably applied to one particular tribe or horde of the Turkish nation, consisting of persons more considerable, warlike, and better known to the Asiatics, on account of their military exploits than the rest, till the time of Genghis Khan. This was succeeded by that of Moguls, which prevailed as long as the dominion of the people so called lasted over the southern provinces of Asia; when that expired, the former appellation was resumed. It is observable, that Sherif al Edrisi, commonly called the Nubian geographer, makes no mention either of Moguls or Tartars; but intimates that the whole country bearing now the denomination of Eastern and Western Tartary, was peopled by different cantons of Turks. This is the more remarkable, as that author wrote but a little before the reign of Genghis Khan, about the year of Christ 1170.

Turk, it is said, was appointed by his father Japhet to bear the chief rule in his family after his death; and being a man of superior genius, he invented many of the conveniencies of life, made tents, and governed his family and subjects with great justice, prudence, and moderation. He also formed a body of salutary laws for his descendants. Turk is said by the Tartars to have had four sons; and from him the country in which he settled was called Turkestan, and his subjects were denominated Turks. From Tatar Khan, the Tatars or Tartars derived their name, as the Moguls did theirs from Mogul or Mung'l Khan. These two branches of Turks, being rendered independent of one another, formed two considerable empires, which flourished for several generations. See MONGOLS and TARTARS.

The name Turk, says Volney, originally, was not peculiar to the nation to which it is now applied; it denoted, in general, all the hordes dispersed to the east and even to the north of the Caspian sea, as far as beyond lake Aral, over those vast countries which have taken from them the denomination of Turkestan. These are the same people, who were known to the ancient Greeks by the names of Parthians, Massagetæ, and even of Scythians, for which we have substituted that of Tartars. These formed a nation of shepherds, continually wandering like the Bedouin Arabs; and in every age exhibiting themselves as brave and formidable warriors. Neither Cyrus nor Alexander was able to subdue them. The Arabs, however, about 80 years after Mahomet, by order of the caliph Waled I. invaded the country of the Turks, subdued them, and imposed upon them their religion; and obliged them to pay tribute. But the power of the caliphs was resisted and vanquished. Like the Bedouins, the Turks were divided into tribes or camps, called "ordou," of which has been formed the term *horde*; and these tribes, allied or at variance, according to their several interests, were perpetually engaged in wars. Hence we see, in their history, several nations, all equally called Turks, alternately attacking, destroying, and expelling each other. Volney, in order to avoid this confusion, has confined the name of Turks to those of Constantinople, and given that of *Turkomans* to their predecessors. (See TURKOMANS.) For a further account of the Turks, see TURKËSTAN and TURKEY.

TURK's-Cap, in *Botany*, a name given to a species of lily. See *LILIUM*.

TURK's-Head, a name sometimes given to the melon thistle.

TURK's Turban, a name given to a species of ranunculus.

TURK Islands, or *Turk's Islands*, in *Geography*, a cluster of small islands among the Bahamas, the largest situated N. lat. 21° 20'. W. long. 71°.

TURKAL, a town of Asiatic Turkey, in the province of Sivas; 25 miles S.E. of Amasfeh.

TURKAREL, a town of Candahar; 30 miles W. of Cabul.

TURKEIM. See **TURCKHEIM**.

TURKESTAN. See **TARAZ**.

TURKESTAN, (formed of *Tourk* and *estan*, a Persian word signifying *country*;) or *Turan*, a country of Asia, bounded on the N. by deserts, which separate it from the dominions of Russia, on the E. by a part of Tartary, belonging to the Kalmucks, on the S. by Bucharia, and on the W. by Charasm or Kharasm, near 300 miles in length, and not much less in breadth. It is at present divided between two Tartar khans or chiefs; one of them, residing at Tashkund, possesses the eastern part; the other, who possesses the western part, resides at Turkestan or Taraz. The latter is generally called the khan of the Karakalpahs. Turkestan, taken in a larger sense, is understood to include all the country between Russia to the N. and Bucharia to the S., and between the Caspian sea to the W. and Chinese Tartary on the E., not less than 700 miles from E. to W. and 350 from N. to S.

In ancient periods, Western Turkestan and the N. of the Caspian were the seats of the Massagetæ; to the S. of whom were the Scythians, on this side of the Imaus or Belur-Tag. In the sixth century, the Turks, having migrated from their habitations near the mountains of Bogdo, adjoining to those of Altai, or the mountains of gold, and having imparted to the country the name of Turkestan, and forming a grand branch of the Tartars, or Huns, spread themselves to the Caspian. They soon after subdued the people of Sogdiana, and the Nephthalites of Great Bucharia, called in that ignorant age White Huns. As the Turks founded their first western settlements in the regions now held by the Kirguses, they thence received the name of Turkestan, the capital city being denominated Otrar, and sometimes Taraz, also called Turkestan. From the centre of their power issued those Turkish armies, which have changed the destinies of so many nations. Little Bucharia was called Eastern Turkestan from a similar cause; but appears to have been first subdued by the Turks of Cathay, on the N.W. of China. The Turks and Huns may be considered as one and the same Tataric race, totally unknown to Europeans till the appearance of the latter, who first passed the steppes, deserts and mountains which had concealed them from observation till the fourth century. The Huns, who appeared about A.D. 375, seemed to the writers of the period as a new and unknown race, having passed in a course of uniform depredation from Asia to Europe; while the Gothic and Slavonic nations had left many of their settlements vacant, in their progress into the Roman empire. But the Turks, though originally the same people, perhaps warned by the fate of their brethren, made a slow and gradual progress, and appear to have been blended by marriages and conquests with the Slavonic and Gothic tribes on the N. and E. of the Caspian. Such was the origin of the name of Turkestan, from which the Turks spread desolation over the most beautiful countries of the East, and

even threatened the liberties of Europe. Pinkerton's *Geog.* vol. ii. See **BUCHARIA** and *Independent TARTARY*.

TURKEY, an extensive empire, comprehending a great number of countries on the continents of Europe, Asia, and Africa, and several adjacent islands.

Turkey in Europe extends, according to the statement of Pinkerton, about 870 miles in length, from the northern boundary of Moldavia to Cape Matapan in the Morea; and its breadth, from the river Unna to Constantinople, is about 680 British miles. It is computed to contain 182,560 square miles. Its eastern and southern boundaries are formed by the Euxine or Black sea, the sea of Marmora, the Archipelago, and the Mediterranean. Its utmost northern limit is now the river Dniester, and the western consists of an arbitrary line, sometimes supplied by rivers or mountains. In its whole extent it comprehends many ancient kingdoms and republics, which, since the subjugation of its greater part in the 15th century, after the fall of Constantinople and of the Byzantine empire, afford only the records of classical names and events. Moldavia, the most northern province, was part of ancient Dacia; and Jassy or Yassy, the capital, was the "Jassiorum Municipium" of the Romans. Budzac, or Bessarabia, was the country of the Getæ and Peucini. Walachia was also a province of the ancient Dacians; and Bulgaria, on the S. of the Danube, embraces nearly the two provinces of Mœsia. Romelia, a spacious territory, contains ancient Thracia, Pæonia, Macedonia, and the northern part of the classical country of Greece; and the Morea is equivalent with the ancient Peloponnesus. Dalmatia retains its ancient appellation; while Servia and Bosnia represent ancient Pannonia. Turkish Croatia, the most western province of the empire, forms a portion of ancient Pannonia, with probably a small district of Noricum; but the Turkish part of Croatia is a diminutive province, about 40 miles in length by 20 in breadth, bounded by the river Save on the N., and partly by the river Unna on the W. In modern times Turkey, sinking before the power of Russia, has lost the provinces of the Crim and New Servia, which, with several Asiatic districts, have surrendered to Russia; and on the W., Transylvania, Slavonia, with the Buckovin and part of Moldavia, and a great part of Croatia, have been subjugated by Austria. Of the original population of the Turkish empire, we have already given some account under the article **TURK**; and it appears to have been derived from the ancient Scythians on the Euxine, the progenitors of the Dacians, Thracians, &c. and even of the Greeks. These were originally blended northward with many Sarmatic or Slavonic tribes; which on the fall of the Roman empire migrated towards the S., so that about one-half of the population may now be regarded as Slavonic. Walachia, however, is supposed to contain many descendants of the ancient Roman settlers in Dacia. This original population, in consequence of the extent of the Turkish empire, has been blended with various Asiatic tribes, among whom the Turks constitute a part. Of that branch called Ottomans, and the commencement of the appellation of Ottoman empire, we have already given a brief account under the articles **OTHMAN** and **OTTOMAN**; and for the more remote antiquity of the name and power of the Turks, we refer to **TURK**. Those Turks, or Turkomans, descending, about the middle of the sixth century, from the Altaian mountains, spread as far as the lake Mæotis; but their progress was restricted to the region near the river Oxus: from the Oxus and Samarcand they afterwards spread to the E. of Persia, where Mahmoud of Gazna established a powerful kingdom, subdued by the Turks of Bochara, who in the 11th century

century founded the dynasty of the Seljuks. The sultans of this race gradually extended their power towards the W. and took possession of Armenia and Georgia, their first acquisitions in the Byzantine empire; and it is remarkable that these should have continued, when it is considered, that the Turks had subdued almost the whole of Asia Minor before the beginning of the 12th century. Nevertheless the extension of their dominion was restrained by the progress of the Crusades, which obliged them by the capture of Nice to remove the seat of power to Iconium. About the middle of the 14th century the Turks first passed into Europe, and soon after seized the greatest part of Thrace. In the 15th century their sultan, Bajazet, extended his conquests even to the Danube, and the provinces of Thrace and Macedonia fell under the Turkish sceptre, while Adrianople became the seat of their government.

Although the Turks, as we have above intimated, formed a part of the people denominated "the Scythians beyond the Imaus," and originally proceeded from the Altaian mountains, they were intermixed by their settlement on the Oxus with Sogdian and Bactrian tribes, and after their subversion of the Byzantine empire, in which they were assisted by European troops, many different nations joined their standard, and various circumstances, beside their intermarriages with Circassian women, contributed to render them a very mixed race. When the Roman arms had subdued many of those countries and cities which were comprehended under the widely extended Turkish empire, they became in the fifth century an important part of the Byzantine empire; and we shall follow Mr. Pinkerton in tracing their principal historical epochs. Accordingly he observes, that the first dawn of Turkish history preceding the reign of Othman, occurs A.D. 1299. In the reign of his successor, Orkan, the Turks took Gallipoli, and penetrated into Thrace, so that Adrianople was taken A.D. 1360; two years after which period, Amurath established the military bands called Janizaries. The Turkish power was for some time restrained after the famous battle near Ancyra, A.D. 1402, between Bajazet and Timur; nevertheless the dominion of the Turks increased in Europe, though they received several checks from the Hungarians under Hunniades, and from the Albanians under the command of George Castriots, called by the Turks Scanderberg. On the 29th of May, A.D. 1453, Constantinople was taken by the Turks. Crimea and the Morea were subjugated A.D. 1458; and in 1480, Otranto in Italy was captured by the Turks. The conquest of Egypt in 1517 made a considerable accession to the Turkish power; Rhodes submitted in 1522; and soon after the battle of Mohatz, in 1526, the sultan Soliman took Buda. In 1552 the Turks seized the bannat of Temeswar, and they took Cyprus from the Venetians in 1571. Although after the famous naval engagement of Lepanto, in this year, their power at sea ceased to be formidable, they invaded Hungary with various success, yet Europe obtained an interval of security by their wars with Persia: however, in 1642, the sultan Ibrahim took Azof from the Cossacks, and about the middle of this century the Turks took possession of some Grecian isles. Hungary became the scene of repeated Turkish and Austrian conquests until the year 1699, when, by the peace of Carlovitz, the Turks surrendered Transylvania to the Austrians, the Morea to the Venetians, and Azof to the Russians. By the peace of 1739 the Turks refused Belgrade and Orsova, with parts of Servia and Walachia, formerly ceded to Austria, and Russia was constrained to abandon Azof. The last epoch of Turkish history would lead to a detail of the Russian wars against

the Turks, and the decline of the Ottoman empire. We may here observe in general, that the Turkish dominion, wherever it has prevailed, has been detrimental in a very high degree to the best interests of humanity, and to every improvement, mental or moral, ecclesiastical or civil.

The religion of the Turks is the Mahometan; although in this European division of the empire, it is supposed that two-thirds of the inhabitants are Greek Christians. The Turkish sultan has for some centuries been the principal leader and support of that attachment to the religion of the Koran, which has been the stay and guard of the Mahometan faith. The Mahometan pontiff, or mufti, presides at Constantinople. The next in rank to him are the moulahs, and from these are selected the inferior muftis, or judges, through the empire, and the cadilechers or chief justices. The next class of divines consists of the imams or parish priests, who perform the service of the mosques, or places of worship, while the cadis are judges annually appointed to administer justice in the towns and villages. The Turks have also their monks, denominated *derwiches*, of four orders, dedicated to religious offices, public prayer and preaching. Of these, the Kadri constitute a singular order, appearing almost naked, and displaying their devotion by frantic and extravagant dances. The Greeks retain their priests, bishops, archbishops, and patriarchs; but their church is in the lowest state of degradation, and its dignities are openly sold by the Turks.

As to the government of Turkey, the sultan is a despotic sovereign, but so restricted by the laws of the Koran, to which he is bound to submit, that many Christian sovereignties are reckoned more arbitrary. The despotism of the monarch is balanced by a religious aristocracy; and many circumstances have lately occurred, such as the insurrections of the Janizaries, and the power usurped by the pashas over their own provinces, which indicate the decline and approaching perdition of the empire. The Turkish laws are contained in the Koran, and in the comments of approved and renowned doctors, which have acquired the force of laws. The Turkish empire is chiefly guided by those of Abou-Hanife.

The number of inhabitants in Turkey in Europe has been estimated at 8,000,000, or about 43 to each square mile: but as the countries which it comprehends are intersected by many mountains and barren tracts, this estimate is supposed to exceed the truth. The navy is stated at about 30 ships of the line, and the army at 150,000 of ill-disciplined soldiers. The revenues of the whole Turkish empire are computed at about 7,000,000*l.* sterling, and the usual expence as not exceeding 5,000,000*l.* Their revenue is partly derived from a capitation tax on unbelievers, and from the "zeechat," or customs, but principally from a tax on land of about 6*s.* an acre, called the "jizie." Upon the whole, the Turkish empire may be regarded as in a declining state, notwithstanding all its endeavours to secure the friendship of various European powers.

Of the manners and customs of the Turks, our limits will not admit of a minute detail. Marriage is a civil contract, managed by female mediation, and liable to dissolution at the pleasure of either party. Circumcision is performed at the age of 12 or 14. The dead are perfumed with incense, and buried in a kind of shroud, open at both ends, that the deceased may be able to sit up and reply to the interrogatories of the angels of death. The burial grounds are near the highways, and as one grave does not intrude upon another, they are very extensive. With regard to diet the Turks are moderate, and their favourite food is rice, of which they prepare their pilau, boiling it
with

with mutton or fowl, their lappa, which is merely boiled rice, and the tchorbe, a kind of broth made of the same vegetable. The fish of the Archipelago is very good, and the beef tolerable; the hares, partridges, and other game are excellent. The meat is usually spread on a low wooden table, over which the master of the house pronounces a short prayer. The frugal repast is followed by fruits and cold water, and these are succeeded by hot coffee and pipes with tobacco. The houses are expensive, and the most costly part of the furniture is the carpet that covers the floor. Their dress consists of a calico shirt, and the loose robe is fastened by a girdle, in which is stuck a dagger; while the tobacco-box, pocket-book, &c. are worn in the bosom. The robe is commonly made of English broad cloth, trimmed with furs. The shoes are light slippers. The dress of the women resembles that of the men, differing only in that of the head, which is a sort of bonnet, formed of pasteboard covered with cloth of gold, or other elegant materials, with a veil reaching to the eye-brows, and a fine handkerchief concealing the lower part of the face. In their persons the Turks are very cleanly; the females, however, stain their nails with a red tincture. Their amusements are principally such as favour indolence, hunting and military exercises excepted. They are fond of reclining on an elegant carpet, or in a hot season by the side of a stream, and smoking the delicate tobacco of Syria. With opium they procure what they call "rief," or a placid intoxication, but a stronger dose produces irritation and ferocity. Chess and draughts are favourite games; whereas those of chance are regarded as immoral. Their coffee-houses and baths afford other means of amusement; and the beiram, or festival succeeding their long lent, is a season of universal dissipation.

The Turkish language is far inferior to the Persian or Arabic, and is formed by a mixture of several dialects. Literature is not wholly neglected, but they have some schools and libraries. In the 18th century a printing-office was set up at Constantinople by Ibrahim Effendi, which was at first much opposed, but afterwards allowed to print all kinds of books, those on religion excepted. Their market for books contains many shops well supplied with Oriental MSS.; and they have their ancient poets, historians, and divines, though of little estimation compared with those of Persia or Arabia. Education, however, is little encouraged: so that ignorance forms the distinguishing character of the nation. Law, connected with their theology, is the chief subject of their study; but they have no institution that merits the appellation of a college or university.

The chief city of European Turkey, and of the whole Turkish empire, is Constantinople: next to this in dignity and extent is Adrianople, two miles in circuit, and possessing several splendid works, and a considerable share of commerce; Philippopoli is a city of considerable importance; Sofia, though meanly built, contains about 70,000 inhabitants, and has considerable trade; Silistria in Bulgaria, on the Danube, contains about 60,000 souls; and Bucharest, the chief city of Walachia, is said to have the same number; while those of Jassy or Yassy, the principal town of Moldavia, and Bender of Bessarabia, are each estimated only at 10,000 or 14,000. Belgrade, the capital of Servia, is supposed to contain about 25,000 inhabitants; and those of Banjaluka, which is a considerable town in Bosnia, are estimated at 18,000. In the southern provinces we may first mention Salonica, containing 60,000 inhabitants, and distinguished by a considerable commerce; Larissa, 80 British miles to the S., an inland town, containing 25,000 souls; and Atini, the ancient Athens, of small population. See each article.

If we except the seraglios and royal palaces, the chief edifices in Turkey are the mosques and caravanferas.

The manufactures and commerce of Turkey in Europe are chiefly conducted by foreigners. The Levant trade almost entirely centres in Smyrna and the Asiatic shore. The manufactures principally exported from European Turkey are inconsiderable, being chiefly carpets and some few other articles; but the products are currants, figs, saffron, statuary marble from Paros, silk, and drugs.

The climate and seasons vary with the different regions comprehended within the limits of European Turkey; and to these we refer for an account of them. The general appearance of Turkey in Europe is mountainous, here and there interspersed with delicious plains and vales; enriched by the Danube, which intersects its provinces, and the numerous gulfs of the Archipelago and Mediterranean. The soil is generally fertile, the northern parts producing wheat and rich pasture, the middle and southern abundance of rice: but agriculture, as well as almost every other art and science, is neglected by the Turks. The principal rivers of Turkey are the Danube, already mentioned, the Maritz or ancient Hebrus, the Vardari or ancient Axios, the Esker or ancient Oeskus, the Morava or ancient Margus, and the Drin, rising N. of Albania, and falling into the Save. Budzac and Walachia, as well as Albania and the southern provinces, contain considerable lakes. The chains of mountains in Turkey are numerous and extensive. Here we might mention, if they were not elsewhere noticed, the Carpathian chain, anciently called the Bastarnic Alps; the grand range of the Hæmus with its branches; and mount Athos of ancient celebrity. European Turkey also abounds with forests. Of its zoology we shall merely notice the jackal, the camel, and horse, and also its cattle and sheep, which are numerous and of different kinds. Its mineralogy has been little investigated. The gold mines of Philippi, about eighty miles E. of Salonica, produced in the time of Philip of Macedon annually about 1000 talents, or 2,880,000*l.* sterling; and silver mines were found in Attica, and other quarters.

The chief islands belonging to Turkey in Europe are those of the Archipelago; for an account of these we refer to their names, such are Crete or Candia, Negropont, the Cyclades, Sporades, Lemnos, &c. &c.

Turkey in Asia extends from the shores of the Ægean sea or Archipelago, to the confines of Persia, through a space of about 1050 British miles. The boundaries towards Persia are the mountains of Ararat and Elwend. Towards the N. the Turkish territories are divided from the Russian by the river Cuban and the chain of Caucasus; in the S. they extend to the junction of the Tigris and the Euphrates, which last river separates, for a considerable interval, the Turkish possessions from those of the Arabs. The distance from the Cuban to the junction of the Tigris and Euphrates may be estimated at about 1100 British miles. This extensive empire is divided into nine or ten provinces, *viz.* Natolia W., Karaman S., and Roum N.E. N. of Armenia are Guria or Guriel, Mingrelia, and the Abkhas of Caucasus, the ancient Circassias. To the S. of Armenia, also denominated Turcomania, are Kurdistan and Irak-Arabi, part of ancient Persia, round the celebrated capital Bagdad. The ancient Mesopotamia, between the Tigris and the Euphrates, now partly corresponds with the province of Algezira; and Syria, or Soria, comprehends the celebrated countries along the eastern extremities of the Mediterranean. These provinces are subdivided into governments, arbitrarily administered by pashas. The original population of these regions consisted chiefly of Scythians blended

TURKEY.

blended with some few Assyrians from the south. See *TURK*, and *Turkey in Europe*, supra.

The prevalent language is the Turkish, to which we may add the modern Greek, together with the Arabic, Syrian, Persian, and Armenian, with the various dialects used by the tribes on the Black sea, and indicating the diversity of population. To the account already given of the historical epochs of Turkey, we may here subjoin the following from Pinkerton. Armenia and Georgia were subdued by the Turks in the eleventh century, and the whole of Asia Minor soon followed. Their kingdom of Roum extended from the Euphrates to Constantinople, and from the Black sea to the confines of Syria. Successive warlike princes acquired additional territory from the Mamelukes of Egypt and the Persians. Syria, formerly an appendage of Egypt, was conquered by Selim II. in 1516; Tauris and Diarbekir, the last of which had formerly belonged to Persia, were subjugated by the same monarch; and in 1589 Abbas, the great sovereign of Persia, was obliged to yield three provinces to the Ottomans, though he extended his conquests to the east; and Bagdad, with the surrounding province of Irak-Arabi, became subject to the Turks in 1638. The present limits seem to have been fixed by the treaty between the Porte and Persia in 1736, since which period the Turks have been chiefly employed in defending themselves against the Russians; but such had been their ascendancy over Persia, that in 1727 they had acquired the territory from Erivan to Tauris or Tebriz, and thence to Hamadan, a boundary which seems to be more precisely marked by nature than the pencil.

The antiquities of Asiatic Turkey are those of Balbec and Palmyra or Tadmor in the desert, and those that have been discovered in the scite and plain of Troy; for which see these articles.

The Turkish empire in Asia is estimated at 470,400 square miles, and the population at 10,000,000; which, allowing 8,000,000 for the European part, will render the total 18,000,000. The reader will find a sketch of the manners and customs of the inhabitants of Asiatic Turkey under this article, which we shall now proceed to mention. The Kurds or Kurds pass in summer from Mousoul to the sources of the Euphrates, and they are never punished either for robbery or murder. They are a pastoral people, who conduct their herds from one country to another, and extending sometimes as far west as Tocat; where Tournefort, in his time, found other hordes called Turkomans. The Armenians, though Eutychian Christians by profession, and of course irreconcilable enemies of the Greeks, are distinguished by many singular manners and customs. They are represented as a sensible and polite people; and by their frugality and enterprise, are admirably qualified for conducting the Levant trade, which is chiefly their province. For an account of the Druzes and Maronites, see these appellations. In the northern extremities of Asiatic Turkey, there are many tribes which have adopted singular practices. Six or seven languages are said to be spoken in the country between the Euxine and the Caspian. The Abkhas, called by the Circassians, "Kush-Hafip," a people beyond the mountains, retain some traces of Christianity. The territory of the Tscherkasses, or Circassians, is extensive: part of it is subject to Russia, but their manners are invariable. The princes cannot possess lands, and their nobles are chosen by the princes from the vassals, or third class. Public measures are proposed by the prince, and debated by the nobles and deputies of the people, on a spot destined for this purpose, near the royal residence. The agriculture of these people is barely sufficient for their own

consumption; but they export sheep and horses, and slaves taken in their predatory excursions. The beauty of their women has been much extolled. Having received a suitable education, and formed from their youth according to their own standard of beauty, they are sold from 20/ to 100/, and sometimes at a much higher price. Soon after the birth of a girl, a belt is sewed round her waist, and when this bursts, it is replaced by a second; so that their waists become very small, and their shoulders broad, which is a defect little regarded, on account of the beauty of their breasts. On the wedding-night the belt is cut by the husband with a dagger, an operation which is sometimes accidentally fatal. The bride-groom pays for his bride a present, or "kelym," consisting of arms, or a coat of mail; but he must not then, nor on any future occasion, see her, or cohabit with her, without the greatest mystery. The young men recommend themselves by their activity and address in military exercises; and those who are most alert have the privilege of choosing the most beautiful partners. Their musical instruments are a long flute, with only three stops, a species of mandoline, and a tambourin. Their dances are in the Asiatic style, with little gaiety or expression. The women pride themselves on the courage of their husbands, and severely reproach them when they are defeated. It is their business to polish and take care of the armour of the men. The habitation of a Circassian consists of two huts, because the wife and husband are not supposed to live together. At meals the whole family is assembled. Their food consists only of a little meal, paste made of millet, and a kind of fermented beer, prepared from the same grain. The Mamelukes of Egypt are slaves regularly imported from Circassia and Georgia. In Imeritia, Mingrelia, and Gurjel, as well as in Georgia, which forms a Persian province, the barons have power of life and death over their vassals, and form a very powerful aristocracy, very formidable to the prince, who resides at Cntais. The religion of all these provinces is the Greek; but they can scarcely be regarded as subject to Turkey. It may be observed in general, after this brief detail, that the most striking feature of manners and customs in the Turkish empire, is that half the people may be considered as somewhat civilized, while the other half may be regarded as pastoral wanderers ranging over extensive wastes. Next to the capital of the Turkish empire, the next city of Asiatic Turkey in dignity and importance is Aleppo, containing about 250,000 inhabitants, where the manufactures of silk and cotton are flourishing, and whither large caravans frequently resort from Bagdad and Bassora, with the products of Persia and India. Damascus is supposed to contain 180,000 souls;—Smyrna may be regarded as the third city in Asiatic Turkey, and contains about 120,000 souls:—Prusa is a beautiful city at the northern bottom of mount Olympus, and its number of inhabitants is estimated at about 60,000:—Magnisi, or Magnesia, is also a city of some repute in this quarter of the empire; and Kircagatch has risen to importance by the cultivation of cotton, being situated about 40 miles N.E. of Magnisi, on the route to Prusa:—Angora contains 80,000 inhabitants, and trades chiefly in yarn for shalloons, and in Angora stuffs of its own manufacture from the hair of a breed of goats:—Tokat is flourishing, and its inhabitants are about 60,000; its manufactures are silk and leather, and chiefly copper utensils:—Bafra, or Bassora, on the estuary of the Euphrates and Tigris, contains about 50,000 inhabitants, and is a place of great consequence; as the various products of Europe and India are here exchanged for those of Persia; and opulent caravans

caravans proceed from this most central port of the Oriental trade to the chief cities of Asiatic Turkey: — Bagdad, the seat of the caliphs, and scene of many Eastern fictions, is now reduced to a town of about 40,000 inhabitants: — the ancient and celebrated city of Jerusalem is now a mean town, chiefly depending on the piety of pilgrims; and towards the frontiers of Persia frequent wars have spread desolation; nevertheless Erzeron, the capital of Armenia, has still about 25,000 inhabitants; but Kars, the extreme town upon the frontiers of Persia, though tolerably fortified, is an inconsiderable place. The chief articles of commerce in Asiatic Turkey are carpets, rhubarb, and several other drugs. The Levant or Turkey trade was formerly of great consequence to Great Britain; but from the middle of last century it has been more advantageous to France. The state of the Levant trade chiefly carried on at Smyrna appears from the following documents:

France sends coffee, sugar, indigo, cloths, and cochineal.

England, shalloons, muslins, iron, tin, spices, refined sugars.

Holland, muslins, India goods, cloths, spices.

Austria, from Trieste, cloths, glass, hard-ware, linen, wood, amber.

Russia, iron, corn, caviare, dried fish, furs.

Italy, silks and velvets, wax and paper.

European Turkey, wines, silks, tobacco.

Natolia and Syria, woollens, cottons, silks, drugs.

Egypt, coffee of Yemen, rice.

Barbary, dates, woollen caps from Tunis, butter, wax.

The port of Marseilles, which carries on the French trade with Smyrna, draws the wool and cochineal from Spain; but this country has lately began to conduct her own commerce. Venice, under the Austrian power, might become the chief port of the Levant business. Of the French commerce, the chief staple is coffee: but this cannot be resumed with much vigour till France shall acquire a greater naval power.

Upon the whole, says Pinkerton, if the commerce of Smyrna be at present valued at fifty millions of franks, the English trade for thirty millions, the Dutch for ten, while France shares the remaining ten millions with the emperor, Italy, and other states above-mentioned.

The climate of Asia Minor has been always considered as excellent. The heat of the summer is tempered by numerous chains of high mountains, some of which are covered constantly with snow. The aspect of Asiatic Turkey is mountainous, intermingled with spacious and beautiful plains, which afford pasture to the numerous flocks and herds of the Turkomans. The soil is various; but the chief agricultural products are wheat, barley, and durra. It abounds also with grapes, olives, and dates. In Syria the agriculture is deplorable, and the peasants are in a wretched condition, being sold, as in Poland, with the soil, and their constant fare being barley bread, onions, and water.

The principal river of Asiatic Turkey is the Euphrates, the course of which may be estimated at about 1400 British miles: next in importance is the Tigris, whose course is about 800 miles; and both these rivers are navigable to a considerable distance from the sea. The third river is called by the Turks Kizil Irmak, the celebrated Halys of antiquity, rising in mount Taurus, and discharging itself into the Euxine sea on the W. of the gulf of Sanfoun: the river Sacaria, or ancient Sangarius, rises about fifty miles S. of Angora, and joins the Euxine about seventy miles E. of Constantinople: next in rank is the Mæander, rising N.

of Apamæa, and winding its course about 250 British miles: the Sarabat is the ancient Hermus, famous for its golden sands. The chief river of Syria is the Orontes, now called Oron or Asi, which runs into the Mediterranean.

The lakes of Asiatic Turkey are numerous. The most remarkable are the Van and Urmiah: others are the Dead sea in Syria, fifty miles long, and twelve or thirteen in breadth: that of Raekama, S. of Hilla and the ancient Babylon, about thirty miles long, and flowing into the Euphrates: the Tatta, or Palus Salina of D'Anville, a saline lake about seventy miles long, and one or two in breadth towards the centre of Asia Minor, being the modern Toufla or salt lake: that of Ulubad in Natolia, anciently denominated the lake of Apollonia, twenty-five miles in circumference, and in some places seven or eight miles wide, sprinkled with several isles and peninsulas, and the grand receptacle of the waters from mount Olympus: the largest of these isles is called Abouillona, probably from the ancient name of the city which stood upon it: and about fifty miles to the N.E. was the lake anciently called Ascanius, now Isnik.

The mountains of Asiatic Turkey are of ancient celebrity: such are the Taurian chain; the Caucasian mountains, ranging from the mouth of the river Cuban in the N.W. to the place where the Kur enters the Caspian in the S.E., and furnishing various chains, such as the Antitaurus of antiquity, and others branching out into Persia; mount Taurus, terminating at the Euphrates and deserts of Algezira: the chain of Taurus is now called Kurun, and extends about 600 miles E. and W. from the Euphrates to the vicinity of the shores of the Archipelago. These and other mountains of Asiatic Turkey are conjectured to be calcareous; while the Caucasus alone aspires to the rank of a granitic or primitive chain. Towards the E. of Armenia is Ararat, properly belonging to Persia; and beyond Ararat are branches of the Caucasian chain, to which probably belongs the mountains of Elwend, or Niphates of antiquity. In Syria, the most celebrated mountains are Lebanon or Libanon, and Antilibanus. On the eastern side of the Archipelago was Olympus (now Keshik Dag); and 140 miles W. of Olympus is mount Ida, the branch of which was called by the ancients Garganus, which gave source to the Granicus, the Simois, and other streams, most of which directed their course to the N., and extended in western prominences to the Hellespont, amidst which was situated the celebrated city of Troy. Other remarkable mountains on this classical shore, as it has been denominated, were those of Rhea, Pedasus, &c. &c. S. of the Mæander, the Taurus detaches a chain called Cadmus and Grius, bending towards the isles of Cos and the Cyclades. The numerous mountains of Asiatic Turkey are frequently clothed with immense forests of pines, oaks, beeches, elms, and other trees; and the southern shores of the Black sea present many gloomy forests of great extent. The inhabitants are hence supplied with abundance of fuel, in defect of pit-coal, which has not been explored in any part of Asiatic Turkey. Sudden conflagrations arise from the heedless waste of the caravans, which, instead of cutting off a few branches, set fire to a standing tree. The extensive provinces of Natolia, Syria, and Mesopotamia, have been little accessible to European curiosity, since their reduction under the Turkish yoke. In Pinkerton's Geography we have a catalogue of those plants and trees that have been found wild in the Asiatic part of the Ottoman territory. Several dyeing drugs and articles of the materia medica are imported from the Levant, among which are madder, and a variety called alizari, which grows about Smyrna, and affords a much finer red dye than the European kind; jalap, scammony, febesten, the ricinus,

TURKEY.

yielding by expression castor oil, squirting cucumber, coloquintida, opium poppy, and spikenard. The best herbes in Asiatic Turkey are of Arabian extract; but mules and asses are more generally used. The beef is scarce and bad, the mutton superior, and the kid a favourite repast. Other animals are the bear, tiger, hyæna, wild boar, jackal, and dogs in great abundance. On the summits of Caucasus is found the ibex, or rock-goat; at Angora, singular goats and cats; the gazel, and deer and hares in great abundance are found in Asia Minor. The partridges are generally of the red-legged kind, larger than the European: fish is plentiful and excellent. The mineralogy of these extensive provinces has not been yet sufficiently explored. The most noted mineral waters are those of Prusa, at the bottom of mount Olympus: the baths are splendid, and paved with marble. Walachia furnishes many other hot-springs.

The chief islands belonging to Asiatic Turkey, situated in the Archipelago, are Mitylene, Scio, Samos, Cos, and Rhodes. Along the southern shores of Asia Minor are some small isles, such as that of Castel Rosso, S.E. of Patira; but these are of no moment compared with Cyprus, about 160 miles long and nearly 70 at its greatest breadth; the chief cities of which are Nicofia and Famagusta.

Some geographers, in opposition to the testimony of travellers, have considered Egypt as a Turkish province; whereas it was only occasionally tributary, and subject to the military aristocracy of the beys. Some of the maritime Mahometan powers have likewise assisted the Porte with ships in time of war; but they cannot be regarded as subject to the Ottoman sceptre.

TURKEY, Coinage, &c. of. As the Turks, though aspiring to a very ancient derivation, comprehending Tartars and Moguls, (see **TURK**.) are merely a mixture of Sarmatæ or Slavi, Arabs and Greeks, which began to form a nation in the fourteenth century, they seem to have issued no coins till they seized Constantinople in 1453; and their coins resemble those of Persia and Arabia, having merely inscriptions on both sides. Turkey keeps accounts in piastres, commonly called grouch by the Turks, and by the English dollars. Each piastre is divided into 40 paras, and each para into 3 aspers. Sometimes, instead of these real coins, the piastre is divided into 80 or 100 imaginary parts, called aspers, or minas. Jux or juck is a sum of 100,000 real aspers; a chife or purse is 500 ditto. The gold coins of Turkey are the sequin or chequeen (see **SEQUIN**): the silver coins are the two-dollar piece of 80 paras; the altmichlic of 60 paras; the dollar or piastre of 40 paras; the zolotta or izelotta of 30 paras; the roup of 10 paras; the beslick of 5 paras; the para of 3 aspers; and the asper. The Turkish coins, notwithstanding the regulations of 1780, when a single piastre weighed $5\frac{1}{2}$ drachms, or 277 English grains, have been gradually deteriorated; so that a piastre of the latest coinage, weighed and assayed by the king's assay-master of the Mint, was reported to be as follows: weight 8 dwts. 6 grs., fineness 5 oz. 6 dwts. worse than the English standard: hence its fineness was 47 car. 2 grs. Turkish, and its value in sterling $13\frac{1}{2}d$.

The Turkish cheque or pound, with which gold, silver, diamonds and precious stones are weighed, is divided into 100 drachms, and the drachm into 16 killots or carats, or 64 grains. A cheque weighs 10 oz. 5 dwts. 3 grs. troy weight, and a drachm $49\frac{1}{2}$ grs. ditto; so that 48 chequees = 41 lbs. troy very nearly.

The cantaro, quintal or kintal contains 44 okes, or 100 rottoli; the oke, 4 yusdromes or chequees, or 400 drachms; the rottolo, 176 drachms. A metecal is $1\frac{1}{2}$ drachm. The kintal of cotton-yarn is 45 okes.

The cantaro weighs about $123\frac{1}{2}$ lbs. avoirdupois; the oke, 2 lbs. 13 oz.; the rottolo, $19\frac{1}{2}$ ounces; the chequee, $11\frac{1}{2}$ ounces avoirdupois.

Silks from Persia are weighed by the batman of 6 okes, or 2400 Turkish drachms, or 16 lbs. 14 oz. avoirdupois: silks from Brussa are weighed by the tafsee of 610 Turkish drachms, or 4 lbs. 4 oz. 10 drs. avoirdupois.

The chequee of goats' wool is 800 Turkish drachms, or 5 lbs. 10 oz. avoirdupois: the chequee of opium 250 Turkish drachms, or 27 oz. 10 drs. avoirdupois.

Corn is measured by the quillot or killo, weighing, in wheat, about 22 okes, or 60 lbs. avoirdupois; 4 killos make 1 fortin: $8\frac{1}{2}$ killos answer nearly to 1 English quarter. A killo of rice is 10 okes.

Oil and other liquids are sold by the meter, or almod: the meter weighs 8 okes, or $22\frac{1}{2}$ lbs. avoirdupois; and 8 almods equal 11 English gallons.

The pic or pike is of two sorts; the longest, called halebi or archim, with which silks and woollens are measured, is 314 French lines, or $27\frac{1}{4}$ English inches long; the other, called endassè, with which cotton goods and carpets are measured, is 3 *per* 100 shorter. But, in the general course of European trade, the pike is reckoned at $\frac{3}{4}$ ths of an English yard.

The exchanges of Constantinople with the principal commercial places in Europe are as follow: Constantinople gives

- Amsterdam 60 paras, more or less, for 1 florin current.
- Genoa 23 paras, more or less, for 1 lira fuori banco.
- Hamburgh 1 piastre, for 24 grotes Flemish banco, more or less.
- Leghorn 145 paras, more or less, for 1 pezza of 8 reali.
- London 18 piastres, more or less, for 1l. sterling.
- Marseilles 1 piastre for 1 franc 45 centimes, more or less.
- Naples 120 paras, more or less, for 1 ducat regno.
- Paris 210 piastres, more or less, for 100 ecus of 3 livres, or 300 francs.
- Venice 360 paras, more or less, for 1 sequin of 22 lire piccoli.
- Vienna and Trieste 50 paras, more or less, for 1 florin current.

The exchanges between Constantinople and other trading places, where Turkish money is used, are done at a premium of 10 *per cent.* more or less, in favour of Constantinople.

Bills between Constantinople and the principal trading places of Europe are commonly drawn at 31 days' sight; but from one place, in Turkey, on another, at 11 days' sight. Some European merchants pay their bills on the very day on which they become due; and others take as many days grace as are allowed in their respective countries.

Trieste keeps accounts in fiorini or florins of 60 creutzers; also in lire of 20 soldi; the creutzer being subdivided into 4 pfenings, and the soldo into 12 denari. These monies of account are valued in Austrian currency, in Trieste currency, and in Valuta di Piazza: the first is chiefly used in foreign exchanges, the second in wholesale trade, and the third in retail business. A florin Austrian currency is worth $5\frac{1}{7}$ lire of Trieste currency, or $5\frac{1}{7}$ of lire di piazza. For the coins, &c. see **VIENNA**.

Tripoli keeps accounts in piastres of 13 grimellini, or 52 aspers: the grimellin is valued at 6 sous Tournois, which makes the piastre of Tripoli worth 3s. 3d. sterling. The weight for gold and silver is called *Metacal* (which see); 50 of which are equal to a Venetian mark; so that 1 metacal weighs $73\frac{1}{2}$ English grains. The cantaro weight contains 100 rottoli, each of 6 ounces, or 128 termini; the cantaro

answering to 168 lbs. peso sottile of Venice, or about 112 lbs. avoidupois. The corn measure, called cassio, contains 20 tiberi, and is equal to 4 staja of Venice: so that 13 cassio = 15 English quarters. The oil measure, called mattaro, weighs 42 rottoli, or about 47 lbs. avoidupois. The pic, or ell, is equal to $2\frac{1}{2}$ of Genoese palmi, or $21\frac{1}{2}$ English inches. Kelly's Universal Cambist.

TURKEY, a town of the state of New Jersey; 13 miles N.N.W. of Amboy.

TURKEY Creek, a river of South Carolina, which runs into the Cangaree, N. lat. $34^{\circ} 50'$. W. long. $81^{\circ} 35'$.—**Alfo**, a river of America, which runs into the Ohio, N. lat. $38^{\circ} 22'$. W. long. $83^{\circ} 12'$.

TURKEY Foot, a township of Pennsylvania, in Somerset county, containing 975 inhabitants.

TURKEY Hill, a township of Illinois territory, in the county of St. Clair, containing 1151 inhabitants.

TURKEY Point, a cape on the coast of Maryland, at the mouth of the Susquehanna, where it takes the name of Chesapeake. Here the British army landed in August 1777, as they were advancing to Philadelphia; 16 miles S.E. of Elkton.—**Alfo**, a cape on the N. coast of lake Erie.

TURKEY River, a river of Louisiana, which runs into the Mississippi, N. lat. $42^{\circ} 10'$. W. long. $91^{\circ} 55'$.

TURKEY Town, a town of the state of Georgia; 60 miles N. of Oakfuskee.

TURKEY, Meleagris, in *Ornithology*, a distinct genus of birds, of the order of the Gallinæ. For the distinguishing characters and species, see MELEAGRIS.

Wild turkies preserve a sameness of colouring; the tame varying; but the black approaching nearest to the original flock. Of late a beautiful kind has been introduced into England of a snowy whiteness, finely contrasting with its red head. The usual weight of the wild turkey is about 30 lbs.

The passions of the males are strongly expressed by the change of colours in the fleshy substance of head and neck, which alters to red, white, blue, and yellowish, as they are differently affected. One cock serves many hens, who retire to an obscure place in order to sit, the cock being apt to break the eggs. The females are very affectionate to their young, and though the eggs addle, will almost perish with hunger, unless they are removed, before they will quit the nest.

Turkies delight much in the seeds of nettles, but those of the purple fox-glove are fatal to them. They are stupid, quarrelsome, and cowardly birds; they are swift runners, but indifferent flyers; they love to perch on trees, and in a wild state, get so high as to be beyond the reach of the musket.

In the state of nature they go in flocks, even of five hundred, and feed much on the small red acorns, frequenting the swamps of their native country, where they roost, but at sun-rising repair to the dry woods in search of acorns and berries. The flesh of the wild turkey is said to be preferable to that of the tame, but redder.

Wild turkies are now very rare in the inhabited parts of America, but are found in numbers in the distant and most unfrequented spots.

The Indians make a very elegant clothing of the feathers, twisting the inner webs into a strong double thread of hemp, or inner bark of the mulberry-tree, and working it like matting: it appears rich and glossy, and as fine as a silk shag. They also make fans of the tail, and the French of Louisiana were wont to make umbrellas by the junction of four of the tails.

Turkies are natives only of America, or the New World,

and of course unknown to the ancients: this is a point which Mr. Pennant has established by an elaborate induction of various particulars in the history of these birds; evincing that they are natives neither of Europe, Asia, nor Africa. The first precise description of them is given by Oviedo, in 1525; they are also mentioned as natives of the main land of the warmer parts of America, by Fernandez, physician to Philip II. who wrote between the years 1555 and 1598: they were also frequently seen, both in their wild and tame state, by Dampier, in the province of Yucatan, now a part of Mexico.

In North America they were observed by the first discoverers. They were first introduced into Europe from Mexico or Yucatan, and imported into England, probably from Spain, as early as the year 1524. Since that period they have been successfully cultivated in this kingdom, so that in the year 1585 they made a dish even in our rural feasts. But in France they were so rare, that the first which was eaten in that kingdom appeared at the nuptial feast of Charles IX. in 1570. Phil. Transf. vol. lxxi. part i. p. 67, &c. See POULTRY.

TURKEY-Berry Tree, in *Botany*. See CORDIA.

TURKEY Company and Silk. See COMPANY and SILK.

TURKEY Leather. (See MOROCCO Leather.) The processes for dyeing leather red and yellow, as practised in Turkey, with the directions for preparing and tanning the skins, as communicated by Mr. Philippo, a native of Armenia, who obtained 100*l.* and a gold medal from the Society for the Encouragement of Arts, as a reward for the discovery, are as follow.

1. *First Preparation of the Skins, both for Red and Yellow Leather, by dressing them in Lime*.—Let the skins, dried with the hair on, be first laid to soak in clean water for three days; let them then be broken over the flesh-side, put into fresh water for two days longer, and afterwards hung up to drain half an hour. Let them now be broken on the flesh-side, limed in cold lime on the same side, and doubled together with the grain-side outward. In this state they must be hung up within-doors over a frame for five or six days, till the hair be loose; which must then be taken off, and the skins returned into the lime-pit for about three weeks. Take them out, and let them be well worked flesh and grain, every sixth or seventh day during that time; after which, let them be washed ten times in clear water, changing the water at each washing. They are next to be prepared in drench, as below mentioned.

2. *Second Preparation of the Skins for both the Red and Yellow Dyes by drenching*.—After squeezing the water out of the skins, put them into a mixture of bran and water, warm as new milk, in the following proportions; viz. about three pounds of bran for five skins, and water sufficient to make the mixture moderately fluid, which will be about a gallon to each pound of bran. In this drench let the skins lie three days; at the end of which time they must be well worked, and afterwards returned into the drench two days longer. They must then be taken out and rubbed between the hands; the water squeezed from them, and the bran scraped off clear from both sides of the skins. After this they must be again washed ten times in clear water, and the water squeezed out of them.

Thus far the preparatory process of all the skins, whether intended to be dyed red or yellow, is the same; but afterwards those which are to be dyed red, must be treated as follows.

3. *Preparation in Honey and Bran of the Skins that are to be dyed Red*.—Mix one pound of honey with three pints of lukewarm water, and stir them together till the honey is dissolved.

dissolved. Then add two double handfuls of bran; and taking four skins (for which the above quantity of the mixture will be sufficient), work them well in it one after another. Afterwards fold up each skin separately into a round form, with the flesh-side inwards; and lay them in an earthen pan, or other proper vessel; if in the summer, by the side of each other; but in the winter, on the top of each other. Place the vessel in a sloping position, so that such part of the fluid as may spontaneously drain from the skins, may pass from them. An acid fermentation will then rise in the liquor, and the skins will swell considerably. In this state they must continue for seven or eight days; but the moisture that drains from them must be poured off once or twice a day, as occasion may require. After this a further preparation in salt is necessary; and which must be performed in the following manner.

4. *Preparation in Salt of the Skins to be dyed Red.*—After the skins have been fermented in the honey and bran, as above-mentioned, let them be taken out of that mixture on the eighth or ninth day, and well rubbed with dry common sea-salt, in the proportion of about half a pound to each skin; the salt must be well rubbed and worked with them. This will make them contract again, and part with a further considerable quantity of moisture: which must be squeezed out by drawing each skin separately through the hands. They must next be scraped clean on both sides from the bran, superfluous salt, and moisture that may adhere to them. After which dry salt must be strewed over the grain-side, and well rubbed in with the hand. They are then to be doubled, with the flesh-side outwards, lengthwise from neck to tail, and a little more dry salt must be thinly strewed over the flesh-side, and rubbed in; for the two last operations, about a pound and a half of salt will be sufficient for each skin. They must then be put, thus folded on each other, between two clean boards, placed sloping, breadthwise; and a heavy weight laid on the upper board, in order gradually to press out what moisture they will thus part with. In this state of pressure, they must be continued two days or longer, till it is convenient to dye them, for which they will then be duly prepared.

5. *Preparation of the Red Dye, in a proper Proportion for four Skins.*—Put eight gallons of water into a copper, with seven ounces of shenan tied up in a linen bag. [Shenan is a drug much used by dyers in the East; and may easily be procured at any of the ports of Syria and Africa, in the Levant. It is the Eastern jointed kali, called by botanists *salicornia*; and grows in great plenty in those and other parts of the East.] Light a fire under a copper; and when the water has boiled about a quarter of an hour, take out the bag of shenan, and put into the boiling fluid or lixivium, 1st, two drachms of alum; 2dly, two drachms pomegranate bark; 3dly, three quarters of an ounce of turmeric; 4thly, three ounces of cochineal; 5thly, two ounces of loaf-sugar. Let the whole mixture boil about six minutes, then cover the fire, and take out a quart of liquor, putting it into a flat earthen pan; and when it is as cold as new milk, take one skin, folded lengthwise, the grain-side outwards, and dip it in the liquor, rubbing it gently with the hands. Then taking out the skin, hang it up to drain, and throw away the superfluous dye. Proceed in the same manner with the remaining three skins; repeating the operation of each skin separately, eight times, squeezing the skins by drawing them through the hands before each fresh dipping. Lay them now on one side of a large pan, set sloping, to drain off as much of the moisture as will run from them without pressure, for about two hours, or till they are cold; then tan them as below directed.

6. *Tanning the Red Skins.*—Powder four ounces of the

best white galls in a marble mortar, sifting it through a fine sieve. Mix the powder with about three quarts of water, and work the skins well in this mixture for half an hour or more, folding up the skins fourfold. Let them lie in this tan for 24 hours; when they must be worked again as before; then taken out, scraped clean on both sides from the first galls, and put into a like quantity of fresh galls and water. In this fresh mixture they must be again well worked for three quarters of an hour; then folded up as before, and left in the fresh tan for three days. On the fourth day they must be taken out, washed clean from the galls in seven or eight fresh quantities of water, and then hung up to dry.

7. *Manner of dressing the Skins after they are tanned.*—When the skins have been treated as above, and are very near dry, they should be scraped with the proper instrument or scraper on the flesh-side, to reduce them to a proper degree of thickness. They are then to be laid on a smooth board, and glazed by rubbing them with a smooth glass. After which they must be oiled, by rubbing them with olive-oil, by means of a linen rag, in the proportion of one ounce and a half of oil for four skins: they are then to be grained on a graining-board, lengthwise, breadthwise, and cornerwise, or from corner to corner.

8. *Preparations with Galls, for the Skins to be dyed Yellow.*—After the four skins are taken out of the drench or bran, and clean washed as before directed in the second article, they must be very well worked, half an hour or more, in a mixture of a pound and a half of the best white galls, finely powdered, with two quarts of clean water. The skins are then to be separately doubled lengthwise, rolled up with the flesh-side outwards, laid in the mixture, and close pressed down on each other, in which state they must continue two whole days. On the third day let them be again worked in the tan; and afterwards scraped clean from the galls, with an ivory or brass instrument (for no iron must touch them). They must then be put into a fresh tan, made of two pounds of galls finely powdered, with about three quarts of water, and well worked therein fifteen times. After this they must be doubled, rolled up as before, and laid in the second tan for three days. On the third day, a quarter of a pound of white sea-salt must be worked into each skin; and the skins doubled up as before, and returned into the tan, till the day following, when they are to be taken out, and well washed six times in cold water, and four times in water lukewarm. The water must be then well squeezed out, by laying the skins under pressure, for about an hour, between two boards, with a weight of about 200 or 300 pounds laid upon the uppermost board, when they will be ready for the dye.

9. *Preparation of the Yellow Dye, in the proper Proportion for four Skins.*—Mix six ounces of cassiari gehira, or dgehira, or the berries of the Eastern rhamnus, with the same quantity of alum; and pound them together till they be fine, in a marble or brass mortar, with a brass pestle. [The cassiari gehira is the berries of an Eastern rhamnus, or buckthorn-tree; and may be had at Aleppo, and other parts of the Levant, at a small price. The common Avignon or yellow berries may be substituted, but not with so good an effect; the cassiari gehira being a stronger and brighter yellow dye, both for this use and also that of colouring paper-hangings, &c.] Then dividing the materials, thus powdered, into three equal parts of four ounces each, put one of those three parts into about a pint and half of water, in a china or earthen vessel, and stir the mixture together. Let the fluid stand to cool, till it will not scald the hand. Then spreading one of the skins flat on a table, in a warm room, with the grain-side

side uppermost, pour a fourth part of the tinging liquor, prepared as above directed, over the upper or grain-side, spreading it equally over the skin with the hand, and rubbing it well in. Afterwards do the like with the other three skins, for which the mixture first made will be sufficient.

This operation must be repeated twice more on each skin separately, with the remaining eight ounces of the powder of the berries and alum, with the above-mentioned due proportions of hot water, put to them as before directed.

The skins, when dyed, are to be hung up on a wooden frame, without being folded, with the grain-side outwards, about three quarters of an hour to drain; when they must be carried to a river or stream of running water, and well washed therein six times or more. After this they must be put under pressure for about an hour, till the water be well squeezed out; afterwards the skins must be hung up to dry in a warm room.

This being done, the skins are to be dressed and grained as before directed for those dyed red; except the oiling, which must be omitted.

The processes for dressing and preparing the skins of lambs, sheep, goats, and other thin hides are various, according to the nature of the article. This branch of the manufacture supplies the large demand of white and dyed leather for gloves, the leather called morocco of different colours and qualities, used for coach-linings, book-binding, pocket-books, &c. This leather is applicable to a variety of other purposes. The white leather is not tanned, but finished by the mere process of tawing; but the coloured leather receives a tanning, generally by sumach, independent of the other materials. The previous preparation of each, or that in which the skin is thoroughly cleansed and reduced to the state of simple membrane, in which it is called *pelt*, is essentially the same, whether for tawing or dyeing. It is thus performed at the best manufactories at Bermondsey, near London, a place long celebrated for all branches of the leather business.

By far the greater number of the skins are imported: if lambs, they are thus prepared; the skins are first soaked for a time in water, to cleanse them from any loose dirt and blood, and put upon the beam commonly used for the purpose, which is a half cylinder of wood covered with strong leather, and scraped on the flesh-side with the semicircular blunt knife with two handles, used in this operation. They are then hung up in considerable numbers in a small close room heated by flues, where they remain to putrefy for a given time. During this process a thick filthy slime works up to the surface of the skin, by which the regularity of the process is judged of; and the wool is loosened, so that it readily comes off with a slight pull. Each skin is then returned to the beam, the wool taken off and preserved, and all the slime worked off with the knife, and the rough edges pared away. The skin is then put into a pit filled with lime-water, and kept there from two to six weeks, according to the nature of the skin, which has the effect of checking the further putrefaction, and produces a very remarkable hardening and thickening of its substance, and probably also it detaches a further portion of the slime. The skin is again well worked upon the beam, and much of its substance pared down, and all inequalities smoothed with the knife. Much pains and judgment are required in these operations, on the one hand not to endanger the substance of the skin by the putrefaction (which if carried on too long would soon reduce it to an incohesive pulp), and on the other hand to work out every particle of the slime, of which the least, if retained, will prevent the skin from dressing well in the subsequent processes, and from taking the dye uni-

formly and well. The skin is then again softened and freed from the lime by being thrown into a vat of bran and water, and kept there for some weeks in a state of gentle fermentation, being occasionally returned to the beam. All the thickening produced by the lime is thus removed, and the skin is now highly purified, and is a thin extensible white membrane, called in this state a *pelt*, and is fit for any subsequent operation of tawing or dyeing, or oil dressing, or shammoing.

The method of bringing kid and goat's skins to the state of pelt is nearly the same as for lambs, except that the liming is used before the hair is taken off, the hair being of but little importance, and only sold to the plasterers; but the lamb's wool, which is more valuable, would be injured by the lime. Kids' skins will take a longer time in tanning than lambs'.

If the pelts are to be tawed, they are put into a solution of alum and salt in warm water, in the proportion of three pounds of alum and four pounds of salt to every 120 middle-sized skins, and worked about therein till they have absorbed a sufficient quantity. This again gives the skin a remarkable degree of thickness and toughness.

The skins are then taken out and washed in water, and then again put into a vat of bran and water and allowed to ferment for a time, till much of the alum and salt are got out, and the unusual thickening produced by it is for the most part reduced. They are then taken to a lofty room with a stove in the middle, and stretched on hooks and kept there till fully dry. The skins are then converted into a tough, flexible, and quite white leather; but to give them a glossy finish, and to take off the harshness of feel still remaining, they are again soaked in water to extract more of the salt, and put into a large pail containing the yolks of eggs beat up with water. Here the skins are trodden for a long time, by which they so completely imbibe the substance of the egg, that the liquor above them is rendered almost perfectly limpid, after which they are hung up in a loft to dry, and finished by glossing with a warm iron. There are other smaller manipulations, which need not be here mentioned.

The essential difference therefore between *tanning* and *tawing* is, that in the former case the pelt is combined with tan and other vegetable matter, and in the latter with something that it imbibes from the alum and salt (possibly alumine), and which is never again extracted by the subsequent washing and branning.

The morocco leather prepared chiefly from sheep's skins and used for coach-linings, the best kind of book-binding, &c. is prepared by the following process. The skin, cleansed and worked in the way already described, is taken from the lime-water, and the thickening thereby occasioned is brought down, not by bran liquor as in tawing, but by a bath of dogs' or pigeons' dung diffused in water, where it remains till sufficiently suppled, and till the lime is quite got out, and it becomes a perfectly white clean pelt. If intended to be dyed red, it is then sewed up very tight in the form of a sack, with the grain side outwards (the dye only being required on this side), and is immersed in a cochineal bath of a warmth just equal to what the hand can support, and is worked about for a sufficient time till it is uniformly dyed, a process that demands much skill and experience. The sack is then put into a large vat containing sumach infused in warm water, and kept for some hours till it is sufficiently tanned.

The skins intended to be blacked are merely fumached without any previous dyeing. After some further preparation, the colour of the fine red skins being finished with a

weak bath of saffron, the skins when dry are grained and polished in the following way. They are stretched very tight upon a smooth inclined board, and rubbed over with a little oil to supple them. Those intended for black leather are previously rubbed over with an iron liquor, by means of a stiff brush, which uniting with the gallic acid of the fumach, instantly strikes a deep and uniform black. They are then rubbed by hand with a ball of glass cut into a polygonal surface, with much manual labour, which polishes them and makes them very firm and compact. Lastly, the *graining* or ribbed surface by which this kind of leather is distinguished, is given by rubbing the leather very strongly with a ball of box-wood, round the centre of which a number of small equi-distant parallel grooves are cut, forming an equal number of narrow ridges, the friction of which gives the leather the desired inequality of surface.

The process for the real morocco leather, as prepared from goat-skins at Fez and Tetuan, is thus described by M. Brouffonnet. The skins are first cleansed, the hair taken off, limed and reduced with bran, nearly in the way already described for the English morocco leather. After coming from the bran they are thrown into a second bath made of white figs, mixed with water, which is thereby rendered slimy and fermentable. In this bath the skins remain four or five days, when they are thoroughly salted with sal-gem (or rock-salt) alone (and not with salt and alum), after which they are fit to receive the dye, which for the red is cochineal and alum, and for the yellow, pomegranate bark and alum. The skins are then tanned, dressed, suppled with a little oil, and dried.

Much excellent leather of every kind is prepared in different parts of the Russian empire. The preparation of the fine Russian leather, so well known for its quality and for its peculiar smell, is described at large in Mr. Tooke's "View of the Russian Empire," to which we must refer the reader for the minuter particulars. In general it may be stated that the hides are first put into a weak alkaline ley to loosen the hair, and then scraped on a beam, then (if calves) are reduced by dogs' dung, and a four oatmeal drench, then tanned with great care and frequent *handling*. The bark used here is seldom oak, but, where it can be got, the bark of the black willow, or if this cannot be had, birch-bark. They are then dyed either red or black, these being the two colours the most esteemed. For the red, the hide is first soaked in alum, and then dyed with Brazil wood. The black is given as usual with an iron liquor. The leather is then smeared with birch-tar, which gives the peculiar smell so much prized (and which, when used for book-binding, has the valuable property of protecting the book from worms), and is finished by various other manipulations. The streaked or barred surface is given to the leather by a very heavy steel cylinder wound round with wires. See YUETS.

A valuable saffian or dyed maroquin leather, almost equal to that of Turkey, is prepared largely at Astrachan and other parts of Asiatic Russia. Only bucks' and goats' skins are used for this purpose. The favourite colours are red and yellow. The general method of preparing the pelt is the same as in this country for the dyed morocco leather, that is by lime, dogs' dung, and bran. Honey is also used after the branning. The honey is dissolved in warm water, and some of this liquor is poured on each skin spread out on wooden trays till it has imbibed the whole of the honey, after which it is let to ferment for about three days, and then salted in a strong brine and hung up to dry. The skin is then ready to receive the dye, which for red is made with cochineal and the *salsola ericoides*, an alkaline plant grow-

ing plentifully on the Tartarian salt deserts, and the colour is finished with alum. When dyed, the skins are tanned with fumach. To the very finest reds, a quantity of forrel is used with the cochineal bath, and the subsequent tanning is given with galis instead of fumach, which renders the colour as durable as the leather itself. The roughness always observed on the surface of the skin, is given by a heavy kind of iron rake with blunt points. The yellow saffians are dyed with the berries of a species of rhamnus (the Avignon berry would answer the same purpose, and is used in other countries), or with the flowers of the wild camomile. For other kinds of leather, see SHAGREEN and SHAMOY.

TURKEY-Pod, in *Agriculture*, a troublesome weed in dry sandy pastures, but which is only an annual.

TURKEY-Stone. See OIL-Stone.

TURKEY-Wheat. See MAIZE and ZEA.

TURKI, in *Geography*, a town of Hindoostan, in Bahar; 31 miles W.N.W. of Durbungah. N. lat. 26° 18'. E. long. 85° 33'.—Also, a town of Grand Bucharia; 30 miles N. of Termid.

TURKIN, a town of Russia, in the government of Caucasus, on the Caspian sea; 140 miles S. of Astrachan. N. lat. 44° 15'. E. long. 47° 14'.

TURKISH Coins, Measures, and Year, see the substitutes, and **TURKEY**.

TURKOMANS, TURCOMANS, or Turkmans, in *Geography*, a denomination distinguishing some of those Tartar hordes, who, on the great revolutions of the empire of the caliph, emigrated from the eastward of the Caspian sea, and spread themselves over the vast plains of Armenia and Asia Minor. After having been introduced into the Arabian empire, they proceeded to give law to those who called them in, either as mercenaries or allies. This was signally experienced by the caliphs themselves. In 834, Motazzam, brother and successor of Almamoun, having taken a body of Turkmans for his guards, was compelled to quit Bagdad on account of their disorders, and, after his time, their power and insolence increased to such a degree, that they became the disposers of the throne and life of their princes, and murdered three of them in less than thirty years. The caliphs, when freed from this bondage, did not profit by their experience; for about the year 935, Radi B'ellah, having again resigned his authority to a Turkman, his successors were entangled in their former chains, and guarded by the Emirs-el-Omara, possessed only the shadow of power. Amidst the disorders of this anarchy, a multitude of Turkman hordes penetrated into the empire, and founded different independent states, in the Kerman and the Khorasan; at Iconium, Aleppo, Damascus, and in Egypt. Until this time the Turks, called "Ogouzians," had remained to the E. of the Caspian and toward the Djihoun; but, about the beginning of the 13th century, Genghis Khan, having united all the tribes of Upper Tartary against the princes of Balk and Samarcand, the Ogouzians did not think proper to wait for the Moguls, but marched under their chief Soliman, and driving their herds before them, encamped (in 1214) in the Aderbeidjan, to the number of 50,000 horsemen. The Moguls followed them, and pushed them still farther to the west, into Armenia. Soliman, being drowned in 1220 in endeavouring to pass the Euphrates on horseback, Ertogrul, his son, took the command of the hordes, and advanced into the plains of Asia Minor, where he was relieved by the abundant pasturage which they afforded for his cattle. The good conduct of this chief procured for him, in these countries, a power and respect which made his alliance sought after by other princes. Among

Among these was the Turkman Ala-el-din, sultan of Iconium. Ala-el-din, advanced in life and harassed by the Tartars of Genghis Khan, granted lands to the Turks under Ertogrul, and even made their chief general of all his troops. Ertogrul proved himself deserving the confidence of the sultan, vanquished the Moguls, acquired still greater power and reputation, and transmitted his honours to his son Osman, who received from Ala-el-din, successor of the former of that name, the Kofetan, drum, and horse-tails, which are symbols of command among all the Tartars. This Osman, to distinguish the Turks, his followers, from the others, gave them the name of "Osmanles," from which we have made Ottomans; which new name soon became formidable to the Greeks of Constantinople, from whom Osman conquered a sufficient extent of territory to found a powerful kingdom. He soon bestowed on it that title, by assuming, in 1300, the dignity of sultan, which signifies absolute sovereign.

No one is ignorant in what manner his successors, the heirs of his ambition and activity, continued to aggrandize themselves at the expence of the Greeks; till, continually depriving them of whole provinces in Europe and Asia, they at length shut them up within the walls of Constantinople; and Mahomet II. son of Amurath, having taken that city in 1453, annihilated this branch of the Roman empire. The Turks, now finding themselves disengaged from the affairs of Europe, turned their ambitious arms against the southern provinces. Bagdad, subjugated by the Tartars, had been without caliphs for two hundred years, but a new power, established in Persia, had succeeded to a part of their domains; and another, formed in Egypt, so early as the tenth century, and subsisting, at that time, under the name of Mamlouks, had seized on Syria.

The Turks determined to despoil these two rivals. Bayazid, the son of Mahomet, executed a part of this plan, by taking Armenia from the Soffi of Persia, and Selim his son completed it, by the conquest of the Mamlouks. This sultan having drawn them near to Aleppo, in 1517, under pretext of desiring their assistance in the war with Persia, suddenly turned his arms against them, and took from them successively Syria and Egypt, whither he pursued them. From that time the Turks established themselves in that country; but they are not settled much among the villages. We rarely meet with any individuals of that nation, except at Cairo; there they exercise the arts, and occupy the religious and military employments. Formerly they also were advanced to posts under government, but, within the last thirty years, a tacit revolution has taken place, which, without taking from them the title, has deprived them of the reality of power. See TURK and TURKEY.

Vöney observes, that the language of the Turkmen is the same with that of the Turks, and their mode of life nearly similar to that of the Bedouin Arabs. Like them, they are pastors, and consequently obliged to travel over immense tracts of land to procure subsistence for their numerous herds. But there is this difference, that the countries frequented by the Turkmen being rich in pasturage, they can feed more cattle on them, and are therefore less dispersed than the Arabs of the desert. Each of their "ordous" (hence *hordes*), or camps, acknowledges a chief, whose power is not determined by fixed laws, but governed by custom and circumstances. It is rarely abused, because the society is compact, and the nature of their situation maintains sufficient equality among its members. Every man able to bear arms is anxious to carry them, since on his individual force depend both his personal safety, and the

respect paid him by his companions. All their property consists in cattle, that is camels, buffaloes, goats, and especially sheep. They live on milk, butter, and meat, which are in great abundance among them, and the surplus of which they sell in the towns and the neighbouring country, for they are almost able alone to supply the butcheries. In return, they take arms, clothes, money, and corn. Their women spin wool, and make carpets, the use of which is immemorial in these countries, and consequently indicates their manner of living to have been always the same. As for the men, their whole occupation consists in smoking, and looking after their flocks. Perpetually on horseback, with their lances on their shoulders, their crooked sabres by their sides, and their pistols in their belts, they are expert horsemen and indefatigable soldiers. They have frequent differences with the Turks, who dread them; but as they are divided among themselves, and form separate camps, they do not assume that superiority which their combined forces would ensure them. The pachalics of Aleppo and Damascus, which are the only parts of Syria they frequent, may be computed to contain about 30,000 wandering Turkmen. A great number of these tribes pass, in summer, into Armenia and Caramania, where they find grass in greater abundance, and return to their former quarters in the winter. The Turkmen are reputed Mussulmen, and generally bear the distinguishing mark, circumcision. But they trouble themselves very little about religion, and they have neither the ceremonies, nor the fanaticism of sedentary nations. As for their manners, to describe them accurately, it would be necessary to have lived among them. They have, however, the reputation of not being robbers, like the Arabs, though they are neither less generous, nor less hospitable than they; and when we consider that they live in plenty, without being rich, and are inured to war, and hardened by fatigue and danger, we may presume they are equally removed from the ignorance and servility of the peasants, and the corruption and selfishness of the inhabitants of the towns. See TRUCHIMENIANS.

TURLACH-MORE, *i. e.* the Great Turlach, in the county of Galway, Ireland, a kind of lake, formed by the expansion of the rivers Clare and Moyne, which is upwards of six miles in length, and two in breadth; but which in summer, from the water being carried off by subterranean passages, becomes a beautiful and sound sheep-walk.

TURLAH, a town of Hindoostan, in the circar of Cicacole; 25 miles E. of Kimedya.

TURLOS, a small island in the gulf of Engia, near the N.E. point of the island of Engia.

TURLUPINADE, a term used chiefly among the French for a low jest or witticism. The occasion of the name is said to be derived from a famous comedian at Paris, called *Turlupin*; whose talent consisted chiefly in raising a laugh by miserable puns and quibbles.

TURLUPINS, TURLUPINI, a denomination given to the *brethren of the free spirit*; whose external aspect and manners carried a very shocking air of lunacy and distraction.

They called their sect the *fraternity of the poor*, and spread themselves over England and France. They are said by some to have had their name *turlupines*, *quod ea tantum habitarent loca, quæ lupis exposita erant*.

They attempted to settle themselves at Paris in 1372, but were a great part of them burnt, with their books; as is related by Gaguin and Du Tillet, in the life of Charles V.

TURMERIC, or *Indian Saffron*, in *Botany*. See CURCUMA.

TURMERIC, *Curcuma*, in the *Materia Medica*, a medicinal

nal root, being the root of the *curcuma longa* of Linnæus, used likewise by the dyers, to give a yellow colour.

It is externally greyish, and internally of a deep lively yellow or saffron colour, very hard, and not unlike, either in figure or size, to ginger.

It is brought chiefly from the East Indies, but it is common in the gardens of the Chinese, who use it as a sternutatory, and grows abundantly in Malacca, Java, and Balega. In England it was first cultivated by Mr. P. Miller in 1759. It has been long officinally known. That should be chosen which is big, new, resinous, hard to break, and heavy.

Some people have mistakenly imagined, that there was a native red turmeric; their error was owing to this, that the yellow root, as it grows old, turns brown; and when pulverized, is reddish. It is much used by the glovers, &c. to dye their gloves. The Indians use it to dye their rice, and other foods, of a yellow colour: whence some call it *Indian saffron*.

Our dyers do not find that it gives so steady a yellow as the luteola, or weld; nor can any of the mordants give it a sufficient degree of durability; common salt and ammoniacal muriate fix its colour fast, at the same time rendering it deeper; but it is admirable to brighten and heighten the red colours dyed with cochineal and vermilion; as scarlets, &c.

Turmeric has a slight aromatic, and not very agreeable smell; and a bitterish, slightly acrid, and somewhat warm taste. It readily gives out its active matter, both to aqueous and spirituous menstrua; communicating to the former its own deep yellow, and to the latter a fine yellowish-red tincture. Distilled with water, it yields a small quantity of a gold-coloured essential oil, of a moderately strong smell, and pungent taste: the remaining decoction, inspissated, leaves a bitterish, considerably saline mass. The inspissated extract from rectified spirit is moderately warm and bitter, and not a little nauseous. In the Eastern countries, this root, besides its use in colouring and seasoning their food, is much recommended as a medicine; being accounted one of the most effectual remedies in obstructions of the viscera and mesentery, which are there frequent; in uterine disorders, difficulties of urine, and affections of the kidneys. Among us it has also been employed by way of decoction, infusion, and powder, as a deobstruent, in hypochondriac, leuco-phlegmatic, and cachectical constitutions; and esteemed by some as a specific in the jaundice: the dose in substance is from a scruple to a drachm; in decoction or infusion twice as much. It tinges the urine of a deep yellow colour. Lewis.

Although the use of this root has been highly commended, it is now very rarely employed.

A plaster of turmeric, well bruised, top and roots, is thought to be good against the bite of the rattle-snake. See Phil. Trans. N^o 479. p. 144.

TURMERIC-Wash, is the gum of the turmeric-root dissolved in water.

The qualities and uses of it are much the same as those of the yellow-berry wash for water-painting; but it is a brighter and cooler yellow; for which purpose it should be dissolved in spirit of wine instead of water, by putting two ounces of proof-spirit, and one ounce of water, in a phial, with two drachms of powdered turmeric-root, shaking them well together, and letting them stand, with a repetition of the shaking, for three or four days.

TURMERO, in *Geography*, a town of South America, in the government of Caraccas; 40 miles S.W. of Leon de Caraccas.

TURN, a town of Walachia, at the conflux of the Alaut and the Danube; 24 miles S. of Brancovani.

TURN is used for a circular motion; in which sense it coincides with *revolution*.

TURN, in a *Clock* or *Watch-work*, particularly denotes the revolution of a wheel or pinion.

In calculation, the number of turns which the pinion hath is obtained by common arithmetic; thus 5)60(12, where the pinion 5, playing in a wheel of 60, moves round 12 times in one turn of the wheel. Now, by knowing the number of turns which any pinion hath in one turn of the wheel it works in, you may also find how many turns a wheel or pinion has at a greater distance;

as the contrate-wheel, crown-wheel, &c. by multiplying together the quotients, and the number produced is the number of turns, as in this example:

$$\begin{array}{r} 5)55(11 \\ 5)45(9 \\ 5)40(8 \end{array}$$

The first of these three numbers has 11 turns, the next 9, and the last 8. If you multiply 11 by 9, it produceth 99; that is, in one turn of the wheel 55, there are 99 turns of the second pinion 5, or the wheel 40, which runs concentrical or on the same arbor with the second pinion 5: If you multiply 99 by the last quotient 8, it produces 792, which is the number of turns the third pinion 5 hath. See *CLOCK-Work* and *PINION*.

TURN, in *Mining*, is a pit sunk in some part of a drift. If the mine be deep, there are many of these turns one below another.

TURN-HOUSE. When a drift is driven across the country N. and S. to cut a lode, the miners make a right angle from their drift, and work on the lode itself; which, as it is in a contrary direction to their past drift, they call *turning-house*, in order to work on the course of the lode.

TURN, in the *Manege*, is a term commonly used in directing to change hands. See *CHANGE* and *ENTIER*.

TURN, in the *Sea Language*. See *LAND Turn*, *TACK*, and *TURNING*.

TURN, or *TOURN*, is also used for the sheriff's court, kept twice a year in every hundred within his county, viz. a month after Easter, and within a month after Michaelmas.

From this court none are exempted but archbishops, bishops, earls, barons, religious men and women, and all such as have hundreds of their own to be kept.

It is a court of record in all things that pertain to it; and is also the king's leet through all the county, of which the sheriff is judge; this court being incident to his office. The attendance on it is called *seita regalis*, or *suit-royal*.

It is called the *sheriff's turn*, because he takes a turn or circuit for this purpose through the shire, holding the same in several places.

TURN in the Head, in *Rural Economy*, a disease in calves and young cattle, in which external objects would appear to turn round. The affection in this case seems to arise from some diseased state of the brain, or parts about it.

In the cure, bleeding is advised, in proportion to the size and strength of the animal; after which a powder, composed of camphor, valerian, nitre, and birthwort, in the quantity of a drachm of the first to an ounce of each of the other ingredients, should be well powdered and mixed together, and then given at once in a pint of rosemary tea, repeating it as occasion may require.

By this means much advantage has been gained, it is said, in some instances of this disease.

TURNADO. See *TORNADO*.

TURNAGAIN ARM, in *Geography*, a branch of the north part of Cook's inlet, extending east from Point Possession.

TURNAMENT, or **TOURNAMENT**, a martial sport or exercise, which the ancient cavaliers used to perform, to shew their bravery and address.

The first tournaments were only courses on horseback, in which the cavaliers tilted at each other with canes in manner of lances; and were distinguished from *juſts*, which were courses or careers, accompanied with attacks and combats, with blunted lances and swords.

Others say it was a tournament when there was only one quadril or troop; and that where there were several to encounter each other, it was a *juſt*; which see. But it is certain that the two became confounded together in process of time; at least we find them so in authors.

The prince who published the tournament used to send a king at arms with a safe-conduct, and a sword, to all the princes, knights, &c. signifying that he intended a tournament and a clashing of swords, in the presence of ladies and damsels: which was the usual formula of invitation.

The first engaged man against man, then troop against troop; and after the combat, the judges allotted the prize to the best cavalier, and the best striker of swords; who was, accordingly, conducted in pomp to the lady of the tournament; where, after thanking her very reverently, he saluted her, and likewise her two attendants.

The tournament made the principal diversion of the thirteenth and fourteenth centuries. Munster says, it was Henry the Fowler, duke of Saxony, and afterwards emperor, who died in 936, that first introduced them; but it appears from the Chronicle of Tours, that the true inventor of this famous sport, at least in France, was one Geoffry, lord of Preuilly, about the year 1066.

It is difficult to fix the epocha of their institution, as many nations have laid claim to it. Nithard relates, that at the interview of Charles the Bald, king of France, who succeeded to the throne in the year 840, and his brother Lewis of Germany, at Strasburg, the gentlemen of the retinue of both princes fought on horseback, to display their courage and skill.

Du-Cange says, that these sports were so peculiar to the French, that they were called *conflictus Gallici*, or French combats. To this purpose Matthew Paris, under the year 1179, says, "Henricus rex Anglorum junior mare transiens in conflictibus Gallicis, et profusioribus expensis, triennium peregit, regiaque majestate deposita, totus est de rege translatus in militem."

The Historia Byzantina tells us, that the Greeks and Latins borrowed the use of it from the Franks; and we find mention made of them in Cantacuzenus, Gregorias, Bessaron, and others of the late Greek authors.

Instances of them occur among the English in the reign of king Stephen, about the year 1140; but they were not much in use till Richard's time, towards the year 1149. After which period these diversions were performed with extraordinary magnificence in the *Tilt-yard*, near St. James's, Smithfield, and other places. At last, however, they were found to be productive of bad effects, and the occasion of several fatal misfortunes; as in the instance of Henry II. of France, and of the *tilt* exhibited at Chalons, which, from the numbers killed on both sides, was called the little war of Chalons. These and other inconveniences, resulting from these dangerous pastimes, gave the popes occasion to forbid them, and the princes of Europe gradually concurred in discouraging and suppressing them.

Budæus derives the word tournament from *Trojana agmina*; others from *Trajamentum*, *quasi ludus Troja*. Menage deduces it from the Latin *torneris*, or the French *tourner*, because the combatants rode in rings and circles, and were obliged

to make many turnings with their horses, as the laws of the game required.

M. Paris calls them in Latin *baſtiludia*; Neubrigenſis, *meditationes militares*; others, *gladiatura*; others, *decursiones ludicra*, &c.

It is natural, however, to conclude *ex vi termini*, that although the sport itself may owe its rise to the Trojan game, yet that its name is of French extraction, and not only given with great propriety, but seems to be a tacit agreement of its superior antiquity among that people, whose historians assert that it was first known in France. Berenger's Art of Horsemanship, vol. i. p. 104, &c.

Pope Eugenius II. excommunicated those who went to tournaments, and forbad them burial in holy ground. King Henry II. of France died of a wound received at a tournament. One Chiaoux, who had assisted at a tournament under Charles VIII. said very wisely, "If it be in earnest, it is too little; if in jest, too much."

It is to the exercise of tournaments that we owe the first use of armories, of which the name blazonry, the form of the escutcheons, the colours, principal figures, the mantlings, labels, supporters, &c. are undeniable evidences.

In Germany it was anciently a custom to hold a solemn tournament every three years, to serve as a proof of nobility. For the gentleman who had assisted at two was sufficiently blazoned and published; *i. e.* he was acknowledged noble, and bore two trumpets, by way of crest, on his tournament casque. Those who had not been in any tournaments had no arms, though they were gentlemen.

TURNAU, in *Geography*, a town of Bohemia, in the circle of Boleslaw; 14 miles N.E. of Jung-Buntzel. N. lat. 53° 32'. E. long. 15° 11'.

TURNDORF, a town of Bavaria; 21 miles N.N.W. of Amberg.

TURNEBUS, **ADRIAN**, in *Biography*, a learned critic and scholar, was born at Andeli, in Normandy, in the year 1512, educated at Paris, and intimately acquainted with every branch of classical literature. After having been employed for some time in teaching the classics at Toulouse, he became, in 1547, a professor of Greek at Paris, in which station he was very popular. He also superintended the royal press for Greek books, which he declined on being appointed professor-royal of Greek in 1555. In his manners, which were mild and condescending, meek and modest, he differed, as we regret to observe, from many eminent scholars; so that Henry Stephens pronounces this eulogy upon him,

"Hic placuit cunctis, quod sibi non placuit."

His fame spread through Italy, Spain, Germany, and England; from which several countries he was honoured with many lucrative proposals, which he declined, though at home his income was scanty. He closed his life at Paris in 1565, at the age of 53 years, and his remains were privately interred in the cemetery of poor scholars, at Montaigu-college. Catholics and Protestants, claiming him respectively as one of their own body, concurred in their testimonies to his learning and character. His works consist of "Annotations upon Cicero, Varro, Thucydides, and Plato;" "Writings against Ramus;" "Translations from Aristotle, Theophrastus, Plutarch, Plato, and other Authors;" "Poems, Latin and Greek;" "Treatises on particular Subjects;" and "Adversaria; or, Miscellaneous Remarks on Writers," which latter was printed at Paris in 1 vol. fol. 1580. Of his versions, Huet says, that they possess every quality necessary for perfect translations; as he understood Greek thoroughly, and turned it into elegant Latin, without deviating from his author, and his style was clear and agreeable. His works

were

were printed collectively at Strasburg, in 3 vols. fol. 1606. Nouv. Dict. Hist. Huet de Interpret. Gen. Biog.

TURNEFF ISLAND, in *Geography*, an island in the bay of Honduras, about 20 miles long, and 10 broad, abounding in cocoa-nut trees, and much frequented by fishermen. N. lat. 17° 16'. W. long. 88° 20'.

TURNER, in *Botany*, &c. See BRASSICA and TURNIP.

TURNER, WILLIAM, in *Biography*, one of the fathers of English botany as well as of the English Protestant church, was born at Morpeth in Northumberland, probably about the year 1520. He was educated at Pembroke college, Cambridge, under the patronage of sir Thomas Wentworth, and about the year 1538 had already distinguished himself for science and learning, being justly dissatisfied with the little real information he could obtain from those about him. Natural philosophy, medicine, and botany, chiefly engaged his attention at this time, but the great questions involving the vital interests of religious truth and liberty, having been stirred up, he devoted himself also to their examination, and incurred the danger and obloquy incident, more or less, in every age and country, to the honest prosecution of such enquiries. Turner, like many others in England, at this period, united the characters of a physician and a divine. He became an itinerant preacher, of so zealous a character that the infamous bishop Gardiner threw him into prison; from whence he was, after a long time, released, we are not informed by what means, and became a voluntary exile from his native land. He resided on the continent with many other English refugees, principally at Cologne, and Basle, till the death of Henry VIII. During this interval, Turner travelled into Switzerland and Italy, where he contracted a friendship with many distinguished botanists and physicians, especially the great Conrad Gesner of Zurich, and professor Ghini of Bologna, the founder of the physic-garden, and of the botanical chair, in that university, and the preceptor of Cæsalpinus and Anguillara. At Ferrara Turner received the degree of doctor of physic, which was confirmed to him at Oxford, when he returned to England on the accession of Edward VI. He was made physician to the Protector Somerset, and his ecclesiastical merits were still more amply rewarded, by a prebend of York, a canonry of Windfor, and the deanery of Wells. He had deserved this preferment by several publications in defence of Protestantism, which very cause, however, obliged him to fly from the persecutions of the bloody Mary, during whose whole reign Dr. Turner remained abroad. The accession of Elizabeth restored him to his liberty and native soil, as well as to all his ecclesiastical benefices. The rest of his life was devoted to his clerical duties, and his botanical amusements; two pursuits which in many honest and good men have "gone very lovingly together," to their mutual advantage and honour. He had a botanic garden at Wells, and another at Kew, and appears to have divided his time between his deanery, and his residence in Crutched Friars, London. Dr. Pulteney thinks, from Turner's frequent mention of the plants of Purbeck, and Portland, that he had some intimate connections in Dorsetshire. This worthy man died July 7, 1568, apparently at no very advanced age, leaving several children. "His son Peter was educated to physic, travelled, and took degrees abroad; was incorporated doctor at Cambridge, and at Oxford, and died, aged 72, in 1614, but does not seem to have inherited his father's turn for botany."

Turner's earliest botanical work is said to have been printed at Cologne in 1544, in octavo, under the title of *Historia de naturis herbarum, scholiis et notis vallata*. But

this is mentioned by Bumaldus, or rather Ovidius Montalbanus, only, in his *Bibliotheca Botanica*, Seguier's edition, p. 18, without notice of any other publication of our author; nor does it appear to be known to English collectors, any more than the following. "Names of Herbes in Greek, Latin, English, Dutch, and French," printed at London, 1548, in 12mo., by the same writer.

The chief publication of Dr. Turner is his well-known Herbal, in small folio, black letter, with wooden cuts, of which the first part was originally printed at London in 1551, and is now, on account of its rarity, much valued by collectors. The second part appeared at Cologne in 1562, accompanied by a reimpression of the first. In 1568 these first and second parts were republished at the same place, with a new title page, a dedication to queen Elizabeth, from which many of the above particulars of the author's life are taken, and the addition of a third part of the same work. To the whole are subjoined "A booke of the natures and properties as well of the bathes in England as of other bathes in Germanye and Italye, very necessarye for all sycke perones that can not be healed without the helpe of natural bathes:" and "A most excellent and perfecte homish apothecarye or homely physick booke, for all the greses and diseases of the bodye, translated out of the Almaine speche into English, by Jhon Hollybusch." For this last sapient production Turner is, perhaps, not responsible. The Herbal is arranged alphabetically, and is more original and practical, than the more popular and celebrated publications of Lyte, Gerarde, or even Parkinson. The object of the author was to determine the plants of the ancients, and to record their reputed virtues. But this is accomplished with more caution and discretion than are common to most of his contemporaries, and with far less dogmatical confidence than Fabius Columna subsequently assumed. The third part, dedicated to the company of surgeons, professes more especially to treat of medical plants not known to the ancients. The author apologizes in these terms for its imperfections. "For surely beyng so much vexed with sicknes, and occupied with preaching and the study of divinitye and exercise of discipline, I have had but small leasure to write Herballies." This dedication is dated "at Welles 1564." The wooden cuts of all the three parts of Turner's Herbal are taken from those of Fuchsius, and at first sight appear to be the very same blocks as those used in the octavo edition of the latter author, printed at Lyons, in 1595. A careful inspection however will easily detect minute differences; and we especially observe slight damages in Turner's figures, not occurring in this later impression, which decisively prove it to have been printed from more recent cuts. Haller gives our author credit for having first figured the true *Medica*, and the *Rhus Cotinus*; see part 2d, 52 and 115. Under the former he describes various species of *Medicago*, distinguishing their different seed-vessels; and of the latter exhibits a sufficiently expressive delineation, with a correct, though brief, history.

Turner ranks moreover amongst our earliest British zoologists. He published at Cologne, in 1544, an octavo of ten pages, entitled *Avium præcipuarum, quarum apud Plinium et Aristotelem mentio est, historia*. Conrad Gesner, to whose museum he repeatedly contributed, after his settlement in England, speaks of him as eminently deserving of praise in the department of ornithology; and Merret in his *Pinax* mentions the above little book, as great in authority, though small in bulk. Gesner has prefixed to the third volume of his own ponderous *Historia Animalium*, a letter of Dr. Turner's, dated Wittenburg, Nov. 1557, in which the various

kinds of Fishes known in England, amounting to more than fifty, are briefly distinguished, with their Latin and English names. At the conclusion of the dedication of his Herbal to the queen he promises a book of the names and natures of fishes that are within her majesty's dominions, if he might have rest and quietness in his old age, and defence from his enemies, "whiche," says he, "have more then these eight yeares continuallye troubled me verye much, and holden me from my booke." He speaks here also of sickness, as an impediment to his labours. His work upon baths is marked with the same originality of thought, and practical observation, as his botanical and zoological writings. Turner wrote also on the "Wines commonly used in England," and on the "Nature and Vertue of Treacle." His numerous treatises on controversial divinity, published and unpublished, were chiefly in defence of the Reformation; but his most valuable undertaking of this kind we presume to have been his collation of the translation of the Bible, with Hebrew, Greek, and Latin copies, in consequence of which he found occasion to correct it in many places. How far his corrections were turned to advantage by the translators in James I.'s time, we are not informed.

Dr. Pulteney observes, that "he procured to be printed at Antwerp, a new and corrected edition of the *Historia Gentis nostræ, s. Angliæ*, written by William of Newburgh, from a manuscript he found in the library of Wells;" but he complains of the printer, for omitting his preface as well as other communications. Turner translated several works from the Latin, particularly "The Comparison of the old Learning and the new;" written by Urbanus Regius; printed at Southwark in 1537, in 8vo.; and again in 1538 and 1548. We regret having never met with this book, as the subject promises much; and in the hands of Turner, or any man like him, who dared to think for himself, and whose judgment was regulated by prudence and learning, it could not but be valuable and instructive.—Turner's Herbal. Haller's Bibl. Bot. Pulteney's Sketches of the Progress of Botany. Dryand. Bibl. Banks. S.

TURNER, WILLIAM, a fellow student with Purcell and Dr. Tudway, among the second set of chapel-children under Dr. Blow, was sworn in gentleman of the royal chapel in 1669, as a counter-tenor singer, his voice settling to that pitch; a circumstance which so seldom happens, naturally, that if it be cultivated, the possessor is sure of employment; and, in consequence of its utility, soon after his reception into the chapel royal, he was appointed vicar-choral in the cathedral of St. Paul's, and a lay-vicar of the collegiate church of St. Peter, Westminster. In 1696, he was admitted to the degree of doctor in music at Cambridge.

Dr. Turner arrived at the great age of eighty-eight, and dying in 1740; was buried in the cloister of Westminster Abbey, in the same grave with his wife; who, being nearly of the same age, died but four days before him, after living together with great harmony of disposition, and felicity, near seventy years.

In many of our cathedral books there is an anthem, "I will always give thanks," which is called the *club-anthem*, on account of its having been composed by three masters in conjunction; but not, as has been said, by Dr. Boyce and others, "as a memorial of the strict friendship that subsisted between them:" for, according to Dr. Tudway, who remembered the transaction, and records it with the anthem in the Mus. Collect. vol. iii. "the anthem was composed by order of Charles II. at a very short notice, on account of a victory at sea over the Dutch, the news of which arrived on Saturday, and the king wishing to have the anthem performed the next day, and none of the masters

choosing to undertake it, three of the children of the chapel, Humphrey, Blow, and Turner, performed the task."

There are two whole services, and several anthems, of Dr. Turner's composition in Tudway's collection, with an ode for the solemnity of St. Cecilia's day, 1697, accompanied with violins and trumpets. To this there is a long symphony or overture, consisting of two movements, the second of which is in triple time, upon a ground, seemingly in imitation of Purcell, as the first movement is of Lulli. After this production, is inserted his anthem, "The King shall rejoice," which is more in the style of a secular ode, than a composition for the church. The divisions, light and common in the last century, are now become extremely old-fashioned.

TURNER, in *Geography*, a township of the province of Maine; 172 miles N. of Boston.

TURNER'S *Cerate*. See CERATUM *Epuloiticum*.

TURNERA, in *Botany*, was dedicated by Plumier to the memory of Dr. WILLIAM TURNER, (see that article,) whom he characterizes, in spite of his heresy, as "a man of solid learning and judgment."—Plum. Gen. 15. t. 12. Linn. Gen. 149. Schreb. 201. Willd. Sp. Pl. v. 1. 1503. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 2. 172. Juss. 313. Lamarck Illustr. t. 212. Gærtn. t. 76. (Piriqueta; Aubl. Guian. 298. Juss. 295.)—Clafs and order, *Pentandria Trigynia*. Nat. Ord. *Columniferae*, Linn. *Portulacæ*? Juss. Rather *Tiliacæ*.

Gen. Ch. *Cal.* Perianth inferior, double; the outermost of two combined, oblong, permanent leaves; inner of one leaf, funnel-shaped, deciduous; tube oblong, erect, cylindrical, slightly angular; limb erect, in five deep lanceolate segments, the length of the tube. *Cor.* Petals five, inversely heart-shaped, pointed, flat, moderately spreading; claws narrow, inserted into the tube of the calyx. *Stam.* Filaments five, awl-shaped, shorter than the corolla, inserted into the tube of the calyx; anthers pointed, erect. *Pist.* Germen superior, conical; styles three, thread-shaped, the length of the stamens; stigmas in many capillary divisions. *Peric.* Capsule ovate, of one cell and three valves. Receptacles linear, attached lengthwise to the valves. *Seeds* numerous, oblong, obtuse, dotted, each furnished with an oblong, membranous, lateral tunic.

Eff. Ch. Outer calyx of two permanent leaves; inner funnel-shaped, five-cleft, deciduous. Petals five, inserted into the calyx. Stigmas many-cleft. Capsule superior, of one cell, and three valves. Seeds numerous, each with a lateral tunic.

Of this well-marked genus, which we presume to belong to Jussieu's *Tiliacæ* rather than to any other of his orders, Linnæus has described but four species, to which Willdenow has added five from Aublet and Jacquin. We are enabled to furnish three new species from the Linnæan herbarium. Aublet's *Piriqueta* differs from the rest merely in having five styles, a point of no generic importance in the present case. All the species are found within the tropics, in South America, or the West Indies; none in the East Indies, nor in Europe. Their *stems* are either shrubby or herbaceous. *Leaves* alternate, stalked, simple, and mostly undivided, though crenate or serrated. *Pubescence* rather silky. *Flowers* yellow, stalked, axillary, or occasionally racemose; their stalks in some instances combined with those of the leaves. *Outer calyx* wanting in some of the species.

1. *T. ulmifolia*. Elm-leaved Turnera. Linn. Sp. Pl. 387. Willd. n. 1. Ait. n. 1. Lamarck t. 212. (T. frutescens ulmifolia; Plum. Gen. 15. Mart. Cent. t. 49. f. 1. T. c petiolo florens, foliis ferratis; Linn. Hort. Cliff. 112. t. 10. T. n. 2; Mill. Ic. 179. t. 268. f. 2.)

TURNERA.

β. T. ulmifolia; Mill. *Illustr. t. 14.* (*T. angustifolia*; Curt. Mag. t. 281. *T. frutescens, folio longiore et mucronato*; Mart. Cent. t. 49. f. 2. *T. n. 1.*; Mill. Ic. 179. t. 268. f. 1. *Ciftus urticæ folio, flore luteo, vasculis trigonis*; Sloane Jam. v. 1. 202. t. 127. f. 4, 5.)

Flowers sessile on the footstalks. Leaves ovato-lanceolate, acute, coarsely serrated, with two glands at the base. Outer calyx ovato-lanceolate, notched.—Native of the red hills, and other places, in Jamaica; cultivated by Miller, and frequently seen in our stoves, especially the narrow-leaved variety, *β*, flowering from June to November. The stem is shrubby, but soft, or partly herbaceous, lasting a few years only, several feet high, with roundish, wavy, downy branches, leafy at the ends. Leaves ovate, or lanceolate, varying in length from two to three inches, and in breadth from half an inch to above an inch, unequally and bluntly serrated, strongly ribbed and veined, soft and downy on both sides, fetid when bruised. Footstalks half an inch or an inch long, bearing two peltate glands near the top. Flowers large, bright yellow, short-lived, solitary, on the footstalks of several of the upper leaves, close to the leaf itself. Outer calyx of two ovato-lanceolate, strongly notched or serrated, permanent leaves, resembling the proper foliage; inner tubular, silky, yellowish, in five lanceolate, entire, deciduous segments, shorter than the corolla. We can scarcely think there is any specific difference between the broad and the narrow-leaved varieties. Willdenow's *β* and *γ* are precisely the same plant. He, like Linnæus, erroneously refers Sloane's synonym to the broad-leaved variety, though Martyn had previously, like Miller, considered it as belonging to our *β*. His figure, in fact, represents that intermediate form of leaf which most usually occurs.

2. *T. subulata*. Awl-shaped Turnera.—Flowers sessile on the footstalks. Leaves ovate, acute, coarsely serrated, with two glands at the base. Outer calyx awl-shaped, entire.—Gathered in New Granada by Mutis, whose specimen was very incautiously referred by Linnæus to *T. ulmifolia*. The leaves are ovate, not much above an inch in length, very downy and hoary, like the stalks and branches. Flowers likewise smaller than those of *ulmifolia*; their petals, in the dried specimen at least, nearly white, with a purple radiating spot on the disk. Calyx clothed with dense silky bristles; the leaves of the outer one very narrow, awl-shaped, channelled, and quite entire, affording a decisive specific character. Capsule the size of a pea, clothed with long silky bristles. The peltate glands, on the edge of the leaf itself, are very large and conspicuous in this species.

3. *T. obtusifolia*. Blunt-leaved Turnera.—Flowers sessile on the footstalks. Leaves obovate, obtuse, coarsely crenate, with two glands at the base. Outer calyx linear-lanceolate, flat, entire.—Native of Brasil. Communicated to the younger Linnæus by Thouin, probably from Commerçon's collection. This is very clearly distinguishable from the two former by its broad obtuse leaves, scarcely an inch and a half long, and one inch in breadth; wedge-shaped at the base; broadly and bluntly crenate. The leaves of the outer calyx are broader, flatter, and rather shorter, than in the last, measuring about half an inch. Capsule twice as large as in that species, coriaceous, densely covered with rigid bristles. Seeds club-shaped, beautifully reticulated, with intermediate depressions; their tunic nearly of their own length.

4. *T. Pumilea*. Nettle-leaved Dwarf Turnera. Linn. Sp. Pl. 387. Am. Acad. v. 5. 395. Willd. n. 2. Ait. n. 2. Swartz Obf. 116. (*Pumilea n. 1*; Browne Jam. 188. *Chamæcistus urticæ folio, flore luteo*; Sloane Jam. v. 1. 202. t. 127. f. 6.)—Flowers sessile on the footstalks.

Leaves lanceolate, deeply serrated, without glands. Outer calyx linear, minute, hairy.—Native of dry sandy fields in Jamaica, flowering late in the year. Swartz. Root annual, fibrous. Stem herbaceous, from one to three inches, or more, in height, simple or branched, erect or decumbent, round, hairy, leafy. Leaves about an inch long, so deeply serrated as to be almost pinnatifid, clothed with long scattered hairs, but destitute of glands at the base. Flowers small, yellow, seldom expanded, solitary, sessile at the base of each upper leaf, on its hairy footstalk. Outer calyx of two small, linear, upright leaves; inner in five linear hairy segments, pressed close to the corolla. Petals convolute, with long orange-coloured claws. Seeds roundish, compressed, corrugated. Swartz. The Linnæan specimen, from Browne, has no flowers, nor is it easy to say whence Linnæus took his account of the inflorescence, which, nevertheless, is confirmed by Swartz.

5. *T. fidoides*. Sida-leaved Turnera. Linn. Mant. 58. Willd. n. 4.—Flower-stalks axillary. Outer calyx linear. Leaves nearly sessile, obovate-wedge-shaped, sharply serrated, downy and hoary on both sides, without glands.—Gathered in Brasil by Father Panegai, whose specimen was sent by Arduino to Linnæus. The stem is shrubby at the base, four or five inches high, erect, simple, round, leafy, clothed with hoary down, and long, soft, tawny hairs. Leaves rather more than an inch long, covered on both sides with dense, entangled, somewhat fleshy, soft, hoary pubescence; strongly and acutely serrated upwards; entire at the base, and tapering down into a very short hairy footstalk. Flowers axillary, nearly sessile, tawny, their stalks and calyx downy, and clothed with long, yellow, shining hairs. The specific character of Linnæus, *pedunculis bifidis*, seems to allude to the two linear or awl-shaped leaves of the outer calyx.

6. *T. setosa*. Bristly Turnera.—Flower-stalks axillary, partly combined with the footstalk. Outer calyx linear. Leaves obovate-wedge-shaped, deeply serrated or pinnatifid, very hairy on both sides, without glands.—Gathered by Commerçon at Monte Video and Buenos Ayres. The size of the last. Stem shrubby at the base, throwing up a few simple, wavy, nearly upright, hairy, leafy branches, from three to five inches high. Leaves more stalked, and much more deeply cut, than in *T. fidoides*, being sometimes sharply pinnatifid; they are scarcely at all hoary or downy, but covered with long, silky, yellow hairs, such as are extremely copious on the branches, stalks, calyx, and capsule. The flowers are said to be of a tawny red. Their outer calyx is very long and linear. Their stalks, as far as we can judge, are connected, for about half their length, with the adjoining footstalks. This species is certainly near akin to the last, and the segments of its leaves are evidently variable. We cannot, without spoiling our only specimen of *T. fidoides*, determine whether its flower-stalk be really separate from the footstalk or not. What Linnæus in the *Mantissa* terms *bractææ*, are what we have all along called, after his own example in the *Systema Vegetabilium*, an outer calyx; nor is this part perhaps, as professor Swartz says, entirely wanting in the next species, though we must allow it to be there still more like *bractææ*.

7. *T. cistoides*. Betony-leaved Turnera. Linn. Sp. Pl. 387. Willd. n. 7. Ait. n. 3. Swartz Obf. 117. (*Pumilea n. 2*; Browne Jam. 189. *Helianthemum betonicæ folio, caule hirsuto*; Plum. Ic. 141. t. 150. f. 1. *Chamæcistus caule hirsuto, folio oblongo angulato sinuato, flore luteo, pediculo insidente*; Sloane Jam. v. 1. 202. t. 127. f. 7.)—Flower-stalks axillary, many times longer than the footstalks. Outer calyx obsolete. Leaves linear-oblong, obtuse, with shallow serratures.—Native of dry barren ground

ground in Jamaica. Sent by M. Richard, in 1774, to Kew garden, where it flowered in the stove, from June to October. The *root* is annual, long and simple. *Stems* one or more, subdivided, erect, from six to twelve inches high, round, leafy, hairy. *Leaves* on short stalks, spreading, bluntly toothed or ferrated, about an inch and a half long, clothed on both sides with minute starry hairs; paler beneath. *Flowers* small, yellow, on long slender hairy stalks swelling upwards, bent or jointed about the middle, where are sometimes to be seen two minute *bracteas*, hardly to be deemed an *outer calyx*. The proper *calyx* is hairy, in five lanceolate acute segments. *Capsule* somewhat hairy, pale. *Seeds* buff-coloured, curved, elegantly impressed with numerous rows of minute dots.

8. *T. racemosa*. Cluster-flowered Turnera. Jacq. Hort. Vind. v. 3. 49. t. 94. Willd. n. 8. Ait. n. 4.—Flower-stalks in a terminal cluster; the lower ones axillary, many times longer than the footstalks. *Outer calyx* wanting. *Leaves* ovate, bluntly ferrated, downy.—The native country of this species is not known, but we have little doubt of its West Indian origin. Jacquin received its seeds with the name of *T. cistoides*, under which a specimen lies in the Linnæan herbarium. M. Thouin sent seeds to Kew in 1789, and we have what seems a garden specimen from him. The *root* is annual. *Herb* much larger than the *cistoides*, with a very hairy, slightly branched, stem. *Leaves* broadish-ovate, two inches long, unequally ferrated, clothed with extremely soft, starry, depressed hairs. *Footstalks* bristly, almost an inch in length. *Flowers* small, dull or tawny yellow, on very long and slender hairy stalks. *Calyx* hairy. *Capsule* slightly hairy, each of its valves splitting into two. *Seeds* pale, rough with minute points between the depressed dots.—The *calyx* in this and the last species does not answer well to the idea of the genus, the tube, though present and permanent, being very short, nor are there any traces of the two outer leaves. Perhaps the latter had best be omitted in the generic character, which is sufficiently marked without them.

9. *T. guianensis*. Slender Guiana Turnera. Aubl. Guian. 291. t. 114. Willd. n. 9.—Flower-stalks in a terminal cluster, smooth. *Outer calyx* linear, entire, naked. *Leaves* linear, smooth, slightly ferrated, with two glands at the base.—Gathered by Aublet in the marshy meadows of Timoutou in Guiana, flowering in April. *Root* fibrous, probably annual. *Herb* slender, smooth, with a rusty, angular, slightly branched stem, two feet high. *Leaves* nearly sessile, two inches long, much less distinctly ferrated in Aublet's specimens than in his figure. *Flowers* small, yellow, on short smooth partial stalks, collected, very few together, into a cluster. *Outer calyx* permanent, glandular at the bottom, rather longer than the *inner*, whose segments arc, as in all the species we have hitherto described, deciduous, the permanent base being short, like that of *T. racemosa*. *Capsule* very smooth, of three undivided valves.

10. *T. rupestris*. Rock Turnera. Aubl. Guian. 289. t. 113. f. 1. Willd. n. 3.—Flower-stalks axillary, very short. *Outer calyx* linear-lanceolate, toothed, somewhat bristly. *Leaves* nearly linear, toothed, very smooth, almost sessile.—Found by Aublet, in the moist mossy clefts of rocks about the great water-falls of Sinémari in Guiana, flowering in November. A rigid, slender, branched shrub, about a yard high, whose stems are more or less covered with *Jungermannia*. *Leaves* crowded about the ends of the branches, nearly sessile, an inch and a half long, very narrow, tapering at each end, slightly revolute, furnished with distant teeth, and by no means ferrated, as in Aublet's plate, from which Willdenow took his specific definition. *Flowers*

small, yellow, nearly sessile, solitary in the bosoms of two or three of the uppermost leaves. *Outer calyx* toothed, or rather ferrated, longer than the *inner*, whose segments are lanceolate and entire; both are slightly clothed with close, silky, white hairs. *Petals* oblong, jagged at the end.

11. *T. frutescens*. Shrubby River Turnera. Aubl. Guian. 290. t. 113. f. 2. Willd. n. 5.—Flower-stalks axillary, very short. *Outer calyx* linear-lanceolate, toothed, somewhat bristly. *Leaves* lanceolate, ferrated, very smooth, almost sessile.—Observed by Aublet, on the rocky banks of the Sinémari river, above the great fall, flowering in December. The natives call this shrub, as well as the former, *Nopotogomoti*. The present appears to us a variety of the last, differing only in its more luxuriant growth, being seven or eight feet high, with larger more dilated leaves, whose length is two or three inches, their breadth above half an inch, their veins far more numerous, and their margins rather ferrated than toothed. These differences may arise from a more favourable situation, or more fertile soil. In the *flowers* or *inflorescence* there seems no difference whatever.

12. *T. rugosa*. Wrinkled Turnera. Willd. n. 6. (*Piriqueta villosa*; Aubl. Guian. 298. t. 117. *Burcardia*; Schreb. Gen. 206, adopted from Scopoli; expunged at p. 827, and referred to Turnera.)—Flower-stalks axillary, many times longer than the footstalks. *Outer calyx* wanting. *Leaves* ovate, unequally crenate, wrinkled, downy. *Styles* five.—Native of the sandy sea-shores of Cayenne and Guiana, flowering and bearing seed almost all the year round. The *root* is annual. *Stem* erect, about two feet high, branched, leafy, villous. *Leaves* on very short stalks, bluntish, two or three inches long, rather elliptical, veiny, rugged, clothed with reddish hairs. *Flowers* small, yellow, on long, slender, hairy stalks. *Capsule* very like that of *T. racemosa*, n. 8, which this species so nearly resembles in many respects, that, were it not for the five styles, and the more crenate and rugged leaves, we should be disposed to unite them. We place this at the end, for future examination, not having seen a specimen to determine the question.

TURNERA, in Gardening, comprises a plant of the woody, flowering, exotic kind, for the stove, the species of which cultivated is the elm-leaved Turnera (*T. ulmifolia*); which has a shrubby stem, rising eight or ten feet in height, and a bright yellow flower. It is found in the West Indies.

There is a variety with narrow leaves, which also rises with a shrubby stalk to the height of eight or ten feet, with branches less slender and stiff than in the broad-leaved sort: the leaves narrow-lanceolate, hairy, near three inches long, and about three quarters of an inch broad, terminating in acute points, obtusely ferrate on their edges, and standing upon very short footstalks; when rubbed they emit a disagreeable odour: the flowers are of a pale yellow: the petals large and oval, with the tails or claws twisted, and joining: they are not so large or half so bright a yellow as in the true elm-leaved sort. This is a native of Jamaica.

Culture.—Both these plants are easily raised from seed, which should be sown in the spring, in pots, and plunged in the bark-bed, or any other hot-bed, under glasses; and when the plants are come up two or three inches in height, they should be planted separately in small pots, plunging them in the bark-bed of the stove, to forward them a little in growth: they may afterwards be placed in any part of the stove, and be managed as other stove exotic plants. They are also capable of being increased by cuttings, planted in pots, and forwarded in the above manner.

They afford a good variety among stove-plants, but they are seldom of long duration, as they mostly go off in the

course of two or three years, being therefore rather of a biennial nature.

TURNESOLE, or **TURNSOLE**, in *Botany*. See **HELIOtropium**, and **CROTON Tinctorium**.

Some have translated turnefole by the English word *sun-flower*, which has led many to suppose that the great yellow sun-flower, which we keep in gardens, was the plant that afforded the turnefole colour: but this is a mistake; and it is to be observed, that the true turnefole plant, or *heliotropium tricoecum*, is very common in the fields of France, especially about Montpellier, and in Germany, but does not grow wild with us in England.

The juice of the berries of the turnefole, rubbed upon paper or cloth, at the first appears of a fresh lovely green, but presently changes into a kind of blueish purple. It is said that the common blue paper receives its colour from this juice. The same cloth, afterwards wet in water, and wrung out, will turn the water into a claret colour; and it is to be observed, that the rags of cloth tinged by this juice, and turned red by acids, are usually called turnefole in the druggists' shops, and employed for colouring wines and other liquors. M. Nissole, of the French Academy of Sciences, says, that the colouring juice is obtained, not from the berries, but from the tops of the plant, gathered in August, ground in mills, and then committed to the press. The juice is exposed to the sun about an hour; the rags dipt in it, dried in the sun moistened by the vapour which arises during the slaking of quicklime with urine, then dried again in the sun, and dipt again in the juice. The Dutch and others are said to prepare these rags and turnefole in the mass from other ingredients, of which archil is a principal one. Boyle's Works abr. vol. ii. p. 19. Neumann's Chem. by Lewis, p. 433.

The Dutch process for making the blue called turnefole is as follows: Lichen, archil, or in case this last cannot be obtained, the greater moss of the oak, is dried, cleaned, and pulverized in a mill, resembling the oil-mill, and then sifted through a brass wire sieve, the interstices of which do not exceed one millimetre in width ($\frac{1}{75}$ th of an inch). The sifted powder is then thrown into a trough, and mixed with an alkali called vedas, which is nothing else but the cendres gravelées in powder. The proportion is one part by weight of the alkali, to two parts of the pulverized vegetable. This mixture is moistened with a small quantity of human urine; the urine of other animals does not contain a sufficient quantity of ammoniac. The mixture ferments, and is kept moist by successive additions of urine. As soon as the materials have become red, they are transferred into another trough, where they are again moistened with urine, and stirred to renew the fermentation. Some days afterwards, the paste acquires a blue colour, in which state it is carefully mixed with one-third of excellent potash well powdered; and with this new mixture certain trays are filled, which are one metre ($39\frac{1}{2}$ inches) deep, and eight decimetres ($31\frac{1}{2}$ inches) wide. When the fermentation which takes place for the third time has given the paste a considerably deep blue colour, chalk or powdered marble is added, and the whole is well and perfectly mixed. This last addition is made, not to improve the quality of the blue, but to add weight. It is merely an affair of profit. The blue thus prepared is put into iron moulds 32 centimetres long and 22 square at the end ($1\frac{1}{4}$ inch by $\frac{7}{10}$ ths of an inch). The moulded pieces are then placed upon deal planks, in well-aired lofts, to dry; after which they are packed in casks for sale.

The Hollanders made a secret of this process: and in order to mislead, they have published, that the blue was

made with rags coloured by the plant turnefole; whence it has obtained its appellation. The English writers have used this denomination: but the dry-falters, or dealers in drugs, distinguish these pastils by the name of litmus. We may derive much profit by carrying this discovery into practice.

The principal use of this plant is in dyeing: in order to which, the juice is inspissated and prepared with calx and urine, into blue cakes; which are used also with starch, instead of smalt.

The lixivium of this plant in lime-water and urine, or in the volatile spirit of wine, turns marble blue. See *Colouring of MARBLE*.

TURNESS, in *Geography*, a cape on the east coast of the island of Hoy. N. lat. $58^{\circ} 41'$. W. long. $3^{\circ} 10'$.

TURNETUM, in our old *Law Books*, a duty paid to the sheriff for holding his turn, or county-court.

TURNHOUT, in *Geography*, a town of France, in the department of the Two Nethes, built in the year 1212, by Henry IV. duke of Brabant. In the year 1545, the emperor Charles V. gave it to his sister Mary, queen of Hungary, to enjoy during her life. In the year 1648, after the peace of Munster, Philip IV. gave it to princess Amelia, widow of Frederick Henry of Nassau, from whom it came to the house of Orange. The quarter of Turnhout comprehends fifteen villages; 25 miles S.S.W. of Bois-le-Duc.

TURNING, in the *Mechanical Arts*, is the operation of shaping wood, metal, or other hard substances, into a round or oval figure, by the aid of a machine called a *lathe*; which see.

In turning, the work or substance to be operated upon is placed in the lathe, and made to revolve with a circular motion about a fixed right line as an axis of motion; and the exterior surface is worked to its intended figure by means of some kind of edged tool, which is presented to it and held fast down upon a fixed rest. The protuberant parts of the work, by its rotatory motion, are carried against the cutting edge, and cut off, so as to reduce every part of the outside surface, to an equal distance from the axis of motion, and of course it will be of a circular figure.

The articles which admit of being turned to give them their figure, are all such as combine the three following properties: 1. That they may be supposed to have an imaginary right line or axis passing centrally through the whole length of the piece: 2. That all the sections which can be made by planes perpendicular to such axis shall be circular: and 3. That the centre of all such circles shall coincide with the axis or centre line.

It should be observed, that a piece of work may have two or more centre lines in different parts or in different directions; but it must in that case be formed or turned at two or more successive operations, because what can be done at once fixing in the lathe, must come within the above definition.

The work may be turned hollow, so as to make a cavity within; or work may be turned on the outside, to give form to the external surface; and frequently work is turned both without and within; but in either case, the above definitions will apply.

Diodorus Siculus says, the inventor of the art of turning was a nephew of Dædalus, named Talus; and that the reputation which he acquired by this invention excited the jealousy of Dædalus, and induced him to put Talus secretly to death. Pliny ascribes it to Theodore of Samos, and mentions one Thericles, who rendered himself very famous by his dexterity in managing the lathe. With this instrument,

ment, it is said, the ancients turned all sorts and kinds of vases, many of which they enriched with figures and ornaments in basso relievo. Thus Virgil says:

“Lenta quibus torno facili superaddita vitis.”

The Greek and Latin authors make frequent mention of the lathe, and Cicero calls the workmen who used it, *vascularii*. It was a proverb among the ancients, to say a thing was formed in the lathe, to express its delicacy and justness.

The art of turning is of considerable importance, as it contributes essentially to the perfection of many other arts. The architect uses it for many ornaments, both within and without highly finished houses. The mathematician, the astronomer, and the natural philosopher, have recourse to it, not only to embellish their instruments, but also to give them the necessary dimensions and precision: in short, it is an art absolutely necessary to the mechanist, the goldsmith, the watchmaker, the joiner, the smith, and others.

As the operation of turning is to be performed by the aid of the lathe, the structure of that machine is the first thing to be considered. In our article *LATHE*, we have given a description of the most perfect kind of lathe, made in iron, with a triangular bar; and in the article *ROSE-ENGINE*, we have described a curious lathe for ornamental turning; but it is to be observed, that a much more simple machine will answer all the common purposes of turning.

The essential properties of a lathe for *outside* work are, first, that it shall have two points which will firmly sustain the work at each end, by penetrating into the ends of the work, and, at the same time, allow it to turn freely round upon the points: there must be a rest or support to hold the tool upon, and also some means of turning the work round upon the points. A lathe to turn hollow or *inside* work will not admit of a point of support at each end of the piece, and therefore the work is firmly fixed to the extremity of a spindle, which is called a *mandrel*; when the mandrel is turned round, the work revolves with it, and the tool can be applied at the end of the work, to excavate or turn it hollow within, or to turn it on the outside, as required.

Lathes are made in a great variety of forms, and put in motion by different means: they are called *centre lathes*, where the work is supported at both ends; and *mandrel, spindle, or chuck lathes*, when the work is fixed at the projecting extremity of a spindle.

From the different methods of putting them in motion, they are called *pole lathes*, and *band-wheel lathes*, or *foot-wheel lathes*. For very powerful works, lathes are turned by horses, steam-engines, or water-wheels.

The lathes used by wood-turners are generally made of wood, in a simple form, and are called *bed lathes*: the same kind will serve for the common turning of iron or steel, but the best work in metal is always done in iron lathes, which are sometimes made with a triangular bar, and are called *bar lathes*, (such an one is described in the article *LATHE*); small ones, for the use of watch-makers, are called *turn-benches*, and *turns*; but there is, in fact, no proper distinction between these and the centre lathes, except in regard to size, and that they are made of iron and brass instead of wood.

The *centre lathe* is the most simple of all others. Two beams of wood are fixed horizontally upon legs, like a bench, and form what is called the *bed*. The two beams are fixed together, parallel to each other, and at a small distance asunder, so as to leave a space or narrow groove between them, nearly the whole length of the bed. This groove is to receive the tenons at the lower ends of the *puppets*, which are short posts rising perpendicularly from the bed, and firmly fixed thereto

by means of cross wedges, put through the tenons beneath the bed; for the tenons are of sufficient length to descend quite through the groove in the bed, and project beneath sufficiently to receive the cross wedges, which being driven in, draw the bases of the puppets or posts so firmly down upon the surface of the bed, that they will stand firmly erect upon it; or by withdrawing the wedges, the puppets become loose, and can be fixed in another part of the bed, in order that the distance between the two puppets may be made to correspond with the length of the piece of work to be turned. One of the puppets has a pin or *pike* of iron fixed into it, and the other one has at the same level the centre *screw*, working through a nut fastened in the puppet: both the screw and pike have sharp points made of steel, hardened and tempered, that they may not wear away. They must be exactly opposite, and in a line with each other. The piece of work, suppose for instance it is a roller of wood, is supported by its ends between the points of the pike and the screw, that it may turn round freely. The *rest* for the support of the tool is a rail or bar, extending from one puppet to the other; it lies in hooks, projecting from the faces of the puppets.

The work is put in motion by means of the *treadle*, which is worked by the turner's foot; a *string* or catgut is fastened to the treadle, and passing two or three turns round the work, it is fastened to the end of an elastic *pole*, fixed to the ceiling over the turner's head.

The workman stands before his lathe, having one of his feet on the treadle to give it motion; he places a sharp *gouge* or *chissel* on the rest, and approaches the edge of it gently to the piece of work; then pressing the treadle down by his foot, the string turns the work round, and the chissel or gouge being held firm upon the rest, and so as to touch the wood, it will cut it to a circular form. When he has brought the treadle to the ground, he releases the weight of his foot, and the elasticity of the pole draws up the treadle, turning the work back again; during which retrograde motion, he withdraws the chissel from the work, as it would not cut in this direction, though it might impede the motion of the wood, and would injure the edge of the tool. He must perform his work gradually, without leaving ridges; and when he meets with a knot in the wood, he must go on still more gently, otherwise he would be in danger both of splitting his work and breaking the edge of his tool. For turning light work, a bow, such as is used for shooting arrows, is suspended by its middle over the lathe; the string is then tied to the middle of the bow-string, in lieu of the pole, and acts in the same manner.

The common centre lathe is a very imperfect machine, when worked in this manner; yet its simplicity is a great recommendation, especially among country workmen, who use it to make various sorts of common articles of household furniture in soft wood, as stool and table legs, stair-case rails, &c.

In centre lathes, the work is sometimes put in motion by means of a large wheel, turned by one or more labourers; the wheel should be heavy, that its momentum may be sufficient to overcome any moderate obstacle in the work; and the frame in which it is mounted must be of sufficient weight to stand steady, and not be liable to move, by the exertions of the man turning it. An endless line is used, to communicate the motion of the wheel to the work; it passes round a groove in the circumference of the wheel, and after crossing, like a figure of 8, goes round a small pulley, fixed upon the work. By this means, when the great wheel is turned, it gives a rapid rotatory motion to the matter to be turned, and with a much greater power than can be obtained from the treadle, with the additional advantage of the work turning always

TURNING.

the same way round, so that the turner has no need to take his tool off the work.

The centre lathe will turn any kind of work which will admit of being supported at both ends; and it is used by mill-wrights and iron-founders, for turning mill-shafts, axles, rollers, and other iron-work. For such purposes, the lathe must be made exceedingly strong, and with nuts and screws to fasten the puppets down upon the bed, instead of wedges; the rest must be made in iron, with the requisite adjustments for placing it close to the work, at that part where it is required to be turned. To put the work in motion, the centre pin or point in one of the puppets is made to project considerably, and has a pulley fitted upon it, so that it can turn freely round upon the pin by means of an endless band or strap, which communicates the motion from a great wheel. In these large lathes for iron-work, the wheel is commonly turned by horses, or by a water-mill or steam-engine. From the pulley a pin projects in a direction parallel to the centre pin, and a piece of iron, called a *driver*, is screwed or clamped fast upon the end of the piece of work, so as to project from it sufficiently to be intercepted by the pin which is fastened into the pulley: by this means, the motion of the pulley is communicated to the work. The tools employed for turning iron and other metals are different from those used for wood, as we shall afterwards describe.

The *spindle* or *mandrel lathe* will turn hollow or internal work, and is equally well adapted to turn centre work as the centre lathe. In *Plate Turning, fig. 1.* we have given a representation of one of these, which is on a very good construction, made by Messrs. Holtzapfel and Deyerlien: it is put in motion by the foot, so that the turner has both his hands at liberty to direct the tools. *A A* are upright legs, to support the bed *B*, which consists of two pieces or bars of cast-iron, put together, and leaving a small crack between them: *C D* is a cast-iron frame, which is fastened down upon the bed *B*, and supports the spindle or mandrel *a b*: *E* is the back puppet, which is used to support one end of a piece of work, as is shewn in the figure at *G*, when the other end is fixed to the end of the mandrel, and turned round by it: the back puppet, *E*, has a cylindrical pin accurately fitted into it at the upper part, and the end of the pin is formed to a sharp conical point, proper to penetrate and support the end of the work: this point is called the *back centre*. A screw *e* is tapped into the puppet, so as to press on the opposite end of the pin, and force it towards the work; and there is likewise a clamp screw, *E*, at the top, to bind or fasten the pin into its socket. The back puppet is fastened down upon the bed, by means of a tenon entering into the groove, through the bed *B*, and a screw descends from the tenon quite through the bed, and projects beneath it: upon this screw a nut *g* is tapped, and by turning it, the shoulder of the puppet *E* is drawn down firmly upon the bed; but when the nut is loosened, the puppet can be slid along the bed to place it at any required distance from the end of the spindle, according to the length of the piece of work *G*. It is necessary that the point of the back centre should in all cases be precisely in the centre line of the axis of motion of the spindle *a b*; and for this purpose, the bed must be made very straight, and flat on the upper surface; the groove through it should also be perfectly straight and parallel, and the tenon at the lower end of the back puppet must be exactly fitted to the groove: the frame of the mandrel must be so fixed on the bed, that the centre line of the mandrel will be exactly parallel to the bed, and to the groove in the bed.

Mandrels are mounted in different ways, but they are always made of steel at the parts where they are supported

in the collars, which collars should be also made of steel, and hardened, so as to have little friction. The neck of a mandrel must be very accurately fitted into the collar, so as to have no shake or looseness, at the same time that it can turn round quite freely.

The neck at one end projects beyond the collar, and the projecting part is formed to a screw, for the purpose of fixing the work to it. A variety of pieces, called *chucks*, are fitted upon this screw, and each chuck is adapted to hold a different piece of work: the chucks screw up against a shoulder on the end of the mandrel, and by the motion of turning round in the direction in which the lathe works, the chuck screws itself fast on against the shoulder; but if the lathe is stopped, and the chuck is turned in the opposite direction, it will unscrew and come off, and a different chuck may be put on. In some lathes, the neck of the mandrel is perforated, and cut within side, with a female screw adapted to receive a male screw on the chuck: the effect is just the same as the above described. The opposite end of the mandrel to that on which the chucks are screwed, must be supported either by a point or in a collar. In general, the mandrel is made with a point at one end; and the other end, which has the screw to fix the work to it, is formed with a neck, proper to run in the collar, and with a shoulder on the neck, to stop the neck from going through the collar. The mandrel represented in the drawing has a neck and collar at each end, for a purpose which will be explained. When the mandrel is made with a pointed end, the point must be received in the end of a screw tapped through the part *D* of the frame of the mandrel, just in the place of the end *a* of the mandrel. By turning this screw, the mandrel can be adjusted to run very correctly in length; and to prevent the screw from turning back when the lathe is in motion, a nut is placed on the screw, beyond the part *d*: this causes such a pressure upon the threads of the screw, that it is in no danger of turning back, as it would otherwise do with rough work. The mandrel, by this means, runs very steadily and accurately in its bearings, and it is plain that any piece of work, which is firmly attached to the end of it by means of the screw before mentioned, may be turned by a tool held over the rest, in the same manner as if it were mounted between centres, but with the advantage that it be turned at the end, to make hollow work when required.

The mandrel is turned round by a band of catgut passing round the pulley *b*, and also round the large foot-wheel *H*, which is made of cast-iron, and fixed on the end of the axis *I*. This axis is bent in the middle, as in the figure, to form a crank, which crank is united, by an iron link *K*, to the treadle *L*, on which the workman presses his foot. This treadle is affixed by three rails to an axis *M*, on which the treadle moves. The wheel *H* is of considerable weight in the rim, and being fixed fast on the axis *I*, turns round with it: the momentum acquired by the wheel is the power that continues to turn the work while the crank and treadle are rising, and consequently while the workman exerts no power upon them.

When the crank has passed the vertical position, and begins to descend, the workman presses his foot upon the treadle, to give the wheel a sufficient impetus to continue its motion until it arrives at the same position again. The length of the iron link *K*, which connects the crank with the treadle, must be such, that when the crank is at the lowest position, the board *L* of the treadle, to which the link is hooked, should hang about two or three inches from the floor. To put the lathe in motion, the turner gives the wheel a small turn with his hands, till the crank rise to the highest, and

passes a little beyond it; then by a quick tread he brings the crank down again, putting the wheel in motion with a velocity that will carry it several revolutions: he must observe to begin his next tread just when the crank passes the highest point, and then it will continue running the same way with a tolerable regular motion, if he is punctual in the periods of his treads. The foot-wheel, by means of the band, causes the mandrel to revolve very rapidly, so that it will perform its work very quick, and the workman must acquire a habit of standing steady before his work, that he may not give his whole body a motion when his foot rises and falls with the treadle.

The rest N of this lathe is fixed on the bed of the lathe by its foot, which is divided in the manner of a fork, to receive a screw-bolt: this bolt passes down through the lathe-bed, and fastens the rest at any place along the bed, by a nut *k* beneath. The groove in the foot is for the purpose of allowing the rest to be moved to and from the centre of the work, to adjust it to the diameter of the work which is turning. The height of the rest is a matter of some importance in turning, and in some work it should be fixed higher than others; therefore the piece upon which the tool is laid, is made with a shank of the form of the letter T. This shank is a round pin, and is received into a socket in the foot of the rest, and can be held at any height by a clamp-screw. As the socket and shank are cylindrical, the edge of the T of the rest can be placed inclined to the axis of the work when turning cones, or other similar work, though the same purpose may be accomplished by the screw, which holds the foot of the rest down to the bed of the lathe, admitting the fork to stand in an oblique direction across the bed.

The wood-turner employs gouges of all sizes, and chisfels of different forms: the gouges are used in the first instance to rough out and form the wood, as they cut very rapidly, because they can take a very strong chip, and the angles will not stick in, as would be the case with the chisfels. The latter are used to smooth the work, and to reduce it exactly to shape and size.

The blade of the turning-gouge is formed nearly half round to an edge, and the two extreme ends of this edge are a little sloped off, in the manner of an apple-scoop, that the middle part of the edge may cut away the prominences of the work; and it has no corners, which would catch and get fast in the rough wood. The hollow part is whetted upon a piece of Turkey-stone, made with a convex edge, for the purpose; the outside is whetted upon a common flat Turkey-stone, taking care to turn the gouge round, that all parts of the convex edge may successively be sharpened. In turning, the blade of the gouge must be held considerably inclined, by depressing the handle (see *fig. 42.*), so that the bevil, or outside of the edge of the gouge, may come very nearly in the tangent to the circumference of the work, and the cutting edge be above the level of the centre. The turner holds the tool down firmly upon the rest, keeping it steady, by placing the long handle under his arm.

The turner's chisfels are mostly ground with a bevil on both the flat sides, so that either side may be indifferently applied to the work: they are ground up and sharpened on the oil-stone to a keen edge. In some chisfels, the line of the edge is inclined to the direction of the blade, instead of being perpendicularly across it, as in the chisfels used by carpenters; in others, the edge is rounded to a femicircle, instead of being a straight line; and others are made with angular points, like spears. It is difficult to describe the proper use of each particular tool, as the turner must employ one or other, according to the

particular part of the work which is to be executed. In using the chissel, the rest is raised considerably above the centre of the work, so as to be nearly on a level with the top of it (see *fig. 41.*), and the line of the cutting edge must stand oblique to the axis of the cylinder, so as to prevent either angle of the chissel from running into the work. It is necessary to traverse the chissel gradually along the work, but not too fast, otherwise it will leave a roughness on the surface.

The turning-tools should be fixed in long handles, and the turner holds them firmly down upon the rest, steadying them by placing the end of the handle under his arm.

The turner should be provided with a grindstone, and an oil or Turkey-stone to sharpen his tools; and he must have callipers and gauges to ascertain the dimensions of his work. In order to fix the work in the lathe, he must have a great assortment of chucks. The chucks for wood-turning are blocks of wood, each having a screw, by which it can be attached to the mandrel. The end of the chuck being turned true, and the shoulder of the screw upon the mandrel being also turned true, the chuck fixes so tight to the spindle, that it becomes as it were one piece with it. Most of the wood chucks are bored out like a box, and the work is jammed into the cavity. There are other chucks, which are only flat round boards, and the work is cemented or screwed against them; but the generality of chucks are cylindrical blocks, with a cylindrical or conical hole turned in the end, like a box, into which the piece of wood to be turned is driven fast, so as to be turned round with the mandrel. The chucks are generally hooped with iron, to prevent them from splitting. When centre-work is to be turned in a mandrel lathe, a chuck must be screwed on the end of the mandrel, which terminates in a sharp conical point.

The lathe should be fixed in a place very well lighted; it should be immovable, and neither too high nor too low.

The puppets should neither be so low as to oblige the workman to stoop in order to see his work properly, nor so high, that the little chips, which he is continually cutting off, should come into his eyes.

The piece of wood to be turned should be rounded, before it is put in the lathe, either with a small hatchet made for the purpose, or with a plane or rasp, fixing it in a vice, and shaving it down till it is every where almost of an equal thickness, leaving it a little bigger than it is intended to be when finished off. Before putting it in the lathe, it is also necessary to find the true centres of its two end surfaces, so that they shall be exactly opposite to each other, in order that, when the centre points of the puppets are applied to them, and the piece is put in motion, no one side may project out more from the centre line than another. To find these two centres, lay the piece of wood to be turned upon a plank, open a pair of compasses to almost half the thickness of the piece, lay one of the legs on the plank, and let the point of the other mark on one of the ends of the piece when laid flat on the plane with the plank, like a roller, from which plank the point of the compasses stands up at a given height above the plane on which the piece lies. Describe four marks or arcs on that end at equal distances from each other round the circumference of the end, by laying the piece successively on four different sides, which arcs intersecting one another, the point within the intersections will be the centre of the end. In the same manner, the centre of the other end must be found.

After finding the two centres, make a small hole at each of them, into which insert the centre points of the back centre and the mandrel, and screw up the back centre, to fix the

TURNING.

the piece so firmly as not to be shaken out, and yet loose enough to turn round without difficulty.

This is the manner of fixing the work when it is to be turned between centres; but if it is required to be hollowed out, the back puppet is removed, and the work must be fixed in a chuck at the extremity of the mandrel. For this purpose, a chuck is selected which has a hole in it nearly the size of the piece of wood, the diameter of which being taken in the callipers (*fig. 35.*), the chuck is screwed to the mandrel: the rest is fixed in a convenient position, and the hole in the chuck turned out by a proper tool to the size measured by the callipers: the hole should be rather conical, and the wood, being rasped to the same figure, is driven in fast by a hammer. By turning the mandrel slowly round, it will be seen if the wood is fixed straight in a line with the mandrel, and if not, a blow or two of the hammer, properly directed, will rectify it.

If the piece of wood is not very long, the chuck will be sufficient to hold it firm whilst it is turned; but if it is not, then a small centre hole must be made in the extreme end, and into this the point of the back centre screw must be inserted to steady the work, until the rough part of the turning is done, and then it may be removed; but it is much more convenient to turn without the back centre, and therefore the turner fits the chuck to the wood with care, so that it will fix fast in the chuck.

The work being thus chucked, or fixed in the lathe, the rest is set, so that its edge is close to that part of the work which is required to be turned, and the top of the rest being raised considerably above the level of the centre of the work, it is there screwed fast.

The turner now puts the lathe in motion by treading with his foot, and takes a gouge, of a proper size, in his right-hand, and holds it by the handle a little inclined, keeping the back of the hand lowermost: he grasps the blade of the tool with his left-hand, the back of which is to be turned upwards, and he holds it as near the end as possible on the front side of the rest; then leaning the gouge on the rest, he is to present the edge of it a little higher than the horizontal diameter of the piece, so as to form a kind of tangent to its circumference: see *fig. 42.* This is the best position for cutting, and the tool must be held very firmly, to prevent the edge being depressed by the motion of the work, for if it does, it will take hold too deep, and tear the work. The gouge is applied first to one end of the work, and gradually advanced to the other, turning the work true all the way, and reducing it till the callipers (*fig. 36.*) determine it to be near the intended diameter.

The chissel is next employed to smooth the cylinder: its handle is held in the right-hand, whilst the left grasps the blade, and keeps it steady upon the rest, holding the edge a little inclined over the work, as in *fig. 41*; so that one side of the flat part of the blade lies on the rest, and the other side is elevated, that the plane of the blade, and consequently the line of the edge, is not horizontal, but inclined thereto, so that one corner of the edge of the chissel is elevated above the work: then the bottom of the edge of the chissel, or near the bottom, cuts away a shaving from the work, and this is the only way in which it will cut; for if the edge of the chissel is held parallel to the axis of the cylinder, it acts parallel to the length of the grain of the wood, scraping away the fibres, one by one, without cutting, and leaves a very rough surface. In the same manner, the narrow chissels, formers, and other instruments, are to be used according to the work which is to be done, taking care that the wood be cut equally, and that the instrument be not pushed suddenly forwards, or sometimes more strongly than at others;

and taking care also that the instrument does not follow the work, but that it be kept firm on the rest, without yielding. The gouge and chissel are the instruments by far the most frequently used, and the most necessary in this art. Soft woods are almost entirely turned by them.

To make the end of the work exactly flat, the thin side of the chissel is laid upon the rest, so that the plane of the edge may stand exactly upright. The hand is depressed, that the lower corner of the edge may rise against the work, and cut a deep circle into it, near the end, and being steadily advanced, cut to the centre, separating a thin round chip, and leaving the end quite flat. The cutting corner of the chissel must be directed exactly perpendicular to the length of the work, in advancing it, otherwise the end will be either concave or convex, and care must be taken to keep the plane of the edge truly upright, and hold it very firm, for there is danger of the work drawing the chissel into the end of it, with a deep spiral cut, like a screw, and tearing the work out of the chuck.

A cylinder of wood being formed by the process we have just described, if it is required to turn it hollow within, the rest is fixed opposite the end of it, with the edge of the rest perpendicular to the length: then a sharp-pointed tool is used, to bore such a hollow in the end as will form the required cavity, using the inside callipers (*fig. 35.*) to determine the size of it. The side-tool, which is made with a cutting edge on the side, like a knife, may be used, if it is required to make the bottom of the cavity square; or a hooked tool, with the cutting edge at the end of the hook, may be employed to enlarge the inside to the proper size: the gauge (*fig. 34.*) is used to determine the depth to which it is to be turned.

This is the process for turning soft woods, which are generally of a fibrous texture; but hard woods, ivory, and bone, are turned with different tools. The points or cutting edges of some such tools are represented in *figs. 23.* and *24*; they are bevelled only on one side, and the angle of the edges is obtuse. The round-pointed tool, and the sharp angular-pointed tool, are those employed for first roughing out the work, and by them a number of contiguous grooves are cut in the wood, until its grain is broken and divided, and the irregularities reduced; then an edged tool can remove the remainder: but as the edged tools will only cut or scrape off thin shavings, they are not used when the work is to be reduced to size, but only to finish it. The manner of applying the tools to the work is shewn in *fig. 39.* and is nearly the same as for turning brass, or other soft metal: the upper surface of the tool is directed to the centre of the work, the intention being to scrape away shavings in hard wood, and in soft to cut chips, as at *figs. 41.* and *42.* The graver (*fig. 40.*) is a very useful tool for hard wood: the manner of using it, as well as other tools, will be described when we come to speak of turning in metal.

After the work is completely turned, it is next to be polished, and this cannot be done with the instruments hitherto mentioned. Soft woods, as pear-tree, hazel, maple, &c. ought to be polished with shark-skin, or Dutch rushes. There are different species of sharks, some of which have a greyish, others a reddish skin. Shark's skin is always better when it has been used; at first, it is too rough for fine polishing.

The Dutch rush is the equisetum hyemale; it grows in moist places, among mountains, and is a native of Scotland. The oldest plants are the best. Before using them, they should be moistened a little, otherwise they break in pieces almost directly, and render it exceedingly difficult to polish with them: they are particularly proper for smoothing the

hard woods, as box, lignum vitæ, ebony, &c. After having polished the piece well by such means, it should be rubbed gently either with wax or olive-oil, then wiped clean, and rubbed with its own turnings or shavings, or with a cloth a little warm. Ivory or horn is polished with pumice-stone or chalk, finely pounded and put upon leather, or a linen cloth a little moistened with this: the piece is rubbed as it turns round in the lathe; and to prevent any dirt from adhering to any part of it, every now and then it is rubbed gently with a small brush dipt in water. To polish metals very finely, the workmen make use of a particular kind of earth called tripoli, and afterwards of putty, or calx of tin. Iron and steel are polished with very fine powder of emery; this is mixed with oil, and put between two pieces of tin or pewter, and then the iron is rubbed with it. Tin and silver are polished with a burnisher, and that kind of red stone called blood-stone. Iron and steel may also be polished with putty, putting it dry into shamoy-skin.

All kinds of articles in wood are turned in the above manner; but many contrivances are necessary to mount different things in the lathe.

The small figures in the plate represent various chucks, which are occasionally employed, and which are adapted for turning different kinds of work.

Figs. 2. and 3. exhibit a small wood chuck, which is adapted to be screwed to the mandrel at *a*, a hole being perforated in the centre of it, at *b*, into which a small piece of wood or ivory is to be inserted, in order to turn it. To hold the work fast in this chuck, it is divided at the end *b* by two saw-kerfs, at right angles to each other, as shewn in *fig. 3.* so as to separate the end into four segments, which admit of expanding or closing: a hoop or ferril is fitted on the outside of the chuck, which part is made tapering, so that forcing the ferril farther on, will close the four segments together, and bind fast upon the work, which is introduced into the cavity *b*. This is a very convenient chuck for holding small pieces of ivory, and particularly for the purpose of polishing.

Figs. 12. and 13. exhibit a similar chuck, made in brass, for more delicate work; it is only divided into two segments.

Fig. 4. is a brass box, to screw to the mandrel, and hold a wood chuck, such as we have before explained. Wood chucks are usually made to screw on the mandrel by means of a hole in the chuck, which is cut with a female screw within. The objection to this mode is, that the threads of the screw on the wood wear away by constant use. In *fig. 4.* a brass female screw, *a*, is cut to fit the screw of the mandrel, and at the other end, *b*, is a box, also cut with a screw within, into which the wood block or chuck is screwed, as shewn by the dotted lines, so as not to come out without great force: by this means, the fitting of the chucks to the mandrel is not with a wooden screw, as in general, but with a brass one, which will not be liable to get out of the truth, but will always screw up to the same shoulder. The lathe should have at least two dozen of these wood chucks, with cavities of different sizes, and some of them hooped with iron at the outer end, to prevent them splitting. The brass box is a great security against splitting.

Fig. 5. is a very useful arbor for turning wheels, collets, or any other flat piece of work that will admit of having a small hole in the centre of it. A brass screw-chuck, *a*, is fitted to the mandrel, and a steel pin, *b*, is fixed into it, and projects an inch or more: the pin is turned true, and the work is fitted fast upon it, either by turning the pin to the size, or by broaching the hole in the work: and to prevent the work from slipping round upon the pin, it is pinched fast up against the flat surface of the chuck, as shewn by the dotted lines, by a nut *d*, which is screwed on the end of the steel

pin *b*: by this means, the work will be held fast, and will be carried round by the chuck, so as to be turned by the application of proper tools upon the rest. These kinds of arbors should be of all sizes, to fit the holes in different wheels, &c.

Fig. 10. is a brass chuck, which is very useful for holding small pieces of brass work; it screws to the mandrel at the end *a*: the hollow part, *b b*, has six screws tapped through it, and pointing to the centre, as shewn in *fig. 11.* By screwing in these screws, their points will pinch upon any piece of work which is put into the chuck, as shewn at *d*, and will hold it firm. The screws being regulated, admit of adjusting the work *d* to a true centre with the line of the mandrel.

Figs. 16. and 17. are views of chucks having similar properties to the preceding: *a* (*fig. 16.*) is the end which is screwed to the mandrel; *b b* is a circle of brass, having a mortise or opening across the centre of it, as in *fig. 17*; into this opening two steel dies are fitted, and screws *d, d*, are placed behind them, to approach them together: the screws come through the outside of the chuck, and have square heads, which are to be turned by means of a key. The adjacent surfaces of the two dies are hollowed, so that they will embrace a piece of wire or other similar substance which is put between them, and the dies may be cut like a file, to hold it fast. By means of the two opposite screws *d, d*, the work may be adjusted to the centre line of the mandrel.

Figs. 20. and 21. are a table-chuck, proper for holding wheels or flat plates by the circumference, whilst the centre parts are turned: *a* is the screw to fix it to the mandrel: *b b*, a large circular plate, turned perfectly flat on the front surface. In this plate are grooves, pointing from the centre to the circumference, as shewn in *fig. 21*: the grooves are adapted to receive clamp-pieces, *d, d, d*, by means of which the wheel or other work is bound fast against the flat surface of the chuck. The grooves admit the clamps *d, d, d*, to be placed at any distance from the centre, according to the size of the work, and to place them at those parts where it will be most convenient to apply them.

The form of these clamps is shewn more particularly in *fig. 22*: *f* are sliders of metal, which are fitted to the grooves in the chuck; and the grooves are dove-tailed, so that these sliders can be put into the grooves at the back of the chuck, but will not draw through the grooves into the front. Screws are tapped into the sliders, and draw the clamps, *b*, against the face of the chuck, and hold fast the work, which is placed beneath their claws. The clamps, *b*, have shanks projecting from them at right angles, which pass through the grooves, and keep the clamp from turning round to one side.

Figs. 35. and 36. represent the callipers used by turners to take the measure of their work: they are made of two curved pieces of steel-plate, united together by a joint. When they are opened, as in *fig. 36*, the dimensions of a round piece of work may be conveniently taken between their points, as shewn by the dotted circle; but if the points are closed together, as in *fig. 35*, so that they pass each other, then the callipers are adapted for measuring the diameter of internal cavities, by the distances of their points from each other.

Several other kinds of callipers are used by turners, but these are the most convenient, as they serve equally well for inside and outside dimensions. Some callipers are made double, like a pair of scissars; and the points at one end are for inside measures, whilst the others are for outside measures; and the distances of all the points from the joint being exactly the same, the inside measure of any hollow

TURNING.

being taken by one end of the callipers, the opposite end will be readily opened to the requisite dimensions for a solid to fill such hollow.

Fig. 34. is a gauge for measuring the depth of hollow work. *A* is a ruler, through which is a socket to receive another ruler *B*; and a clamp-screw is fitted through the side of the socket, to hold the ruler, *B*, fast in the socket. The edge of the ruler, *A*, is applied to the end of the work, and the other ruler is then slid through its socket, until the end of *B* touches the bottom of the cavity; and in this state, the clamp-screw being fastened, the gauge may be applied to the piece of work in the lathe, to ascertain if the cavity is turned out to the required depth.

Fig. 6. is a chuck for turning wood when it is a long piece, which will admit of being supported at both ends, or between centres, as it is called. The chuck has a screw within the part *a*, to fix to the mandrel, and the other end is of steel, with a pin *b* in the centre; and on each side of the pin is a sharp edge *c*, like a chissel, the line of the edge pointing to the centre of the pin. When a piece of wood is mounted between the points of this centre pin and of the back centre, as we have before described, if the back centre screw is turned, it will force the piece of work against the mandrel and the pin *b*, and the edges *c* will penetrate into the opposite end of the wood; in this case, the motion of the mandrel and chuck *a* will be communicated to the wood, to turn it round. The centre pin *b* is made to project beyond the edges *c*, and by this means the work may be removed from the lathe, and put in again if required, because the centre pin will enter again into the same hole in the end of the work, and restore the work to its original position.

Fig. 7. is a chuck for the same purpose, but it is made with a flat circle of brass, and three pins, *c*, are fixed in it instead of the edges *c*, *c*. This kind of chuck is shewn in use in *fig. 1*, to turn a pillar for a balustrade.

When a piece of metal work is to be turned between centres, the edges or points of the last chucks cannot be made to penetrate the end of the piece, and therefore a small chuck, *b*, (*figs. 14.* and *15.*) is screwed to the mandrel: in the end of this chuck, at *b*, is a hole, which is made square within, and the work has a square filed at one end to fit the hole. The other end of the work is supported by the back centre, a small hole being made in the end to receive its point; or if the end of the work is sharp-pointed, the back centre pin is drawn out of its socket, and turned end for end: the end of the pin opposite to the point has a small centre hole for the reception of such pointed work. Iron and steel work may be turned very conveniently by means of a square, but not very accurately; and after the work has been taken out of the lathe, and the square cut off, if it be required to turn the work again in the lathe, it is very difficult to find the true centre.

All works requiring great accuracy, as arbors, screws, axles, spindles, &c. are turned between centre points, thus: a chuck (*fig. 8.*) is screwed to the mandrel by the screw in the part *a*, a steel centre point *b* being formed at the end of it. The point is turned very truly, to be exactly in the centre line of the mandrel. The work is mounted between this point and the point of the back centre; and to communicate the motion of the mandrel to the work, a driver (*fig. 9.*) is screwed fast on that end of the work nearest the chuck. The driver is an iron ring, with a screw *d* tapped through one side of it, to pinch the work so fast as to prevent the driver slipping round upon the work; and on the side opposite to the ring is a projecting tail *f*.

The chuck (*fig. 8.*) has a steel claw *k e* fitted through it, and fastened by a screw: the end of the claw is bent at *e* paral-

lel to the direction of the mandrel, so that the end of it will catch the tail *f* of the driver, and turn it round, together with the work on which the driver is fixed.

The stem *k* of the claw slides in and out of the socket, through the chuck, in order to remove the claw *e* to a greater or less distance from the centre point *b*, and adapt the chuck to operate upon different sized drivers, for delicate or large work. This is the most accurate method of turning iron work in a mandrel lathe, because the centre points at the ends of the piece are preserved. When one end of the work is finished, the driver may be shifted to the other end. Such work may at any time be mounted again upon its original centre points, in any kind of lathe, to turn wheels, collets, &c. which may be fitted upon it.

The form of the driver is shewn in *fig. 30.* In order to make it fit different sizes, the side of the ring opposite to the screw *d* is made angular, and the point of the screw forces the work into the angular part.

This driver may be fixed on either end of the work, whilst the other end is turning; but when it is necessary to fix the driver on that part of the work which is finished, the end of the screw *d* is apt to pinch and bruise it; it is therefore proper to interpose a piece of iron between the point of the screw and the work. But it is better to use the driver shewn in *fig. 31*: it is composed of two bars of iron, united by two screws passing through one bar and tapped into the other: both bars are somewhat hollowed out in the middle, that they may encompass the work. If this should be found to injure the work, a piece of sheet-lead wrapped round it before the driver is put on will prevent it from damaging the work; and if the screws of the driver are drawn very tight, it will carry the work about with sufficient force to bear turning.

When a piece of iron or steel work is to be turned, the centre points at the ends must be found with great precision before it is turned, because it is difficult to cut away great protuberances in metal. The centres are first found by the compasses, and marks are slightly punched in the ends by a conical-pointed punch. The workman now places the work in the lathe, between the points of the mandrel and that of the back centre, but without fixing any driver on the work; he then screws up the centres, so as to hold the work just tight enough to prevent its falling down. In this state, by turning it round with one hand, while he holds a piece of chalk against it with the other, he ascertains whether it is pitched nearly concentric on the points; and if it varies much at any one point, he turns back the screw to take out the work, and punches new centre points, or alters the old ones, taking care to move them nearer to that side which appeared to project farthest in revolving, and was of course marked by the chalk.

When he has, by repeated trials, found the true centre, he screws up the centre point so hard, that it may effectually mark the end of the work, by forcing the points to the bottom of the marks punched; then taking the work out of the lathe, he drills holes in the ends, at the places which the centre points have marked, and to such a depth, that the points of the lathe will not reach the bottom. When the work is again returned into the lathe, it will run very nearly concentric, and the driver being screwed fast on either end of the work, as is most convenient, the work will be turned round by the clutch projecting from the chuck.

The work is now ready for turning, which is done by different tools, and applied in a very different manner from the chissels and gouges for turning wood. *Figs. 37.* to *40.* are different examples of the manner of turning metals: a tool applied in the manner of *fig. 39.* operates very well upon

upon brads and bell-metal. The cutting edge should be ground nearly to the angle which is there represented, and the upper side should be directed nearly to the centre of the piece; the edge will then scrape away shavings from the metal. The tool has some tendency to retreat backwards from the work, and must be held firmly thereto. The edges of tools, applied as shewn in *fig. 39*, may be formed to any of the shapes shewn in *figs. 23*, and *24*. the angle of the cutting edge being in all cases nearly the same.

The graver (*fig. 40*.) is an extremely useful tool, and fit for turning any metal or hard wood: it is a square bar of steel, cut off obliquely, and the greatest obliquity of the cutting plane is in the direction from one angle of the square to the opposite angle. This produces a prominent point on one of the angles, which point is applied to the work in the manner shewn in *fig. 40*. and cuts off continuous shavings instead of scrapings: this is owing to the direction of its edge, which is disposed obliquely to the motion with which the work meets the edge in its rotation. The turner should be provided with gravers of all dimensions.

Fig. 37. is the action of what is called a *heel* tool for turning wrought iron or copper: the edge of this is applied nearly in a tangent to the work, on the same principle as the chissel is applied to cut wood. The heel of the tool is placed upon the rest, and being just opposite to the edge on which the pressure or drift of the work lies, the tool cannot escape from its work, although the pressure upon it is very great, so much so, that it would be impossible to keep the tool to its work, if it were held upon the rest, as in the case of the wood chissel, merely by the lateral friction on the rest. The handle of the heel tool is long, and is held inclined upwards, so that the workman can rest the end of it on his shoulder, whilst he holds it very firmly down on his shoulder and on the rest with both hands. This firm position is very necessary, because the heel tool is liable to draw deep into the work, and take away too large a chip. This tool will cut away thicker chips than any other, being what the workmen term a greedy tool. The requisite height of the rest, to make the edge of the tool a tangent to the proper point, is a matter of importance, and requires the attention of the workman, who can only learn the management of this tool by experience. It is not well adapted for finishing work with accuracy, but is very expeditious in roughing out wrought iron: it generates so much heat in working, that it is necessary to keep it constantly wet; and in large lathes, a constant stream of water is made to fall on the edge at the place where it is cutting. The graver and all other tools work wrought iron and steel to the greatest advantage when wetted.

Fig. 39. is the tool used for turning cast-iron; this substance must be scraped away, and it is plain from the figure, that the cutting edge is presented very nearly in the same manner, with respect to the work, as in *fig. 39*; but from the hardness of cast-iron, it requires a very considerable force to press the edge against the work, and it would be impracticable to hold it up effectually on the plan of *fig. 39*; hence the tool in *fig. 38*. is bent at the end, and is lodged over the edge of the rest, in the manner of a lever; the handle is pressed down at the extremity, and lifts up the edge against the work with very great force. The workman must bear on the handle of this tool with the requisite pressure; and in large work, such as cannon and mill-shafts, he usually seats himself upon the end of the tool, which is made very long in the handle.

Different substances require different velocities of motion to cut with the greatest advantage. Wood can scarcely be made to move too quick; and it is always preferable to take a very thin chip, and move as quick as possible, than to move

slowly, and compensate for the loss of time by cutting deep. Brads and bell-metal may be moved very quick, but not with half the velocity of wood. Wrought iron and copper must be turned more slowly, and the tool must be kept wet. Steel should go rather slower than wrought iron, for it is liable to have hard veins in it, which the workmen call pins: these will be cut through if the work moves slowly, but with a quick motion they will destroy the edge of the tool: this makes some workmen think that the pins are actually formed, or that they become hard during the operation of turning, if too great a velocity is used. Cast-iron must move very slowly, indeed it can scarcely turn too slowly, and the tool applied as at *fig. 38*. will cut a thick chip.

To obtain these different degrees of velocity, the foot-wheel of the lathe *fig. 1*. is made with several grooves of different diameters, and the mandrel pulley *b* has also different sizes. A band can be applied upon any of these grooves at pleasure, and the workman finds by experience what velocity is best for different kinds of work.

The most experienced workmen prefer a centre lathe to a mandrel lathe, when they have to turn accurate iron-work, which will admit of being poised between centres; and it is obvious, that the revolving motion of the centre point at the end of the mandrel is of no use; and if the point should be the least out of the centre line, or if the mandrel has any shake in its collar, the work would not be turned truly. But in a centre lathe, where both points are fixed immovably, or, as the workmen say, with dead centres, this cannot happen; and if the work is screwed up tight between the centres, so that there is no shake, the centre points at the ends of the work must be precisely in the centre line of the work.

The manner of giving motion to a piece of work in the centre lathe is, as we have before described, by a loose pulley fitted on the centre pin, and from this pulley a pin projects in a direction parallel to the centre line, so that it comes exactly in the place of the claw *e* (*fig. 8*.), and turns the driver round when the pulley is put in motion by the band, either from a foot-wheel or hand-wheel.

When the mandrel lathe is used for centre work, the centre of the chuck must be turned very exactly, so that it does not vary in the least from the same position when it turns round; and in all cases, the mandrel must be fitted with the most scrupulous accuracy into its collar, so that there will be no shake; for unless this is the case, the lathe will not turn chuck-work with any accuracy.

Messrs. Holtzapfel and Deyerlien make very excellent lathes on the plan represented in *fig. 1*. The bed and the puppets are made of cast-iron, and very correctly fitted, such lathes possess great strength: some of them are fitted up, as in the figure, with a pattern screw at the end *a* of the mandrel, for the convenience of cutting screws on work. For this purpose, the mandrel is fitted in a collar at each end, and the necks are cylindrical, so as to admit of the mandrel moving endways at the same time that it turns round. On the extreme end of the mandrel, beyond the collar *D*, a pattern screw is fixed, which has the distance of its threads corresponding with the screw that is desired to be cut upon the work, which is fixed in the lathe by a chuck: a piece of brads, *n*, is provided, which is cut with threads adapted to the pattern screw, and which can, by turning a screw, be drawn up against the pattern screw, so as to work in its threads; and in this state the mandrel, at the same time that it turns round, will move endways in its collars with a screwing motion; and in consequence, a pointed tool being presented to the work, and held fast on the rest, will cut a spiral groove or screw upon its circumference. This contrivance is more fully

fully explained in the article *ROSE-Engine*. It is the most convenient method of all others for cutting screws, and very accurate, if the pattern screws which are fixed on the mandrel are correctly cut. For all purposes of wood turning, it is undoubtedly the best method, and far preferable to the common one of cutting screws flying, as it is called, that is, by means of the tools 32 and 33, which are applied to the work, and moved along endways at the same time that the work turns round, so that they cut a spiral. (See *ROSE-Engine*.) The rapidity and accuracy with which some workmen cut screws in this way exceed belief; but it is only by long experience that this habit can be acquired, and for those who have not had such experience, some mechanical help is necessary. The objections made by accurate workmen to the flying or screw mandrel are, that as the necks must be cylindrical, it cannot be kept so perfectly fitted in its collars as the common mandrels, which have a point at the extremity, and the neck at the other end is made slightly conical, so that it can always be screwed up to fit in the collar. Messrs. Holtzapfels mandrels are made of hardened steel at the necks, and the collars are also hard; they are accurately fitted, and have no shake when new. From the hardness of the materials, they will wear a long time before they get any looseness.

Mr. Maudslay has the most complete set of tools for all kinds of mechanical works at his manufactory, and is particularly well provided with turning apparatus. All his lathes are made with triangular bars, such as is described in our article *LATHE*, and the mandrels are all formed with conical necks and collars. The bar lathes are very accurate, particularly when the slide-rest is applied to them, as there described. The bed lathe may also have a slide-rest applied, as is shewn under *ROSE-Engine*.

If a piece of metal, after being properly turned, is to be bored hollow within, like a gun-barrel, the back puppet is to be removed from the bed of the lathe, and another substituted in its place, having a hole or collar through it, into which the neck or end of the iron is to be correctly fitted, the other end of the iron being supported and turned round by being fitted into a chuck at the end of the mandrel, or else by means of the centre point at the end of the mandrel, and with a driver, as in *figs. 8. and 9.* The rest is to be set opposite the end of the piece where it comes through the collar, and drills or borers are to be applied, similar to those used by locksmiths in boring keys, beginning with a small one and afterwards using larger ones, until the hole is made as wide and deep as necessary. The borers must be held very firm on the rest, otherwise there is danger of not boring the hole straight. The borer should be withdrawn from time to time, to oil it and clean the hole. As it is difficult to make a hole quite round or concentric with the outside by means of borers alone, it is necessary to have also a turning tool considerably smaller than the hole, one of the sides of which is sharp, very well tempered, and a little hollow in the middle. This instrument being fixed in a long handle, is to be introduced into the hollow, and applied with steadiness to the inner surface of the hole, and it will entirely remove every inequality that may have been there before its application.

The collar puppet is only referred to, when the piece which is to be bored is of considerable length; for if it is short, it will be held sufficiently fast in the chuck, without the necessity of supporting the extreme end.

A collar puppet is sometimes necessary in turning centre work when the work is long, and so slender, that it bends or springs by the stresses of the tools: the collar is then applied to support the work at the part where it is weakest and bends most.

Turning of elliptical or oval Work, such as Picture-frames, Snuff-boxes, &c.—This is performed in the same lathe, and with the same tools, as the circular work; but the lathe is provided with a chuck, which causes the work to traverse in a very curious manner, by a motion given to it in a direction to and from the centre of the mandrel as it revolves; so that a tool held up against the work will cut an elliptical figure instead of a circle. Elliptical work has a very singular appearance when in motion; for after the work has been turned truly elliptical, every part of the circumference, except the exact point where the tool was applied, appears to vibrate, or be excentric in a great degree, but that one point of the circumference runs perfectly true and regular, the same as the whole circumference of a piece of circular work does. The mode of action of this ingenious apparatus is rather difficult to describe, and it is first necessary to understand the principle of its action. This is the same as the trammel or elliptic compasses; see *fig. 29.* An octagonal or square board A A, B B, has two grooves cut in its surface, which intersect each other at right angles; this board is held down upon the surface where the ellipse is to be described, with the centre lines of the cross grooves coincident with the two diameters of the intended ellipsis, and of course their intersection will be its centre. The curve D D is traced beyond the circumference of the board, by means of a pen or pencil, which is fixed at F, to a radical bar or beam F G H; this bar carries two other points or pins, G and H, which are attached to sliders, inserted into the cross grooves of the board, as shewn in the figure: the sliders are fitted in truly, so that each of them will have a motion in its respective grooves: thus the slider of the pin H will move along A A; and the slider of G, along the groove B B. By turning about the beam F G H, the sliders go backwards and forwards in their cross grooves with a simultaneous motion; so that when the beam has gone one-fourth way about, one of the sliders will have moved from the circumference of the board A B, to the common centre of the cross grooves; and when the beam has gone half round, the same slider will have proceeded the whole length of the cross, and arrived at the opposite side of the circumference. The same applies to the other slider, and when one slider is at the centre, the other will always be at the circumference.

The pins F and G H can be fixed at any part of the beam at pleasure, (though this is not so represented in the drawing,) for the purpose of setting the trammel to draw any particular ellipsis: thus, place the beam in the direction of the line A A, then the pin G will be in the centre of the cross grooves; now fix F at such a distance from the centre, as is equal to half the small diameter of the ellipse, and set H so far distant from G, as the difference of the two diameters; consequently, from F to H will be equal to half the longest diameter. Now, in turning the beam round from the direction A A, till it comes to the direction B B, the point G will depart from the centre along B B, and H will approach it along A A, till it gets to the centre. Then will the pencil F be so much farther from the centre, as G is distant from H, and the pin has in its circuit traced one-fourth of an ellipse. The beam being turned quite round, will complete the whole curve.

This apparatus may be applied to turning by some modification. Suppose the two cross grooves made in a round board, as large again as that represented in the figure; then, if the whole apparatus be inverted, and the beam F G held fast in a vice, or otherwise, the board with the cross may be traversed round upon the fixed sliders, in the same manner as the beam could be traversed round upon the fixed board. Suppose a tracing point is held to the back of the board,
exactly

exactly opposite to the place where the tracing point F is fixed to the beam, and held fast; it is evident that its point will trace the same ellipse on the back of the board, that was described on the surface which the board lay upon in the former instance: or a chissel being held fast in the same spot, will cut the board elliptical when it is turned round; and the chissel being successively applied at different points along the line of the beam, a series of concentric ellipses may be turned in the board, to make mouldings for picture-frames or other ornaments. If the distance of the two fixed pins G and H, and the chissel F, is altered, it will vary the proportion between the two diameters of the ellipsis, in the same manner as before described of the trammel.

The oval chuck is constructed in a different manner from this, though it preserves the same movements. It consists of three parts, the chuck, the slider, and the excentric circle. The chuck *ee f* (*fig. 27.*) is attached to the mandrel by a screw-socket, cut in a piece *f*, which projects from the centre of it behind; and hence the chuck turns round with the mandrel with a circular motion.

The chuck has a dove-tailed groove, formed in it at the front side, for the reception of a slider *g b*, (*fig. 26.*) which traverses freely in the groove: the groove is formed, as the figure shews, by pieces *i, i*, screwed to the chuck on each side. In the centre of the slider, in front, is a screw *b*; see also the plan, *fig. 25.* The screw *b* projects from the slider, and by means of it, a wooden chuck may be screwed against the slider, and any work can be fixed in the chuck in the usual manner. The work to be fixed, at the same time that it turns round by the motion of the chuck, has a sliding motion across the centre, which motion being given according to a certain law, produces an elliptic motion. The sliding motion is given by the excentric circle (*fig. 28.*); this is a ring of brass, attached fast to the puppet of the lathe, close to the collar, in which the neck of the mandrel runs. The mandrel passes through the aperture *l*; the ring has a flat plate, *m*, to strengthen it, and forming two bends at the ends *m, m*, which bends have screws tapped through them, and pointing exactly to each other: these screws are sharp at the points, and are inserted into small holes in each side of the puppet, as is shewn in the plan *fig. 25.* at C, the back of the plate *m* of the circle lying flat against the front of the puppet C; by this means the circle is fixed fast; the two screws are horizontal, and both point to the centre of the mandrel *b*; therefore, by screwing one screw in, and the other out, the whole circle may be moved sideways horizontally, so as to give it any required degree of excentricity from the centre line of the mandrel, and it will be held stationary wherever it is placed.

Fig. 27. is a back view of the chuck, and shews two grooves made through it in the direction of the length of the slider; these admit the shanks of two pieces of steel *n, n*, to pass through the chuck, and they are firmly attached to the slider *g*, by a screw for each in front of the slider, as shewn in *fig. 26.* The two inside edges of the pieces *n, n*, are exactly parallel to each other, and the distance between them is exactly equal to the diameter of the outside of the ring 28, which ring is included between them, when the chuck is screwed to the mandrel *b*, and the circle fixed to the puppet C, as shewn in *fig. 25.*

Suppose then the circle is set concentric with the mandrel; if the mandrel is turned round, it will cause the chuck *e*, and slider *g*, together with the work attached to the slider by the screw *b*, to revolve. The work will now run in a circle, and turn circular work as usual, because the slider is guided by means of its claws *n, n*, which embrace the circle; and will keep the same position in its groove in the

chuck during all the parts of a revolution, because the circle is concentric with the mandrel.

To set the chuck for an ellipsis, place the point of a tool opposite the work, at such a distance from the centre of the work, that it will describe a circle of a diameter equal to the breadth or smallest diameter of the ellipsis intended to be turned. This is best done by fixing the tool in the slide-rest. Now turn about the mandrel, till the slider *g* comes horizontal, and set the circle 28 excentric from the mandrel by its screws *m, m*; it will of course move the slider *g* in the groove of the chuck, and also the work will move with it to a greater distance from the centre, because the two steel pieces *n, n*, at the back of the slider include the circle between them. The quantity of excentricity given to the ring, must be equal to the difference between the two diameters of the required ellipsis, so that the work shall move, or throw out a sufficient distance, to bring the point of the tool as much beyond the circle first described, as the length of the ellipse exceeds the breadth. The point of the tool will now be at one end of the longest diameter, and here we will commence to trace the curve all round. In turning the mandrel round till the slider comes vertical, it must return in its groove to the place it first occupied, *viz.* the centre; because the excentric circle which guides the slider is not excentric in a vertical direction, though it is in the horizontal. In this motion, the point of the tool has cut or described one quadrant of an ellipse, because it gradually approached the centre a quantity equal to the excentricity of the circle. By continuing to turn the mandrel round farther, the circle will cause the slider to move out the other way from the centre in its groove until it comes again horizontal, when it will be at the greatest *throw out*, as the turners term excentricity, and the point of the tool will be at the other end of the longest diameter, having described one half the curve: continuing to move forwards till the slider becomes vertical, it will become concentric again, and the tool will be at the breadth of the ellipse, having finished three quarters of the ellipse; and in turning the next or fourth quarter, the slider throws out till it comes horizontal, and brings the work to the position where we first set out, *viz.* at its greatest excentricity; and with the tool at the end of the longest diameter of the ellipse.

The simple trammel (*fig. 29.*) is not easily recognized in this complicated chuck, although it has all the same movements. Thus, let us return to our first idea of a board with two cross grooves in the back of it, turning round on two fixed pins, which enter the sliders in those grooves. Suppose that one of the pins is extended to a large ring, and the groove proportionably widened to receive it, this will have the same effect. Such a groove is formed by the two pieces of steel *n, n*, which have straight edges made truly parallel to each other, and perpendicular to the length of the slider which carries them. The other fixed pin is represented by the mandrel; and the slider being always confined in a right line across it, has the same effect as a pin entering a straight groove.

This ingenious apparatus was invented early in the last century by the celebrated mathematician Abraham Sharp. Before his time, oval-work was always turned in a rose-engine, which had an elliptical pattern.

In turning oval work, the tools must be delicately used, because the circumference moves with an unequal velocity at different parts of its revolution.

Method of ornamenting turned Articles by an Excentric Chuck.—This produces a similar effect to the rose-engine; but as a chuck of this description can be applied to any lathe which has a mandrel and slide-rest, it has been reserved for the present article.

Figs. 18. and 19. are two views of an excentric chuck: *a* is

is a socket, which is screwed to the mandrel; and *bb* the chuck, which is formed in the same piece with the socket *a*; a dove-tailed groove is formed in the front of the chuck, by means of two pieces *d, d*, which are screwed to the chuck, and into this groove a slider, *ee*, is fitted: to this slider a centre pin is fixed very firmly, and upon the centre pin a circle, *f*, is fitted, so as to turn round freely; in the front of the circle a screw, *g*, projects, for the purpose of fixing chucks to the circle. The slider is applied to the chuck, just the same as in the oval chuck, but is not left at liberty to slide in the groove, for a screw, *k*, is applied, which will move the slider gradually in the groove, but always holds it fast where it is placed. By means of this screw, the centre pin of the circle, *f*, can be made either to coincide with the line of the mandrel, or it can be set with any required degree of excentricity from the mandrel, as is shewn in *fig. 19*, by the difference between the line of the screw *g*, and that of the socket *a*.

The circle is divided round the edge with notches or teeth, cut at equal distances; and a tooth or catch, *b*, is fitted on the slider by a centre screw, and has a tooth which can be inserted into any of the teeth at pleasure, and will hold the circle fast from turning round upon its own centre pin. In this case, any piece of work, which is fixed to the screw *g*, will turn round with the mandrel, just as though it was fixed immediately thereto. The manner of using this tool is as follows: when the excentric chuck is screwed to the mandrel at *a*, the screw, *k*, is turned, until the screw, *g*, is brought exactly into the line of the mandrel. A wood chuck is now screwed on at *g*, and a piece of work fitted into it; which work is turned to its required figure, just as though the wood chuck was screwed to the mandrel itself, without the interposition of the excentric chuck, which hitherto has been passive. The work being turned, it can be beautifully ornamented on the flat surface, by tracing a number of circles upon it. To do this, turn the screw *k*, until the centre of the circle, *f*, is removed to a given distance from the line of the mandrel; now apply a tool to the end or flat surface of the work, by means of the slide-rest, and turn the mandrel round, until the tool has cut a fine circular line in the surface of the work. Now it is evident that this circle will not be in the centre of the work, but removed from the centre thereof a distance equal to the degree of excentricity given to the slider. Having thus described one circle, stop the lathe, and release the catch *b*; then turn the circle, *f*, round one tooth or notch.

Put the lathe again in motion, and describe another circle by the point of the tool, held exactly in the same spot as before; but the circle so described will fall on a different part of the work to that circle which was before made, although its centre will be at the same distance from the centre of the piece of work. The lathe is stopped, and the circle, *f*, turned round another tooth: a third circle is then described; and when as many circles are described as the whole number of teeth in the circle *f*, the ornamenting is finished. It will consist of as many circles as there are divisions in the circle *f*, all of an equal size, and their centres arranged at equal distances, around the circumference of a small circle, which is concentric with the work. The whole produces a rosette or engraved figure upon the surface of the work, and the numerous intersections of the excentric circles have a very pleasing effect to the eye. This kind of work is seen on the cases of many watches; and when well executed, is much esteemed.

TURNING Horizontal Hand-Mill, in *Rural Economy*, an useful contrivance of the hand corn-mill kind. It was invented by Mr. Wright, and consists of a sort of tub or

box; the frame of the mill-part of which is three feet square, and three and a half in height. The mill-stones are eighteen inches in diameter, and inclosed in the tub or box, supported by two cross-bearers, under which is a lever, having an iron pin or pivot, which runs through the centre of the bed stone into a socket in the bridge of the upper stone or runner, to which is attached the shaft and spindle, running through the eye of the runner and hopper, and supporting the fly-wheel and crank. A piece of wood of a round form, fastened on the shaft, serves as a feeder; and above is a screw to regulate the feed according as the mill is turned. On the side of the tub or box is a thumb-screw, fixed to the lever underneath, which regulates the stones, according as they are turned. The shaft runs through the crown-tree or cross-bar at the top of the frame, on which is the horizontal fly-wheel and crank; to which are attached one or two handles, by means of which the mill is put in motion. Under the stones is a drawer; in which are placed three sieves of different finesses; one for taking away the broad bran, another for the coarse pollard, and the third for flopping the fine pollard, and letting the flour pass into the drawer, which is effected by a sort of iron fork running through a hole in front of the drawer, and fixing on one of the sieves.

Small hand-mills of this nature are extremely convenient and useful in many cases.

TURNING Palisades. See **PALISADE**.

TURNING-Evil, in *Cattle*, a disease that causes them frequently to turn round in the same place. It is also called the *sturdy*; which see. See **TURN in the Head**.

The common remedy, recommended by Mr. Markham, is to throw the beast down, and bind him; then to open his skull, and take out a little bladder, filled with water and blood, which usually lies near the membrane of the brain, and then gradually heal the wound. Boyle's Works, abr. vol. i. p. 87.

TURNING to Rot, in *Agriculture*, a term used in tillage to signify stripping, ribbling, baulking, and combing, according to the manner in which it is performed. It is the leaving of a narrow strip of ground whole, on which the furrow-sluice is turned. It is much used in Devonshire, Cornwall, and some other districts.

TURNING to Windward, in *Sea Language*, denotes that operation in sailing, in which a ship endeavours to make a progress against the direction of the wind, by a compound course, inclined to the place of her destination. This method of navigation is otherwise called *plying*. See **TACKLING**.

TURNIP, or **TURNEP**, in *Agriculture*, a most useful and nutritious bulb-rooted plant, of which there are many different sorts in cultivation by the farmer. It has been long known in this country, but only more lately introduced as a field-crop, probably from Holland, or the Low Countries. It is from a more general introduction of this root into field-husbandry, that much improvement and advantage have been produced, not only in the management of arable land, but in the general system of feeding and supporting different kinds of live-stock. The culture of this root has, indeed, contributed much towards exploding the expensive and wasteful practice of naked fallowing, as well as to cleanse and ameliorate the soil, and render it more abundantly productive.

The turnip belongs to the genus *brassica*, and is well-known by its having a round, or rather long, fleshy, eatable root, that varies considerably in these respects, as well as size and colour, in different sorts, under the state of cultivation. The leaves proceeding from the top of the root in the

the middle part are large, and mostly of a full green colour, being ragged on the edges. The stem arises from the midst of these in the second season of the growth of the plant, to the height of four feet, or more, producing a yellow flower, with cylindrical pods of some length, filled with small purple, or reddish-brown coloured seeds. See BRASSICA.

All the different sorts of this excellent plant are, for the most part, distinguished by the form or shape of the bulb or root, which appears in some measure to depend upon the diversity of soil, and the nature of the culture of the plant. But the sorts that have been had recourse to as field-crops, with the greatest success and benefit in different parts of the country, are principally of these two kinds; those having a round or flattish-formed root, that rests much on the surface of the land, and those in which the root is of the more long tap-rooted form, penetrating deeper into the mould with the lower part of the root, but standing higher above it with the upper portion of the bulb.

In the first, or *round flat-rooted* sort, there is likewise much variety in the appearances of the tops as well as the roots, though the latter are mostly a little round and flattish. They are commonly distinguished in field-culture into the *red-round* or *purple-topped*, the *green-topped*, the *white-topped*, the *yellow-rooted*, the *black* or *red-rooted*, the *hard* or *stone*, and the *Dutch* turnip.

In the latter, too, or *long tap-rooted* sort, there is some degree of variety in their roots. They are usually known and discriminated by the farm-cultivator under the titles of the *tankard*, the *tap-rooted*, the *pudding*, the *oblong*, the *long*, *round*, and the *hardy* or *Russian* turnip.

It may be noticed, that the different varieties of the former of these kinds of turnips, in consequence of the roots of them being formed more on the ground close to the surface, than in those of the latter kind, which often stand high, naked, and much exposed in their upper parts, above it, are better suited to the purposes of general field-culture, in cases where there is much risk of their being hurt by the effects of frosts in the more severe winter months; but that in other cases, as where they are to afford an early feed, as for suckling ewes, and in the fattening of forward sheep at an early period, the latter kind may be had recourse to as the most proper and beneficial. This is said to be the practice of some districts in the vicinity of the metropolis, where it is of importance to have forward lambs.

In different districts where this root is largely cultivated, different sorts of this plant are employed; and it is not improbable that some sorts may be more proper for some qualities of land than others, though little has yet been done in the view of deciding this point. Nor is it unreasonable to suppose, that among the many varieties of this highly valuable plant, there may not be some which, in addition to their superior hardiness, possess a greater proportion of the nutrient principle than others. It has, indeed, been stated that, in a great northern turnip district, the green-topped and white-topped are generally esteemed as more sweet and nourishing than the red-topped sort, which possesses a degree of bitterness, and is disposed soon to become stringy and bad as food: that the white-topped sort, on the better kinds of land, is probably the most proper and beneficial, as while it has the property of being hardy, it grows to a large size; and that this and one of the stone or small hard sort, are the most commonly grown, and held in the greatest estimation in some of the best turnip districts still more towards the north. The latter of these sorts is, indeed, by some farmers in those districts, supposed to stand the severity of the winter season much better than most of the other sorts; but then the produce on the acre is commonly much less. And by others

in more southern districts, it is thought to bulb quicker, to have a greater solidity, a finer grain, a thinner skin, and to be smoother in the crown of the bulb; consequently to be less liable to injury from wetness and severe froit. And that although it may not grow so quick, or to so large a size, the latter of these defects may be obviated by leaving the plants a little thicker on the ground at the time of thinning and setting them out. Indeed, both the white and green-topped sorts are also much grown and approved in all these districts, and by some highly extolled on account of the qualities just noticed, as well as their being of a large growth, and continuing longer in a state fit for use, especially the latter. The yellow-rooted or straw-coloured turnip, too, is found to be a firm-fleshed and sweet-tasted nourishing sort, but it has not yet been much cultivated, so that its properties are but imperfectly known. The red sort, which was formerly much esteemed, has now mostly given way to other sorts. And the black-rooted sort is very rarely cultivated in any district of the kingdom; nor even those of the Dutch sort, though the early kind of them might answer well for forward crops. Much might probably be done in getting good sorts, by collecting seed from such as are the most hardy, and which grow to a large size, and sowing it in continuance.

In some northern and other districts turnips are grown much in mixture, which is a bad plan, as they have different growths, and of course rise unequally. And in the southern ones, the white globe prevails much in some instances; and the green round sort is found to stand well, and be larger as well as more certain in the produce.

The turnip is a sort of crop which is grown after many other different kinds, as those of a wheat stubble, a pease lay, a tare, potatoe, or any other similar kind of crop, as well as after the process of paring and burning the layers of old grass-lands. It is the practice too, in some districts of this sort, to have two turnip crops in succession, as the means of cleaning the land more effectually, which has been found to answer greatly in the barley or other crops that may be grown after them.

The soils which are the most proper for the growth of this sort of crop, are all those of the more light, friable, loamy, medium sandy, and other kinds, which have a sufficient depth; but it may often be raised with success and advantage on many other sorts, which have the surface-mouldy parts sufficiently fine, without there being too much moisture below, as those of the thin gravelly, loose chalky, and many other sorts and qualities; even on the loamy clays, in some cases, when properly managed in their tillage preparations, and other ways.

A late practical writer has well remarked, that from the success of the culture of this useful crop, on lands that differ greatly in their nature and qualities, it is plain that the plant admits of more latitude in respect to soil than many other sorts; though an opinion appears to have been too general among the cultivators of it, that it is only capable of being had recourse to with advantage, on such as are of a light, mellow, and open texture and quality. It is suggested too, that this has probably had considerable influence in preventing the culture of the turnip from becoming so general as, from its great utility and importance, it ought at present to have been. But though the turnip may be grown with success and benefit on soils that vary considerably in their natural friabilities and compositions, it is constantly necessary, to the perfect growth of such crops, that at least the more superficial parts of the soil, or the beds of earth in which they grow, should be in as fine a reduced powdery condition as possible, as more is found to depend

TURNIPI.

depend on this, than even on the nature or qualities of the soil.

In the view of bringing land into a state of suitable preparation for this sort of crop, much breaking down and reduction of its parts are, of course, requisite. This sort of breaking and pulverization is supposed to be necessary and beneficial in many different ways, as by rendering the land more penetrable to the roots of the plants, by promoting the growth of the small weeds more fully on the surface, and thereby making them capable of being more perfectly eradicated, and the young turnip plants, of course, be less endangered by them; while, at the same time, a more fine and mellow bed of mouldy earth is provided for the reception of the turnip-feed, and its vegetation and growth rendered more quick and strong in consequence of the more equal diffusion of moisture that must take place among the parts of the soil. Without such a state of mould in the soil being produced, it is found to be in vain to expect good crops of this sort. In order to provide this state of preparation in the soil, it is the practice in some of those districts where turnip husbandry is carried on in the most complete and successful manner, when the seed is to be put in on a fallow, to have recourse to three, four, and frequently five ploughings or stirrings of the land, having the cloddy parts of it well broken down, between the times, by harrowing in different directions, and the occasional use of the roller or other such means, as by these modes almost every particle of the soil becomes divided, and exposed completely to the influence and action of the atmosphere, and perfectly aerated and saturated with moisture. In these cases, some advise that the first operation should be performed towards the close of the year in a shallow manner, so as merely to take off the rough surface; the land may then remain in this situation until just before the beginning of the spring, when it should be well broken and reduced by harrowing, and then cross-ploughed to the full depth. When the land is weedy, it should be again broken down by the harrow in the course of a little time; but when clean, it is better to remain in its rough state. In this condition it may then be left until the spring be a little advanced, when it should have another ploughing to the full depth, and where the season is dry, and the soil of the more heavy or stiff kind, be immediately after harrowed, but where it is light, this may be deferred for a week or two. By repeating these operations sufficiently, the soil is mostly soon brought into a fine clean state of preparation for the crop.

Others, however, think the first ploughing should be deep, and the after ones and harrowings be continued to a later period, but at the same time, suggest that they must, in general, be much regulated by the nature of the soil, the circumstances of the season, and the convenience of the cultivator.

In preparing fallows, as well as other lands for turnip crops, some, in different places, besides these means, make great use of scarifiers and scufflers, and find them particularly beneficial in foul states of them.

Where the seed of this sort of crop is, however, to be put in after corn, early pease, tares, or other such crops, the preparation of the land is seldom carried to such an extent of ploughings and other operations. Much fewer are commonly thought sufficient for the purpose, as two, or three at most.

In preparing for this crop, after the surfaces of coarse pasture or other grass-lands that have been long in that state, old saintfoin lays, or downs, have been taken off and reduced by means of paring and burning them, the practice is to have recourse to once ploughing over the lands in a

light manner, the ashes having been previously spread out equally on the surface. In this way the most advantage is afforded to the turnip crops, and they have been well produced by it.

There are some other local practices of preparing for turnip crops, but they need not be noticed in this place, as being only in little use in certain cases.

In the application of manure in the preparing of land for this crop, in the first of these ways, and where it is of the calcareous kind, such as lime, marl, or other similar sorts, it may be the best mode to make use of it after the second or third ploughing, especially in the former of these kinds, in the proportion of from one and a half to about three chaldrons, or thirty-two bushels; and in that of the latter, from eight to ten or fifteen ordinary cart-loads to the acre, as the circumstances and nature of the land may be; as in this manner such matters may become the most perfectly blended and incorporated with the mould of the soil. Each of these sorts of substances has been found highly useful, in this way, in several different districts of the kingdom.

It is, however, clear, from the success of different cultivators of this sort of crop, that substances of the dung-kind, where they can be fully supplied, and used in the preparation of the land, or other ways, are the most suited to the growth of the root. And that for such soils as possess a proper degree of lightness, and are in a fine mellow state of mould, those which are in the more reduced, or rotten short condition, may be the most suitable, as they are capable of being the most intimately mixed and incorporated with them; but that where they are more close and heavy, the longer and less reduced kinds may be more proper and beneficial, as they will not only tend to preserve these soils in a more open and loose state, but by their more gradual decay in them, render the earth more friable and mellow. Some, however, think them best applied in the medium state between these extremes. This sort of manure, when used in preparing land in this intention, should vary, in some measure, not only as the nature of the soil may be, but according to the manner in which the crop may be cultivated: in general, however, it should be put into the soil as nearly as possible to the period at which the seed is sown; as, in this case, in consequence of the new fermentation that necessarily takes place in the soil, the crop receives the most benefit from it. When, therefore, the crop is to be put in, in the broad-cast manner, the dung may be spread out equally over the land, and be turned in with the seed-furrow; though some advise it to be lightly turned in by the ploughing that precedes the seed-earth, and to be well intermixed with the mould of the soil, by harrowing immediately before that earth be given. The former would appear, however, to be the better practice, especially when the manure is in a sufficiently reduced state, as the plants will have the more full advantage of it. The quantity must necessarily depend in a great measure upon the different circumstances of the soil, and the richness of the dungy material; but less than from ten to twelve good three-horse cart-loads can seldom be made use of with advantage on the acre.

Where earthy and other matters, in mixture with dung, are had recourse to in this way, after being well prepared, as is sometimes the case, the proportion should mostly be considerably larger.

In cases where the crops are put in, in the ridge or drill manner, as the manure is wholly confined to the middle parts of the ridged-up earth, and does not occupy all the superficial portions of the land, a somewhat less quantity of it may answer the purpose; though a full and rather liberal allowance

TURNIP.

allowance should always be made, as the safety and success of the crops depend much upon the rapidity and strength with which the young plants are at first pushed forward by such means.

In whatever way this sort of manure is made use of in this preparation, it should constantly be applied in an even manner, and be turned into the soil as soon as possible afterwards; as where this is not the case, great loss must often be sustained by the dissipation of the more liquid parts of it.

There are many different practices, in the preparation and application of this kind of manure, resorted to in different districts, in using it for the purpose of raising turnip crops, as may be seen by consulting the Corrected Agricultural Report of the County of Norfolk; and different kinds of it are sometimes preferred by cultivators, as that from fattening beasts, hogs, and the sheep-fold. But good clean dung of any sort is capable of answering the purpose.

The dungs of rabbits, poultry, and pigeons are occasionally used with success in the raising of crops of this sort, after being rendered dry, and dispersed over the surface of the land in an equal manner. They are mostly used for this purpose in the quantities of from about twenty to thirty bushels to the acre, just before the time of sowing the seed. And as they require to be put into the soil to only a slight depth, harrowing may, in many cases, be sufficient for the purpose, or a very light and shallow ploughing. Rape-cake has long been employed as a manure in some districts, in preparing for turnips, as that of Norfolk, by having it sown over the land in a coarsely reduced state, five or six weeks before the time at which the seed is to be put into the soil, in the quantity of about a ton to three or four acres, and leaving it so, or turning it in very lightly at the period of sowing. But it is considered a great improvement by some, and practised to much extent by Mr. Coke, of the above district, to have it ground by proper mills into a perfect state of powder; and applied at the same time with the seed over it, in the drills or small openings in the land made for the purpose. It is effected by a contrivance of the drill kind, that contains alternate divisions, with small and large cups for delivering the seed as well as the cake into the same drills. The stream of powdered cake is thus rendered constant and regular, the proper cups and funnels being capable of ready application. In this way, it is not necessary to have the cake applied before hand, and a ton is sufficient for six acres, by which there is a considerable saving in labour as well as the material. It is said to answer perfectly in the practice, though some dislike it.

Different other sorts of manures that can be reduced into a powdery state may likewise be employed in this manner, in the growth of this crop, with great economy and advantage in many cases. Malt-dust or combs too, might be made use of in the same way with advantage, though it is commonly applied over the surface in the proportion of about twenty sacks, of three bushels each, to the acre.

Sheep-folding, in some districts, is used as a means of providing manure for the growth of turnips, from the time of first ploughing up the land, to that at which the seed-earth is given. From the treading and consolidating of the soil so much in these cases, it may however be well only to fold during dry weather, and always to plough over the land in a light manner as soon after the sheep are removed as possible.

The quantity of seed which is necessary must be different in different cases, as a great deal must constantly depend on the nature and quality of the soil, the period of sowing, and

the manner and circumstances under which it is put into the ground. In some good soiled districts in the southern parts of the country, where the turnip culture in the broad-cast method is carried on to a considerable extent, the quantity made use of is commonly from about one pound to one pound and an half; but on those of a more light, and those of the sandy kinds, a pound is mostly found quite sufficient; while on some more heavy turnip soils, nearly two pounds are employed. On the calcareous and loose chalky soils too, a large quantity of seed is mostly necessary. It is indeed, in common, a good practice in sowing for turnips, not to be too sparing of seed, as the unnecessary plants are readily capable of being removed by the first hoeings and thinnings of the crops.

In the culture of the crops in the ridge or drill method, as is commonly practised in some northern districts, in consequence of the seed being deposited in a more regular and exact manner, and the whole of the land not being occupied by plants, a somewhat less quantity of seed may be sufficient.

As the success in the growth of turnip crops has been found to depend greatly on the quick early sprouting of the seed, and the young plants being expeditiously pushed into broad leaf, it may be useful to have the seed steeped a little in water, or some other liquid, before it is put into the ground, especially in dry seasons; but it must become externally dry before it be sown in all cases.

Soaking the seed in strong-scented oils, and drying it by means of brimstone, have likewise been practised in the view of preventing the destruction of the crops, but probably with but little success.

The time which is most proper for sowing crops of this sort, must be principally regulated by the intentions of the farmer in respect to the disposal and use of them; but for the general more early consumption of them, the most proper season for putting them in may be about the beginning of the month of June; but where it is intended that the crops should serve as food for stock in the more early spring months, or at late periods, the sowing should take place proportionately sooner or later. Indeed, where the root is grown on a large scale, it may often be of great utility and advantage, as well as very convenient, to have the times of sowing still more considerably varied; as the crops by such means not only come more suitably in succession to the hoe, but are likewise ready for the purpose of consumption by different sorts of live-stock, at the different periods when they may be most wanted.

In cases where the practice of lamb-suckling is had recourse to for getting them ready soon, it is essential to have crops of turnips as early as possible, in which intention the seed is to be put into the soil often a month sooner than the above period; such land being set aside for the purpose as is well enriched with manure, in a fine state of tilth, and perfectly free from weeds.

In common, however, early sown crops of turnips are not only less sweet and nutritious for stock, but more exposed to injury from mildew and other causes of the same kind, than those which are sown later in the season: but though this may be the case, the sowings in no circumstances should be deferred so long as that the plants cannot have time to fix themselves fully in the soil, and cover it well before their growth is checked and restrained by the coldness of the approaching autumn and winter seasons, as in such cases the crops never answer well for the farmer.

In regard to the methods of sowing or putting this sort of crop into the ground, they vary in different districts, but are chiefly of two different kinds, the broad-cast, and the ridge

TURNIP.

ridge or drill. In the great turnip district of Norfolk, and most of the southern parts of the country, it is the most prevailing practice to sow this sort of crop in the broad-cast manner on the level surface: while in the large turnip districts of Northumberland and Berwickshire, where this kind of husbandry has undergone considerable improvement, and in most of the more northern parts of the island, it is more common to have recourse to the drill mode, depositing the seed in rows, either in hollows or ridges mostly raised by one bout of the plough, or in drills on the level surface; at the distances of from twenty-four to thirty inches in the former case, as the circumstances of the land and the intentions of the cultivator may be, and from ten to twelve or thirteen inches in the latter.

These different general methods may each of them probably be had recourse to with propriety, success, and benefit under different circumstances and qualities of the soil. As on the light, mellow earthy, deep sandy, gravelly, and other similar sorts of land, which are apt to part with their moisture too quickly, and consequently liable to become too dry and parched for the healthy perfect growth of the turnip, it may be the best and most successful practice to sow in the broad-cast or drill mode on the plain or level surface, as by such means, the moisture which is necessary for the crop, may be more effectually preserved in the land for the supply of the plants. And on the contrary, where the lands are of a somewhat more heavy quality, and not so much disposed to part with their moisture, but to retain it in a sort of stagnant state, the ridged-up drill method may be the most suitable and advantageous, as by the mellowness and fineness of mould which it affords, and its tendency to keep it dry and preserve the plants from being hurt by the retention of too much wetness about their roots, the growth and security of the crops will be much promoted. It has a superiority too in some cases in other ways; as on soils which are rather thin in the staple, this plant, in consequence of its long tap-root standing in need of a good depth of mould, can seldom be grown in a perfect or beneficial manner, by ridging up the land considerable advantage may be gained in providing a more suitable depth of cultivated soil for the plants to grow in, and a better bed for putting in the seed, as the operation has been found to more than double the common depth of mould in some such cases. The plants in this way grow more strongly, and besides, by the manure being confined to the ridges on which they grow, are less exposed to the atmosphere, and not demanded in so large a quantity, in consequence of which more land may be employed in raising this sort of crop; while by its concentration, and the seed being placed more immediately upon it, the nourishment and means of support to the plants may be more fully and effectually supplied, and a larger produce, of course, be afforded. This mode of sowing may be beneficial too in affording the means of more easily and readily getting up the crops, as food for stock in particularly severe seasons, when eaten off very early in the winter months. It is of importance also in several other circumstances, as the hoeing, working, and cleaning of the land between the rows of the plants can be easier, better, and more perfectly executed, less expert persons can be employed in much of the work, and from the earth or mould being laid up to the plants by the use of the plough or some tool of that kind, the roots of the crops are better protected and preserved from the effects of severe frosts and other causes of injury. They can be raised in this way likewise on land that has been less prepared and is less dry, as the tops of the ridges are preserved by it in a proper state, and the crops are mostly more abundant in this manner of sowing.

Different objections have, however, been made by some to the ridged or raised drill method of putting in the seed; but the principal of those that appear to have any sort of weight or importance are, that in consequence of the roots of the crops, in such cases, being more elevated or standing higher, they are, on account of being so much exposed, less capable of standing the severity of the winter season; and that larger spaces or distances are allowed than are necessary for the roots to attain a proper size in, consequently that the quantity of produce on the acre will not be so great. Notwithstanding the latter supposition, it is probable, however, that from the nourishment or food of the plants being so greatly increased, and the growth of the crops thereby rendered so much more healthy and strong, the amount of the produce must be increased rather than diminished. Different statements and calculations would indeed seem to shew this to be the case, and that even a greater weight of turnip is raised on wide intervalled ridges than those that are narrow within certain limits.

It has been contended too, in opposition to the raised mode of sowing, that there is difficulty in restoring the land to the level state again, and that the ground in the intervals becomes unproductive in consequence of the want of manure; but by forming the ridges in a suitable and proper manner, according as the nature of the soil may be, all these inconveniences may readily be removed. In this intention, it has been advised to form the ridges in diagonal and other directions over the fields, keeping the lands dry.

It is further objected to the raised practice of sowing, that in lands of the more heavy turnip kinds, which have little irregularity of surface for taking away moisture when in excess, though larger crops of this root may often be produced, the grounds are so much injured by being poached in getting them off, that the crops of grain or other kinds which succeed them, are lessened in a far larger proportion than is compensated by the greater value of the turnips. In such cases and circumstances, it is advised, as more beneficial, to form the land into large ridges, so convex as to throw the wetness quickly into the furrows, as about fifteen feet in width, that a cart may be easily passed along them without pressing the earth in and obstructing the furrows on the sides, the seed, where the land is disposed to throw up weeds of the annual kind, being sown in the drill manner on the surfaces without being raised, as by that means the work of hoeing may be rendered more easy and convenient: but where this is not the case, and where the seed is put in at a late period, or the land much infested with the grub, it may be preferable to have recourse to the broad-cast mode of sowing, as being more certain, from the plants being left so much closer to each other at the first hoeings, as to admit of thinning out and removing the bad and unhealthy ones in the succeeding operations of the same sort. Besides, they are supposed to have the advantage of growing more strongly, from the shelter being more complete, and from the ground being less stirred about them in their early growth, before their tap-roots are sufficiently fixed in the soil to support them perfectly.

It would, however, appear from the success which has attended the sowing and raising this sort of crop in the ridged-up or other drill mode in different districts, and from the greater facility and cheapness of performing the necessary after-culture, that it is, in many instances, the most beneficial manner of sowing; but that the nature of the ridges or drills, and the distance of the rows, must often require to be varied according to the quality of the soil, and many other circumstances. See a paper in the second volume of "Communications to the Board of Agriculture," for the
com-

TURNIP.

comparative benefits of the drill and broad-cast methods of sowing, as ascertained by experiment.

In explaining the practices which are mostly made use of in putting in turnip crops in the above two different methods, it may be observed, that where the former or broad-cast manner of sowing is in use, which may be proper and advantageous in some cases, as has been just shewn, it is of much consequence to their success, that the more superficial parts of the land be brought into as mouldy and fine even condition as possible previously to the putting in of the seed, and that in sowing, the seed be dispersed over the surface of it in as perfectly even and exact a manner as may be, as soon as it can be done after the ground has been made ready, as upon these circumstances being well attended to, the goodness and abundance of the crops in a great measure depend. An expert seedman is required for performing this sort of work, but as it can seldom be done by the hand in a suitable manner by persons who have not been long in the habit of putting in small seeds in this way, a sort of box or trough has been invented and constructed for the purpose, which is in frequent use; and when proper care is taken to prevent the perforations of it from becoming obstructed by two or more seeds being fastened in them, it is of great utility in dispersing the seed in an uniform and regular manner over the surface of the land. After this has been properly effected, the seed is mostly covered in, in a shallow manner, by means of harrowing, a light short-tined harrow being used for the purpose, as from the turnip plant forming its bulb in some measure above the surface of the ground, it should not probably be put in to too great a depth in the soil. Some advise the passing of the tool twice over the land only in the same direction, in the first going slowly, and in the latter more quickly, in order to give a neater finish and finer surface; the ridges having been laid out to the breadths of from four to ten yards, as the land may be inclined to be more moist or dry. This is the Norfolk practice in some measure, and found to be extremely beneficial in many cases of broad-cast sowing for this crop.

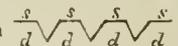
In the drill method of sowing turnips, the land, after being prepared in the manner already described, is either formed into little ridges by the plough, and the seed put in, in drills upon them, or these are struck in the level surface, as noticed above; but the first is by far the most common. In the great turnip-drilled district of Berwickshire, the little ridges or drills, in cases where the ground is not well reduced, but remains in rather a rough and cloddy state, are, it is said, formed with the common swing plough, drawn by two horses, which lays together three or four small rinds or furrow-slices for one such ridge or drill. But that the most common and expeditious method of laying up these ridges or drills is by a double mould-boarded plough, which has the boards hung on the sheath with hinges, and which can be set wider or narrower, as may be necessary. This too is drawn by two horses abreast, and forms two sides of the little ridges or drills at the same time; the width of such ridges or drills being commonly, as has been seen, from twenty-seven to thirty inches. In cases where the large ridges or lands are not much rounded, the little ridges or drills for sowing on are not laid in exactly the course of them, which is mostly parallel to one or other of the sides of the fields, but are angled a little, for the purpose of having the manure better mixed with the soil, when it comes to be ploughed up into ordinary sized ridges or lands for other crops, after the turnips have been eaten or taken off the ground, as already suggested.

But in another district, where this mode of sowing turnips is largely practised, in the extensive cultivation of the root

by some, the manner of performing the work is, after the land has been prepared and made very fine, as directed above, for the ploughman to set up three sticks or poles in a right line where it is thought most proper to begin, and by having the horses yoked double, and driven by himself with cords, these poles are seen between the horses, and by keeping the plough to bear always upon the poles, the first furrow is drawn as straight as possible. In returning, the far-side horse is kept in the new-made furrow, and the plough at such a distance as to form a one-bout ridge or drill in a complete manner, which has somewhat this appearance Δ : by proceeding in this manner over the whole, the land, when finished, displays the forms of alternate

little ridges and furrows in this way ; the distances of which are mostly as stated above, as smaller ones do not admit of ploughing between the little ridges or drills. However, in the practice of the former of these districts, the land when ridged up or formed into narrow raised divisions, the ridges have a less sharp form: thus 

In the latter of these districts, or that of Northumberland, the next processes are those of applying and turning in the dung or other manure into the little ridges or drills, which is effected in this way: a cart goes down every third interval between the small ridges or drills, and lays such matters in small heaps in it; when labourers, as women and children, are ready, and with small three-pronged forks place them out evenly in the bottoms of the three furrows of the ridges or drills; that is, in the one where the matters are dropped, and in those on each side of it. This being done, the ploughman splits the one-bout ridges, and covers up the manure exactly in the middles of new-formed ridges of the same sort: but before the sowing can take place, the tops of the ridges require to be flattened, which is done by means of a small roller, four feet eight inches in length, and nine inches in diameter, which flattens two ridges at once. On the tops, and exactly in the middles of these flattened ridges, the seed is deposited in small openings, made by one or more drill-sowing implements tied to the roller by a rope of six or seven feet in length, at which distance the roller is followed, the sowing-drill or tools being guided by a man, the

work when finished appearing in this form ; the letter *s* shewing the place of the seed, and *d* that of the substance used as manure. The ridging-up the land, and covering in the manure, are done in the same way as in the first district, by ploughs of the same kind.

And in the mode of this district, or Berwickshire, the work of manuring and covering it in go hand in hand, and succeed each other as fast as possible; the matters thus used being laid in heaps in the furrows of the different ridges or drills, from the third to the sixth, at the distance of from eight to ten feet, and immediately put carefully in along the furrows of them, when, a few being completed from end to end, the double mould-boarded plough is used, as before, to split the ridges or raised drills, and cover in the manure, which it does at one bout, leaving the ridge-tops immediately above the manure put in, rather high. These are sometimes here, in some cases and circumstances, a little levelled down before sowing, in a sort of sharp convex manner, by a light harrow run once or twice over them. But the most usual mode of flattening them is by the light wooden roller, as above, to which the drill or sowing-plough is attached, in the manner already seen. Sometimes, however, instead of the roller, a kind of sled, made of wood or iron, is had recourse to in some places, for flattening the tops of one or more

TURNIP.

more bout-ridges; but the light rolling mode is much the neatest, most convenient, and ready manner of executing the work.

There are different other modes and practices of performing the business of putting in the seed, in the ridged-up and drill manners made use of in different places; but as they are not common, or of much practical importance, they need not be mentioned here.

In putting in the seed of turnip crops in this way, a great number of different kinds of drill-fowing implements and contrivances are made use of; but those wrought by horses, and which are so formed and attached in their different parts, as to perform all or most of the several operations of the process at the same time, are, in general, the most proper and convenient for the purpose. Whatever contrivance of this nature is, however, employed, it is constantly necessary to take care that the seed be regularly delivered and put into the soil; as from the smallness of the perforations in the revolving cylinders of most of them, the seeds are liable to be obstructed in passing, and the regularity of the delivery and fowing thereby prevented.

Every district has mostly its favourite drill-fowing implement for this purpose. In the first of the above, they, for the most part, make use of a tool of this sort for fowing turnips, which has a cylinder or small barrel of white iron or copper, and that is mounted on an axle with two wheels. The barrel is perforated with holes at equal distances, and as it turns round with the wheels, the seed falls equally out, and exactly in a straight line. This cylinder and wheels are fixed to a light frame-work, which has two stilts, and is kept on the top of the ridge or drill by them, by a man or boy, who walks behind, as in mananging a common plough. Before the cylinder there is fastened to the frame-work a sort of coulter, which makes a kind of small rut-like opening for the seed, and behind is fixed a rake with two or three teeth, which mixes the seed that is dropped with the mould of the soil, and covers it; and as the horse and implement return by the next furrow or interval to the right or left, the opposite end of the roller rolls the ridge fown, and compresses or flattens the top of that on which the fowing implement follows. When it is necessary to do much work at a time, two fowing tools are had recourse to, which follow the same roller, and sow two ridges at once, and the seed is rolled in by a second roller.

An improved tool of this kind has been invented, which flattens two ridges or drills, forms the little ruts or openings on their tops, puts in the seed, and covers it in all at the same time, by which much saving in tools and labour is made. It is a very complete implement for fowing in the raised drill or ridge method. It is made and much used in Berkshire.

Sometimes the roller used for the seed in these cases is a kind of low broad wheel, which is attached to the fowing tool, and rolls only on the track or rut where the seed is put in, which may answer where the work is on a small scale.

On fine land, fully prepared with reduced dungy matter, and on which it is considered unnecessary to horse-hoe, a fowing implement of this sort is sometimes used, which is attached to the common swing-plough; and one tool following the other, the seed is sown in rows, at a regulated distance and depth. This tool and mode of fowing answer well in such cases, and are much employed in some parts of Yorkshire.

In cases where powdery substances of the rape-cake, or other such kinds, are to be put in as manure with the turnip-feed, in this way, a fowing implement of this sort has lately been contrived and had recourse to in some of the southern

turnip districts, with much utility and benefit. It sows the seed and dirt in regular lines and quantities, on two ridges at the same time, the horse passing in the furrow or interval between them. This is effected by having proper cups and funnels for depositing the cake in addition to the other parts, as seen above. It is a very complete and useful tool for the purpose.

Where, however, the seed is to be sown in the drill manner on the level surface, without its being raised in ridges, as is the practice in some districts, especially when formed at narrow distances, as not more than twelve or thirteen inches apart, the larger contrivances of this sort, which sow a number of rows or drills at the same time, may be the most proper and advantageous, as being more quick in performing the work. There are many other implements of the same kind, which are useful, and suited to different cases of fowing in this way. See *TURNIP-Drill*.

In whatever manner turnip-feed is put into the ground, experience has shewn that it is of much consequence to have it done in such a way, and under such circumstances, as that the germination and early growth of it may be in as ready a manner as possible, as upon this a great deal in the goodness of the crops depends, as has been already seen. It has been supposed by some that the seed, in order to secure these effects in the most certain manner, should be put into the soil to the depth of three or more inches; and that the superiority of the drill method of fowing partly arises from the seed being placed to a greater depth, and growing more rapidly, on account of having more moisture, so as to have the plants become sooner out of danger from insects, or other such causes of destruction; while others think, from these circumstances, that it should be covered in only in a light manner.

A late able practical writer, however, suggests, that as air is necessary as well as moisture to the vegetation of seeds when placed in the ground, it would seem probable that the quick sprouting and growth of such crops may be the best and most effectually secured, by only putting them into a middling depth, and according as the particular nature of the land, and state of the season may be, as from an inch and a half to about two inches, as the soil or season may be inclined to be wet or the contrary. In this way, it is believed, the inconveniences arising from the seed being too much parched and dried by its being exposed near the surface, and from the want of the action of the air on account of its too great depth, may be equally avoided. As crops of this sort are, for the most part, put into the earth during the hotter months, there is another circumstance that may be of equal consequence, it is supposed, in promoting the quick shooting and growth of the young plants; which is, that the seed, especially in such hot seasons, be well imbued with moisture by soaking it, and consequently with the oxygen principle of the air, as already suggested, before it is committed to the ground; as by such means, there will be less required to be drawn from the mould of the soil which surrounds the seed, and the process of vegetation almost immediately takes place. Sir George Staunton, in his account of the "Embassy to China," as well as Mr. Gillet, in the "Bath Papers," have likewise ascribed the preservation of turnip-crops in that country as well as this chiefly to this practice; and by it good crops of this sort may often be produced, where they would otherwise almost wholly fail. And the correctness of the practice and principles on which it depends, is further supported by the success of the general custom of putting in these crops on the moist, new or fresh turned-up mould. Some interesting and useful observations and experiments on the shooting and growth of turnip-feed, may be

be seen in a pamphlet "On the Failure of Turnip-Crops," by the Rev. H. B. Stacey, but which we have not room to introduce here.

After-culture of the Crop.—It is of much consequence in the production of good crops of this sort, to have this part of the culture of them well performed, and at such times as are most suited for promoting the growth of the young plants, as well as preventing those of the weed kind from rising and injuring them by the shade and obstruction which they produce; as without considerable attention in these respects, the labour and expence employed in preparing the land, and putting in the crops, must, in a great measure, be thrown away, from the want of a sufficiently adequate return being afforded. This culture is constantly to be accomplished by means of the hoe, in some way or other. Where the crop has been put into the soil in the broad-cast manner, the hand-hoe only can be made use of for the purpose; but where the seed has been sown in rows by the drill, or in other ways, and a sufficient space of interval allowed, those of the horse kind may be employed, either alone, or in addition, after the plants have been properly set out in the hand manner, to suitable distances.

It is the common practice, when the plants have produced four or five leaves, or when they cover a circle of three or four inches in diameter, which mostly happens, in favourable seasons, in the course of about a month or six weeks from the time of the seed being put in, to begin the different operations in this sort of work. In the first of which, such plants as stand too close are to be struck out, to leave the others at a suitable distance, according as the circumstances of the season, the nature of the soil, the period of sowing, and the use to which the crop is to be applied, may be. When the season is hot and dry, the striking out of the plants in the first hoeings should not, however, be such as to leave them at too great a distance; as by keeping the remaining plants pretty close together, the moisture may be better preserved in the land, and the crop rendered more secure; but in rich soils, when early sown, and when intended to be consumed by stock at an early period, a greater striking out of plants at first may be advantageous. In the practice of some, the most usual custom is to leave the plants in the first hoeings at the distance of from six to eight inches from each other, but others prefer a still greater distance. In the second hoeing, which should be performed in the course of about a fortnight, or three weeks, from the first, according as there may be a necessity, the plants that are to remain for a crop may be left at the distances of from eight or nine to twelve or more inches in the broad-cast practice, and at those of from nine or ten to fifteen, or a greater number, in the rows where the drill method is employed.

In these second hoeings, the mould between the plants should always be well stirred, in order that it may be rendered perfectly mellow and well aerated, and any weeds that may have risen be effectually destroyed. The future hoeings that may be necessary in crops of this sort are to be regulated by the particular circumstances of the cases; but the mould should never be allowed to become too stiff and compact about the roots of the plants, or any weeds be suffered to interfere with them.

It is the practice in some places, especially with the broad-cast crops, to pass a light harrow over the land once in a place, as soon as the plants are sufficiently strong, in order to render the first hoeing more effectual; and even in particular cases, where they push forward rapidly, it is made use of a second time in the contrary direction. In performing the work, however, great care is necessary, particularly when the plants are thin upon the ground, as otherwise too

many of them may be dragged up, and the crop be much injured from the want of a sufficient plant.

In the ridged crops in the latter of the above drilled turnip districts, it is the practice, when the plants have got four leaves, to begin to hoe, leaving the plants at only eight or nine inches distance in the rows; and as they have so much room sideways, or from row to row, the hoers go in that manner and pull out the surplus plants, weeds, and other matters into the furrow or hollow space between ridge and ridge, and the turnip plants are left as regular as if they had been planted out with the greatest care and exactness, the work being performed by women and children at but a trifling expence. After this, when the plants left have perfectly recovered and established themselves again in the soil, as is mostly the case in about eight or ten days, the earth is taken from the rows where the turnip plants stand, by a light plough contrived for the purpose, and turned upon the pulled and struck-out plants and weeds left by the hand-hoers, in the furrows or intervals of the ridges. And when they have once more recovered themselves from this part of the work, and are become again in a vigorous state, or when other circumstances render it necessary; the mould, which was in the former process turned from the turnip rows, is now divided and laid up equally to the different rows by the same tool, or a similar one with a double mould-board. By these means, where the land is clean and free from weeds, the work is completed; but when the contrary is the case, additional hoeings and ploughings are given, according as the state and other circumstances of the land may be.

But in the former of these districts, where the horse as well as the hand methods are had recourse to, they proceed in a different manner. In the former or horse mode, when the turnip plants are from one to three or four inches high, or when weeds begin to appear, a small light common plough of the swing kind, drawn by one horse, goes along one side of the ridge or drill, and turns off the earth from the young plants, and returns on the other side, doing the same, leaving the plants standing on sharp ridges. But sometimes, instead of this plough, the work of turning the earth off from the different sides of the plants on the ridges is done by a tool of the same nature, mounted with two sharp coulter, which cut or pare from both sides at once, and which on smooth fine land performs the work equally well and much more expeditiously. It is indeed an excellent tool for the purpose, when properly formed and made use of in the work.

In the latter or hand method of hoeing, which is had recourse to two or three days after the earth is turned off from the plants, the hoers go to work, making use of a hoe of from five to eight inches in breadth, and at one stroke across the ridge, cut out the weeds and unnecessary turnip plants, and leave the crops sufficiently thinned and set out.

When the crop has been horse and hand hoed in this manner, the field is left in that state for ten or fifteen days, and if weeds grow fast, the same work is repeated. In ordinary circumstances, the whole work of horse and hand hoeing only costs about 7s. the acre.

The turnips are now to be furrowed, or earthed up, which is done after they have been clean hoed, and are beginning to bottle, by having the earth lying between the rows, which was turned off as above, from both sides of the plants, again laid up to them by means of a double mould-boarded plough with one horse. The whole work is now finished, except only removing any weeds that may afterwards arise.

TURNIP.

It has been suggested by a large cultivator of this sort of crop, that these advantages may be equally well attained, and with more success and less danger and inconvenience, by means of paring only one side of a ridge at a time, leaving the other to be performed some time afterwards. It is thought too, that this practice of paring one side only at a time with a single plough, and leaving the other untouched for several days, has many important uses and some superiority. The tool, in this manner, is capable of going nearer to the plants; the drought has not so much impression on their growth; and the land has more benefit from the atmosphere by being stirred at different times, than when the mould is directly thrown into its first bed, as in the common manner.

In this mode of proceeding, the work is reversed at times in an alternate manner, and continued as long as a passage is allowed to the plough by the stems of the turnips; and they are never *set up* at all.

Much advantage in the hoeing of turnip crops may often be gained by having the seed put in at different times, as by this means six labourers have been found capable of performing the work twice over more than one hundred acres, while in the contrary circumstances, a much larger number is always necessary for the purpose. See *HOEING*.

In the hoeing culture of turnips, many different tools of different sorts are in use; but in the horse method, the work can be well and correctly performed by any light small plough. In this work, some use one which is about five inches in width at the bottom behind, and eleven at the top, which answers well for working the intervals of the drills or ridges. But in setting or earthing up the rows, one of the double mould-boarded sort is probably better, as being more expeditious and convenient. Improved tools of this sort have been contrived, with coulters that are moveable, for cleaning these crops, which by their capability of being readily set to different distances, so as to suit the different widths of the rows, not only perform the work of paring off and removing the earth from the different sides of rows at one operation, but which, by having their earth-boards so attached, as to be set differently as to width, effect the work of moulding up the plants. In managing the business by this tool, there is evidently not only an advantage in double the quantity of work being performed, but in the different operations and processes of it being effected in a more correct manner, such as those of stirring the mould in the intervals of the ridges or drills, and the application of it to the stems of the young plants on or in them. For these purposes, the tool of this sort, which has lately been invented by Mr. Waitall, may also be found very useful in different cases. See *TURNIPI-Hoe*.

In whatever way the work may be performed, or whatever tool may be employed for the purpose, it will always be of great utility to have the earth and mould well loosened near to the roots of the plants, when they are stiff in any way, and to have all weeds well cleared out from about them.

Dangers to which exposed.—Turnip crops are liable to danger from different causes during the more early stages of the growth of the plants, but the principal of them are those of the attacks of the fly, the slug, and the black caterpillar.

The fly chiefly preys upon the sweet tender seed-leaves of the young plants, and its presence is rendered sufficiently evident by its leaving many little brown spots on them, and by its eating away their fleshy green parts down to the fibres of the leaves. It is said to increase in size, and the number to become larger, until the plants be wholly de-

stroyed. It is supposed by some, that from these insects being extremely numerous on such leaves of turnip plants, and not *eating*, but, as it were, *sucking* their sap or juice through long probosces or organs, that serve to attach them to the leaves in somewhat the manner of leeches, they may, in some measure, be the cause of the very slow progress that is sometimes made in such plants to push into *rough leaf*.

The ravages of the slug are readily ascertained by looking to the edges of the leaves, as it begins first to feed upon them, gradually afterwards proceeding from one part of them to another, until each is more or less consumed, sometimes exhibiting in the whole of the crop a partially eaten state. In many cases, almost the whole of the plants is destroyed.

The depredations of the black caterpillar mostly take place after the crops are in a more advanced state of growth, and the plants have formed considerable tops, and are in what is usually termed *rough leaf*; the green parts of the leaves in such cases being eaten through and destroyed, consequently the growth of the plants greatly retarded.

A great many different practices have been proposed and had recourse to at different times, for guarding against the destruction produced in these ways, but hitherto probably without any great success in effectually preventing it. In this intention, the blending of new and old turnip-seed together, or such as has been moistened, and such as is dry, and using them as seed for raising the crops, has been advised by some, as by this means the plants, as crops, coming up at different times, may be less in danger of being wholly destroyed, or may escape in sufficient quantity for the purpose, especially as such insects are well known to frequently make their attacks suddenly in large numbers, destroying the plants as they rise, and as suddenly disappearing again, leaving those that come a few days afterwards untouched.

On the supposition that other sorts of plants are more desirable and liable to be fed upon by this destructive insect than that of the turnip, the old practice of mixing and sowing other kinds of seeds with turnip-seed, as those of the radish and some other sorts, has lately been revived, and much extolled by different persons, but probably the method is extremely uncertain, as it cannot be successful, except when the different kinds of plants rise pretty exactly at the same time, which, from the great difference in the vegetative powers of different seeds, will rarely be the case. Any use that can be gained in this way, must probably be by employing the seeds of such preferred plants, as are rather more quick in their sprouting and growth than those of the turnip, as, where this is not the case, the turnip plants may often be destroyed before the others are in a state to be fed upon. The dusting of the leaves of turnip crops over with caustic lime in the state of fine powder has been tried, and found useful in saving them in some cases. The same substance, as well as those of vegetable ashes and soot in their reduced states, when used by being thrown over the crops by the hand in pretty large quantities, have likewise occasionally been used with benefit against this insect as well as the slug. The sprinkling of tobacco-water, either simply, or in mixture with soap-suds and urine by proper means upon the plants and land, has been found to destroy the slugs in a ready manner and to prevent their increase. Heavy night-rolling has long been practised with supposed success against both the fly and the slug. And the practice of treading with sheep, by keeping them in constant motion on lands cropped with turnips, as well as that of sowing barley-chaff over them, has been

TURNIP.

thought useful against the latter. This last too, as well as the tobacco mixture, has been tried with benefit against the black caterpillar, a bush-harrow being previously passed over the crop to dislodge the insects. The barley-chaff is to be applied over the crop on their first appearance.

A great variety of other means has been proposed in these intentions, but probably with no very great success. See *BLACK-Canker*, *SLUG*, and *TURNIPI-FLY*, *Prevention of*.

In turnip crops, the roots of the plants are liable to have a large sort of excrescence formed below the small apples or bulbs, which, after becoming in a state of something like maturity, takes on the putrid process, and sends forth a most offensive smell. Plants in this condition are mostly stunted in their growth, and the crops indifferent. It is said to depend on soil, and that the soils of some turnip districts are subject to it until they have been clayed or marled, which is almost a certain remedy for it. This is the case with Norfolk; the soil is perhaps too light. The knobs often contain a small worm in the centres of them, which may be the cause. Taking out the affected plants and stirring the earth about the others may be useful. See *ANBURY*.

On some thin light soils too, especially in dry seasons, these crops are sometimes liable to be affected with a sort of white mouldy state, which injures and checks the growth of the young plants greatly; the chief means of removing which, is that of proper thinning and stirring the mould about the roots of the plants. When it occurs in deeper soils, benefit may be derived from rendering them more dry by deeper furrowing between the ridges. See *MILDEW*.

Turnip-plants often send off numerous stringy roots with knobby lumps at the ends of them, which are liable to decay and come to nothing, or what farmers term *fingers* and *toes*, instead of bottling or forming bulbs. This mostly happens in new or fresh land, and no mode of preventing it has probably yet been discovered. Utility in such cases may, however, be derived from better tillage and preparation.

Where these crops have been destroyed by the fly, or in other ways, the same lands should not be sown without a slight ploughing, as is too often the practice, as there must always be great danger of the crops of the second sowing in such cases. It is better either to leave the land wholly for wheat, or to give a shallow ploughing or scuffling before the turnip-feed is again put in. Transplanting is said to have been employed with benefit in such cases, as the young turnip plant is found to succeed in this way.

The seasons most favourable to crops of this sort, are those in which the weather is warm and showery, without much continued rain. In the autumn and winter periods, when the changes from frosts to thaws are frequent with rain, the roots are liable to much injury, by becoming decayed and rotten; and where they stand well in them, seldom afford the quantity of nourishment and support for stock that may be fed on them that is usual under other circumstances. They are liable too to be much hurt in the winter season by the wounds and punctures made in them by different sorts of birds, as wood-pigeons, rooks, and some others; against which they should be guarded as much as possible.

The expences of raising crops of this sort must necessarily vary considerably according to the nature of the soil, the crops which they succeed, the methods of putting them into the ground, the situation, and many other circumstances of different kinds; but in the ridge or drill practice, they may in many cases stand in this way.

Expences per Acre.

	£	s.	d.
Ploughings, three at 8s. - - -	1	4	0
Harrowings, ditto at 4s. 6d. - - -	0	13	6
Cleaning by hand-picking - - -	0	7	6
Making up ridges or drills - - -	0	4	6
Manure and labour, half allowed - - -	2	5	0
Covering up ridges or drills - - -	0	4	6
Seed - - - - -	0	1	8
Sowing by the drill - - - - -	0	1	0
Horse-hoeing twice - - - - -	0	1	8
Hand-hoeing once - - - - -	0	6	0
Earthing up rows - - - - -	0	1	0
	5	10	4

In the broad-cast practice, the expences may mostly perhaps be a little lower than in the above estimate.

It is in most cases the practice to sow barley after turnip crops, but in some northern districts, wheat, and other crops with feeds, are occasionally put in after them, when fed off with sheep, and cleared early on one ploughing.

The quantity of produce or food for stock which is afforded by crops of this sort, must, of course, differ much according to the differences of season, the nature of the soil, and the mode of culture that is pursued; but a medium crop, where the land is good and suited to the purpose, may afford fifteen tons or more on the acre; in many cases, however, it will be much less. The value of such crops must depend upon many different circumstances, as their quality and abundance, the manner in which they can be consumed, as on the land, or in cribs and stalls, in feeding or rearing live-stock of different sorts, and on the state of the market for the sale of such stock; but in common, it may be from about three or four to six or seven pounds the acre, and in some cases considerably more, as ten and upwards. An acre of good turnips will fatten a beast of forty stone and more, or about eight sheep.

Seeding Crops.—In raising crops for feed, which is the produce of the second year's growth of the plant, considerable attention is necessary in the view of producing such as is good; as when it is collected from such crops as have been sown three or four years in succession, without transplanting, the roots are liable to be numerous and long, and the necks, or parts between the bulbs and leaves, coarse and thick; and when taken from such as have been transplanted every year, these parts are apt to become too fine, with too great a diminution of the tap-roots. The best and most certain way is, therefore, to take seed from turnip plants that have been transplanted one year, and sown the next; or transplanting once in three years is supposed by some sufficient for preserving it good. The most suitable manner of performing this is to select such turnips as are the hardiest, the best of their kinds, and that have the most perfect forms, from the common crops; and after cutting their tops off, to transplant or remove them, in the latter end of the autumn, into ground that has been well prepared for them, where birds can be kept off. The feed will become ready for gathering towards the close of the ensuing summer. Some prefer that the seeds taken from a few roots, transplanted in this manner, should be preserved and sown in the drill method, for the purpose of providing plants for affording feed for the general crops, taking out all such as are weak and improper, leaving only those that are strong, and which have the best growth; and that when these have *appled*, or formed bulbs, to again take out such as do not appear good and perfect; as, by this means, turnip-feed may be procured,

TURNIP.

procured, which is not only of a more vigorous quality, but which is capable of vegetating with less moisture, and which produces stronger and more healthy plants, and, of course, better crops. The custom of transplanting the whole of the turnips in this intention is said to be too expensive, as well as injurious in some respects.

In either of these modes very good turnip-feed is capable of being raised and provided. When the seed, in these cases, is become fully ripe, the crops are mostly reaped by cutting part of the stems with the seed-pods upon them, afterwards tying them up into wads or sheaves, which, when properly dry, are carried and put into long narrow stacks, to be kept through the winter, and threshed out near the time when wanted in the spring. As in this way, however, much seed is liable to be shed and lost, on account of its readiness to escape from the pods in which it is contained, it is probably a much better practice to have it immediately threshed out, either upon a cloth in the place where it grew, or in some other more convenient spot, being then put into proper bags, and placed in a situation which is perfectly dry.

As crops of the feed kind are subject to injury and loss in many different ways, the quantity of produce must be different under different circumstances; but it may be said in common to be about twenty or twenty-four bushels on the acre. And as the price of turnip-feed is seldom less than seven or eight shillings the bushel, from the great demand for it, the culture may seem at first to be very beneficial; but from the exhausting nature of the crop, the loss in that of the grain, and the quantity of manure afterwards necessary, it is probable that turnips can only be seeded to advantage in particular circumstances of soil and situation. As often as possible, however, the farmer should raise his own, as that of the shops is in general less to be depended upon.

Application and Use of the Crop.—The turnip is a plant or root that is capable of being made use of in different intentions, but the principal are those of feeding, supporting, and fattening different sorts of live-stock, in which there are great differences in the practices of different districts of the kingdom; but the most economical and beneficial modes of applying and consuming it, under different circumstances of soils, situations, and animals, have probably not yet been sufficiently investigated and ascertained by those engaged in the cultivation of the root. It is stated by a practical writer, that though few trials have been made to determine the particular state or condition in which these roots afford the greatest and most suitable proportion of nourishment for different animals that are fed on them, it would seem, from their containing a much larger quantity of rich nutrient matter in their fresh state, before being taken from the ground, than afterwards when removed and packed up, as shewn by the shrinking and loss of weight that takes place, to be a more saving and useful practice, particularly where the nature and situation of the land and season will admit of it, as on dry lands in most of the southern parts of the country, to consume them under the former rather than the latter circumstances; but in more cold and exposed situations, as in many places in the northern districts of the kingdom, and wherever the lands are inclined to moisture or heaviness, as the roots may be greatly injured by frosts and other causes, and the animals receive much harm from the coldness of such places, while feeding on them, as well as the lands be much damaged by their treading, it may be better to eat them under the latter conditions. There are likewise other situations and circumstances, it is supposed, in which it may be particularly necessary, as well as bene-

ficial, to make use of turnips after being drawn, removed, and stored up, as those where it is difficult or inconvenient to raise and provide other sorts of green food for the winter and spring use of stock.

Wherever crops of this sort are, however, taken from the land, to be consumed by animals in other places, as from their nature and large growth they must exhaust and deprive it of its fertility greatly, it will constantly be proper and necessary to return an equivalent in manure, otherwise the harm done in this way may more than equal the benefits of the crop. And in all such cases, the tap-roots and other waste parts should always be removed and left on the land, that neither soil nor manure may be taken away, by adhering to them.

In cases where the lands are properly dry, in a high state of fertility, and under good management, it may often too be an advantageous and economical practice to have a partial recourse to both the methods, by having one part of the crop drawn, removed, and eaten off the land, in some adjoining convenient place for the purpose, and the other fed off on the field where they grow; as, by such means, a much larger quantity of land may be benefited and improved, without injury to the crops that may afterwards be grown on the turnip land.

In this mode of improving lands, a great deal more is yet probably capable of being done than has hitherto been the case, when its vast utility and powers in different ways are fully considered.

Some difference in the use and manner of consuming this sort of crop likewise takes place, from the kind of stock to which it is applied; as when used in the rearing, keeping, and fattening neat-cattle stock, it is, for the most part, pulled up and eaten, either after having been removed to some proper dry field or spot of ground of the grass or stubble kind, or to some shed or other building near the straw-yard or feeding-house; in the latter case, being given the stock in bins, troughs, or cribs, or placed before the heads of the cattle in stalls, when tied up, that are contrived for the purpose. The latter of these two modes of eating the root is supposed the better, though less frequently made use of, as there is the least possible waste, while, at the same time, the dung and urine of the cattle are the most extensively and effectually preserved. In the former of these methods, the usual practice is first to admit the fattening stock, and then to allow the lean to follow them, and eat up what may remain. In this way there is the least loss.

The cattle are mostly confined wholly upon the roots, except when prevented by the state of the season, when they are consumed in other places, or as above. In some cases, the lands to which the roots are removed, in this method of feeding, are those intended to be used for other crops in the ensuing year, by which the different fields, of course, in their turn, have the benefit of being improved in this way most conveniently; and the practice is found more useful than feeding them on the land where they grow. The roots, in these cases and modes of consuming them, should not be scattered over the ground in too thick a manner; as, where that is the case, much loss must necessarily be sustained by their being crushed and bruised by the feet of the stock, while upon them.

These several different practices are much had recourse to in some southern turnip districts, where great numbers of different sorts of this kind of stock are every year fattened on turnips.

In cases where milk is a principal object with the farmer, this plant and root are also capable of great use as a proper juicy food for cows, care being taken that the decayed leaves

leaves and other parts be not given, as they are apt to communicate a disagreeable flavour to it. The offal produced in such cases may be given to the dry stock, by which little or no loss will be sustained in the consumption of the root. This taste in milk is said to be completely removed by the use of a very weak solution of nitre in water.

These roots, too, have been usefully applied in the feeding of work-horses, as by their means the usual quantity of corn may, it is said, be lessened nearly one-half, and the horses rise in condition at the same time, as well as perform their labour equally well, and be more free from bowel complaints than in the common manner of feeding them. When used in this way, they should, however, be chopped, and have dry food of some sort joined with them in proper quantity.

The most extensive use and application of this crop is, however, in its consumption by sheep, particularly where the more suitable improved sorts prevail, in which the most general practice, where the lands are properly light and dry for the purpose, is that of confining them upon a suitable proportion of the crop by hurdles, or other means, and removing them to fresh parts, portions, or *breaks*, as they are sometimes called, every eight or ten days, or oftener, according to circumstances, or as the spaces may be eaten and cleared by the stock. Where the crop is used as the food of ewes and lambs, the former are sometimes confined in this way, and the latter left at liberty, as feeding more readily in this manner. But where the soils are of a more deep and heavy retentive quality, it is more usual, and a better and more beneficial method, to have the roots drawn and removed, as wanted, to some adjoining field to be consumed by the sheep, somewhat in the way noticed for cattle; as, in this manner, there is not only less injury and waste by soiling and treading the turnips into the ground, but the sheep get a more certain and regular supply of fresh roots, by which they do better, and the shells, by being left clean, are more fully and completely eaten up by the store cattle that are afterwards put upon them for the purpose. In some cases and states of the land too, in the former mode, it is the practice to have the crop partly eaten off on the land on which the turnips grow by sheep, and partly drawn and removed, to be consumed in other places. In such cases, the method is usually to turn the sheep upon them as they stand in the field; but, except the bulbs be much exposed above the soil of the land, it is probably a better practice to have the roots pulled up on the part, before the sheep are turned in and confined on it, as in this way they are not only less apt to break and soil the turnips, but feed and fatten much better upon them. This practice is much in use in some southern districts.

In some situations, the hilly parts have the turnips fed off in this manner by sheep, with a certain quantity of hay allowed for every acre thus eaten off, beginning with a break or portion from the lowest part of the field, and allowing a new portion or *hitch* every day, still gradually rising, clearing the whole off in time for preparing the land for the following crop. The crops on the more flat and heavy parts of the lands are drawn and removed, to be eaten with hay or other dry food in proper places.

It has been suggested, that much loss is often sustained in these modes of feeding off turnips by folding sheep upon them, particularly where the crops are raised in the broad-cast manner, and it is the custom to give the sheep large folds or breaks at a time, in consequence of frost or snow taking place. In such cases, it is supposed the ridge or drill method is far preferable, as it is easy to have the pens or trays made and fixed in such a manner as to constitute a sort of moveable crib or trough, the bars being set near the

sides of the rows, and the boards from ten to twelve inches in breadth, having stakes of suitable lengths, as the depths of the foils may be, nailed to them, and secured on the sides from which the sheep feed. The narrower the spaces the turnips are included in, the better. As it may be imagined that the animals may get in among the turnips so fenced off, it is said that, supposing the roots may occupy a regular space of about twelve inches, the troughs may be made little more than a foot in width at the bottom, having a sloping direction upwards. The bars may likewise have an inclination towards the sheep, and hang over the troughs or the parts in which the turnips are inclosed, and thus prevent them from getting in. It is supposed that in this way the sheep will have their food quite clean, and that by setting off only at a time the quantity necessary for a day, they may eat it with more avidity, and without the danger of spoiling so much by their discharges, as is mostly the case in the common circumstances of feeding upon the root.

On examination, it is contended that this mode, when even largely employed, will be found to be better in many respects, as well as a great deal cheaper, as, on the most moderate calculation, three sheep may be kept in this way to two by the common old method, or perhaps even double the number, and they will fatten much sooner. And on the principle that animals do not feed so well when a redundancy of food is before them, it is thought that if the sheep, in such cases, were driven into the straw-yards for the night, and even to eat straw in the morning, they would retain the turnips longer, and fatten quicker; while, in the mean time, the persons employed in looking after them might move the hurdles a row further, and thus little time be lost. If both fattening and store sheep should be kept in this manner, it would be proper to give the feeding stock rather more roots than are sufficient for the day, and to turn in the store sheep the succeeding day to consume what may be left. In this mode, the length of turnips that may be necessary, without waste being committed, may soon be discovered. It would seem, however, that from the constant trouble, difficulty, and expence of the plan, in providing hurdles, and fixing them for the folds, they would render it incapable of being put in execution, except in cases of a small number of sheep, where it may be an improvement, and a more economical manner of feeding off turnip crops by such sorts of stock.

In the practice of hurdling for this purpose, great attention is necessary to see that the hurdles are at first well set into the ground, and secured by stakes of sufficient length, with proper withs for tying them together, as after frosts and thaws, or snows, they are very apt to be thrown down by the wind, and other causes. The best sort of hurdles for this use is that of the flatted kind; and a material of the netting kind is sometimes employed, which is called *toiling*, but it is more expensive. See HURDLE.

In whatever manner the feeding off turnips by sheep is done, the hurdles should always be set in such directions and forms, as that labour and expence may be saved as much as possible.

In some districts, the practice of feeding off these crops in a partial manner, or that of *pull* and *throw*, has given way to that of consuming them wholly upon the land, from the full conviction of its greater utility and profit; while in others, the mixed method of eating the root is still had recourse to, as being preferable for the purpose, and affording more benefit.

As it is found, in the fattening of sheep on this crop, that they make the greatest progress just before the turnips begin to run and form their feed-stems, which is supposed to

TURNIP.

to depend partly on their containing the greatest proportion of rich nourishing matter at that time, and partly on the weather becoming more dry, warm, and settled; the shoots are sometimes mown off in the spring, and by the lateral sprouts and leaves, a more copious supply of green food is not only afforded, but the roots are preserved longer in a condition fit for use in this application. The feeding or fattening qualities of these roots are, however, much disputed by some, except when some sort of dry food is made use of with them.

In the feeding of these crops off by all sorts of stock, regard is to be had on first turning upon them, that they do not continue too long, as otherwise injury may be sustained by the distension that is sometimes occasioned by their eating too freely of them, or their being *hoven* or blown.

Where these crops are drawn for winter and spring use, it is sometimes necessary to have them preserved in some way or other. See *TURNSIPS, Preserving of*.

Great attention in many ways is necessary to turnip crops, as being the foundation of several of the most beneficial practices of the farmer.

Stealing or otherwise destroying turnips, when growing, is by statute punishable criminally, by whipping, small fines, imprisonment, and satisfaction to the party wronged, according to the nature of the offence. By 13 Geo. III. c. 32. the offender shall, on conviction before one justice, by confession on oath of one witness, forfeit such sum, not exceeding 10s. over and above the value of the goods stolen, as to the justice shall seem meet; and in default of payment, be committed to hard labour, for a time not exceeding one month.

No person shall be prosecuted for any such offence, unless the prosecution be begun within twenty days after the offence committed. The provisions of this act have been extended by statute 42 Geo. III. c. 67. in three particulars; *viz.* in the description of the offence, inserting *injuring barns and orchards*; in the penalty, making the sum not exceeding 20s.; and in the term of imprisonment, which is made two months.

TURNSIPS, with regard to *diet and medicine*, are accounted a salubrious food; demulcent, detergent, somewhat laxative and diuretic, but liable in weak stomachs to produce flatulencies, and prove difficult of digestion; the liquor, pressed out from them after boiling, is sometimes used medicinally, in coughs and disorders of the breast. The seeds have been accounted alexipharmic or diaphoretic; they have no smell, but discover to the taste a mild acrimony, seemingly of the same nature with that of mustard-seed, though far weaker. Lewis.

TURNSIPS, *Preserving of*, in *Agriculture*, the means of guarding and securing them against the effects of severe frosts and other such causes, by which they are not unfrequently much injured and rendered improper as the food of stock. In cases where they are designed for the feeding or supporting of neat cattle or other kinds of stock, during the winter and very early spring seasons, as they are then extremely liable to become hurt and destroyed in this way, on account of the sudden alternations of frost and thaw that take place in the former period, this becomes particularly useful and necessary. For want of this attention, the roots often become quite rotten and wholly unfit for use, as well as difficult to be got up when wanted.

In the intention of preserving them, many different methods and practices have been attempted and had recourse to at different times, but hitherto probably without any of them having been attended with complete success, and at the same time so cheap as to answer the farmer's purpose.

The only perfectly secure mode would be that, probably, of having them drawn, topped, and piled up with layers of dry straw in houses properly formed and constructed for the purpose, and conveniently situated for the sheds and other feeding places; but it would be liable to objection, except on a small scale, as being both troublesome and expensive.

A method of preserving this root, which is much in use, very effectual, little expensive, and attended with no great trouble, is that of drawing and piling the turnips up in different portions on the field where they are raised, with layers of dry straw put betwixt each of those of the turnips. In this mode, which is much practised in some southern counties, a load of straw is used to about thirty or forty tons of the turnips. The manner of effecting the work is said to be this: the turnips, on being drawn in a dry time, and the tops and tap-roots removed, a layer of straw is spread out on a dry part of the ground, and a layer of turnips placed upon it to the thickness of eighteen inches or two feet; after this another layer of straw, and then a layer of turnips; proceeding on, alternately in the same manner, until the pile or heap be brought to a sort of ridge or point; when the edges of the different layers of straw are turned up and fastened, which serves to prevent the roots from falling out, and at the same time affords a sort of external covering to the heap or pile, which is completed by being well thatched over the top with long straw.

It is supposed too, by some, that the difficulty of getting them out of the ground, and the dangers they are exposed to in severe frosty seasons, as well as the inconveniences the stock experience in feeding upon them from their coldness, and the hazard of their injuring the land by remaining too long, may all be avoided by piling them up in a similar manner, in small heaps in the stack form, the tops outwards, near to the places in which they are to be consumed, covering them over with wattles or hurdles lined with straw.

In some cases, turnips have been attempted to be preserved by being formed, without straw, after the tops and small roots have been taken off, and the former used green, into a sort of heaps termed *pies*, in the manner in which potatoes are sometimes kept, being well thatched over on the outsides by straw or some other more cheap material.

They have also been attempted to be preserved in the field by covering them by deep ploughing in different manners, when perfectly dry.

A great many other modes of preserving these roots have likewise been suggested and practised by farmers and others, but they need not be noticed here, as they mostly appear less useful than the above.

In all cases of preserving these roots in the heap manner, care must be taken not to have them made too large, or too closely packed up together, as the danger of their heating and being spoiled, may thereby be, in a great measure, avoided.

By some means of these sorts, turnips may mostly be preserved, kept ready, and fit for use as food for live-stock, even in situations and seasons which are the most exposed and severe, which under different circumstances are often matters of much consequence to farmers. See *TURNIP, supra*.

TURNIP, Swedish. See *RUTA BAGA*.

TURNSIPS, Stubble, the crops raised on lands after grain as sheep-feed, which on good dry soils often answer well. See *STUBBLE-Turnips*.

TURNIP-Cutter, or Slicer and Chopper, contrivances of the cutting kind, which are made use of in preparing this sort of root for being eaten by different kinds of live-stock. Implements of this nature are formed and constructed on very different

different principles, but those which have the greatest simplicity are almost always to be preferred, as performing the work in the most easy and ready manner. There is a very useful tool for this purpose, in which the roots are cut by means of a knife fixed upon a fly-wheel, the turnips being forced upon it through an inclined hopper or sort of trough. Some turnip-slicers are so effective as to cut a bushel of the root in a minute.

The chopper is made by a sort of sharp small spade, either fixed or loose, working in a box, into which the roots are thrown for being cut or chopped. The work is readily executed in this way by those who are in the habit of performing it in this manner.

TURNIP-Drill, that sort of drilling implement which is employed in the sowing of turnip-feed in the row manner. An improved tool of this sort for one-bout ridges is in use in some districts, which obviates the defects of sowing too much or too little feed. It consists of a solid cylinder, made of iron or brass, about two inches in diameter, and one inch broad, on the surface of which are formed fifteen or sixteen cavities, resembling the shape of a semi-egg when cut longitudinally, and as deep as to hold four or five feeds each. On the back of the cylinder, a little from the top, is placed the hind part of the hopper, to which is fixed a piece of iron or brass, one inch long and half an inch broad, hollowed on the inside in the form of a Gothic arch, the sides of which meeting the sides of the cavities in an oblique angle, prevent the feed from being bruised: at the lower end of this piece of iron, or gatherer, there is a slit, three-tenths of an inch long and one-tenth wide; and at the back of it, a thin flat piece of iron moves up and down by means of a screw at the top of the hopper, which enlarges or lessens the orifice directly above the cavities, and increases or diminishes the quantity of seed delivered, as the workman may think proper. This slip of iron, or regulator, is let into a groove made in the board, which forms the back-part of the hopper. The cylinder is fixed, before the cavities are made, on an iron axle one inch square, turned very true, as well as those parts of the axle which turn in the collars fixed in the handles. To the ends of the axle are fixed two wheels, twenty-six inches in diameter, which turn the axle and cylinder round, and which, in passing through the hopper containing the feed, bring forward in each cavity a number of seeds and drop them into the spout, by which means they are conveyed to the coultter, which forms a rut or channel on the top of the one-bout ridge in order to receive them. If the cavities in this sowing implement be made to hold five feeds, when the regulator is screwed close down, and there be sixteen of them, it will deposit eighty feeds each revolution; and from the diameter of the wheels being twenty-six, and the circumference eighty-one inches and a half, eighty feeds will be sown in eighty-one and a half inches, or nearly twelve feet. This being the minimum quantity, by screwing up the regulator, the number may be increased gradually to fifty or sixty in a foot, which is far more than is necessary in almost any case.

There are various other improved implements of this nature, which suit different purposes of this sort of culture made use of in different circumstances and places. See **DRILL** and **TURNIP**.

TURNIP-Hoe, a hoe employed in the culture of turnips, which is of the hand as well as the horse kind: the latter is the most ready and effectual, but both are frequently made use of in raising the crops.

A turnip-hoe chopper has lately been contrived, which is both useful in this way and for cutting the roots in feeding stock on the land. It has in the first part the make of the

common nine-inch hand-hoe, but forming an oblong square, with an eye to receive the handle from the centre of the first part or hoe, another crosses it at right angles, but this second is not made solid, as in the first common one, but, like the Dutch-hoe, the centre part is open the whole length of it. In working, the turnip being pulled out of the ground by the angles of the hoe, is immediately struck with it about the centre, which divides it into four pieces, and if these be not small enough, the stroke is repeated upon each of the pieces until they be sufficiently so. It is imagined capable of much improvement, by having two stoutish prongs on the back or reverse part of the hoe, proceeding from the neck of the eye; these prongs would pull up the turnips with a great deal more expedition, it is supposed, and the increased weight of the hoe would rather be in its favour, by lessening the force necessary to split the roots. The whole is simple and the expence trifling, which render it more valuable.

It is said that by means of this tool the turnips may each readily be sliced into as many parts, according to their sizes, as that each piece may be small enough for wether lambs, or, which is of more consequence, for being eaten by the *crores*, or old toothless ewes, which may fatten in this way with nearly equal facility as the young sheep, as they are capable of picking them up, and by a slight toss of the head, to place them so as to be properly consumed. They can thus feed on the root, when they would otherwise find it difficult to supply themselves with a sufficient quantity of food in the usual manner of nibbling the turnip, either while in the ground, or when picked up without being so cut. It is the invention of Mr. Malcolm, and is in much use in the county of Surrey, but may be beneficial in many other districts, where the practice of feeding off the crops on the land by stock is a material object to the farmer.

Hand-hoes of from four to twelve inches in width are in use, in this kind of culture, for setting out the plants and other purposes, as the nature of the crops may be. See **HOE** and **TURNIP**.

TURNIP-Rack, a contrivance of the rack kind, for sheep eating this and some other sorts of food out of with less waste than in some other ways. It is usually made about eight and a half feet long, and on one side two feet high, and on the other two feet three inches, without the feet, which are about three inches long. In the top, the middle part folds back on the rack, and on the lower part or side of it there is a bend, which serves as a gutter for preventing the rain-water falling from it on the sheep's back. The bottom opens the other way and leans against the top, for the convenience of carrying it. It is sometimes placed on low wheels. It is very useful and convenient in many cases of feeding and fattening sheep.

TURNIP Sowing Trough, a contrivance of this kind for the purpose of sowing turnip-feed with regularity in the broad-cast manner, where it cannot be done by the hand. It is somewhat in the box form, and so contrived as to disperse such small seeds with great exactness over the land. See **TURNIP**.

TURNIP-Tray, a long narrow shallow sort of trough or box contrived and made use of for the purpose of sheep eating turnips out of in consuming them upon the land, in order to prevent waste in such modes of feeding.

TURNIP-Cabbage. See **CABBAGE** and **KOHLRABI**.

TURNIP-Rooted Cabbage. See **CABBAGE**.

TURNIP-Rooted Celery, a root of that sort of the turnip form. See **APIUM**.

TURNIP-Fallow, in *Agriculture*, a term applied to that sort of preparation for the crop which is made by repeatedly working

working over the land in some way or other. The most improved practice is that of not having the autumn broken-up lands stirred again, until the surface-working in the early spring has well loosened the mould, to favour the growth of weeds, which is best performed by means of tools that operate the more superficially, as by this tillage keeping the upper parts fine and unburied that have been broken and reduced by the frosts, it is more suited to the rising of such plants than that of turning it down in a deep manner, and the work is done with greater expedition, which is a material object at such a season. This is a most excellent method; but much must constantly depend on the nature and state of the land in such sorts of work. See FALLOWING and TURNIP.

TURNIP-Fly, Prevention of, the means of guarding and protecting young seedling turnip-plants against its attacks and ravages. Though many different means of this nature have been proposed, few have been attended with much success in preserving the crops. The substances which appear to be the most promising in this intention, are those of foot and quick-lime, and urine and quick-lime, in a state of mixture proper for being thrown over the plants on the land, in a watering manner, by some sort of contrivance for the purpose, or for being put in with the seed. It is supposed that the volatile alkali, which is given off by these mixtures, may be offensive to the insects; while at the same time they afford nourishment and ready growth to the plants. In a trial with lime slaked in urine, in mixture with three parts of foot, applied by means of a small barrel, perforated all round with little gimblet holes, so as to let the quantity of about four bushels to the acre pass out, and fall into the drills with the turnip-seed, the adjoining rows were found to be eaten away, while those to which the composition was applied were scarcely touched at all. The mixture of sulphur with lime has been used, but on a full trial found wholly inefficient. Ammoniacal fumes are said to be successful by some, but further trials are wanting, and they are not very well suited for the farmer's purpose. See SEED, STEEPING, and TURNIP.

TURNITZ, or **TWARDONICE,** in *Geography*, a town of Moravia, in the circle of Brunn; 30 miles S.S.E. of Brunn.

TURNO VICECOMITUM, in *Law*, a writ that lies for those that are called to the sheriff's turn, out of their own hundred.

TURNPIKE, a gate set up across a road, watched by an officer for the purpose, in order to stop travellers, waggons, coaches, &c. to take toll of them, or money towards repairing or keeping the roads in repair. See ROAD.

There are several statutes, which have established regulations relating to turnpike-roads, the principal of which, besides those recited under HIGHWAY, are as follow. No person shall be capable of acting as a trustee in superintending turnpike-roads, who is not possessed of lands, &c. of the clear yearly value of 40*l.*, or personal estate to the value of 80*l.*; to which purpose he makes oath before two trustees, or heir apparent of a person possessed of an estate in land of the clear yearly value of 80*l.* No alehouse-keeper, nor persons retailing liquors of any kind, are capable of acting as trustees, or holding any place under them, or collecting the toll; but they are not precluded from farming the tolls, provided some other person collects them. No gate-keeper, or person renting the tolls, and residing in the toll-house, shall gain a parish settlement, nor shall the tolls, or toll-house, be assessed to the poor-rate, or any other public or parochial levy. Any gate-keeper, permitting a violation of the orders pertaining to carriages and horses, and not proceeding with

in one week for the recovery of forfeitures, shall forfeit 40*s.*; and both he and the surveyor shall render upon oath, when required by written notice from the trustees, an account of all money received, on pain of 5*l.*; and all officers shall deliver up their books, &c. relating to the execution of their offices, within ten days after written notice, on pain of 20*l.*; and all persons concerned in the execution of acts relating to turnpike-roads, neglecting their duty, shall forfeit 10*l.* The trustees, whose meetings are assembled by ten days' notice affixed on the toll-gates, or other conspicuous places, and adjourned for no longer time than three calendar months, or any five of them, may cause weighing-engines to be erected at the toll-gates, order the weighing of carriages and their loads, and take an additional toll for every hundred weight, over and above the following weights: *viz.* for every four-wheel carriage, having the fellies of the wheels sixteen inches broad, eight tons in summer, and seven in winter: for every waggon and wain, with axles of different lengths, having the distance of the nearer pair of wheels on the ground not more than four feet two inches, and the distance of the other pair such, that the fore and hind wheels shall roll only a single surface sixteen inches wide, at the least, on each side of the carriage, and the fellies nine inches from side to side, six tons ten hundred in summer, and six tons in winter: for every four-wheeled carriage, having the bottom of the fellies of the wheels nine inches broad, six tons in summer, and five tons ten hundred in winter: for every cart, having fellies of nine inches, three tons in summer, and two tons fifteen hundred in winter: for every waggon, having the fellies of the wheels six inches broad, four tons five hundred in summer, and three tons fifteen hundred in winter: for every waggon, rolling a surface of eleven inches, five tons ten hundred in summer, and five tons in winter: for every cart of the same dimensions, two tons twelve hundred in summer, and two tons seven hundred in winter: for every waggon, having the bottom of the fellies of the wheels of less breadth than six inches, three tons ten hundred in summer, and three tons in winter: and for every cart of the same dimensions, one ton ten hundred in summer, and one ton seven hundred in winter: summer, in all these cases, being determined from May 1, to October 31; and winter from November 1, to April 30. (13 Geo. III. c. 84.) The additional toll shall be as follows: *viz.* for the first and second hundred of overweight, the sum of 3*d.* for each hundred: for every hundred above two, and not exceeding five hundred, 6*d.*: for every hundred above five, and not exceeding ten hundred, 2*s.* 6*d.*: for every hundred above ten, and not exceeding fifteen hundred, 5*s.*: and for every hundred above fifteen hundred, 20*s.* The trustees, however, of the several turnpike-roads within ten miles of London, Westminster, and Southwark, are allowed to lower these additional tolls at pleasure. (14 Geo. III. c. 82.) The toll-taker offending against these regulations, incurs a forfeiture of 5*l.*; but the preceding regulations of weight do not extend to any carriage employed in husbandry, and carrying manure for land, hay, straw, fodder, or corn unthrashed; excepting hay or straw carried for sale; nor shall any toll be taken for horses belonging to officers or soldiers upon their march, or upon duty, or for any horses, cattle, or carriages, employed in carrying their arms or baggage, &c. It is required that a table of the several tolls be put up at every toll-gate. (18 Geo. III. c. 63.) For the encouragement of broad wheels, the trustees are empowered to reduce the toll of carriages, having wheels six inches broad, so that it may not be greater than that which is taken for four-wheeled carriages drawn by four horses; and for carts, having the fellies of their wheels six inches broad, no more than for carts drawn

by three horses; but for every carriage, having the fellies of the wheels of less breadth than six inches at the bottom, and for the horses, &c. one-half more than the tolls payable for the same respectively, except carriages carrying corn in the straw, hay, straw, fodder, dung, lime for the improvement of land, or other manure, and implements of husbandry. The fellies of the wheels of carriages entitled to the above exemptions, and the tire upon them, are required to be so flat, as not to deviate more than one inch from a flat surface. And all carriages, moving upon rollers sixteen inches broad on each side, with flat surfaces, shall pay only so much toll as shall not exceed half of the full toll payable for carriages having the fellies of the wheels six inches broad, and not rolling a surface of sixteen inches on each side; and half-toll shall be paid for waggons having the fellies of the wheels nine inches broad, and rolling a surface of sixteen inches on each side. These regulations do not extend to any chaise-marine, coach, landau, berlin, chariot, chaise, chair, calash, or hearse; nor to the carriage of ammunition or artillery for his majesty's service; nor to any carriage drawn by one horse, or two oxen; nor to any carriage having the fellies of the wheels nine inches broad, and laden with one block of stone or marble, one cable-rope, and one piece of metal or timber; and no toll shall be paid at any turnpike-gate for carriages employed in carrying materials for the repair of any turnpike-road, or public highway. No four-wheeled carriage, having the fellies of the wheels of less breadth than six inches, shall pass upon any turnpike-road with more than four horses. Two oxen or neat cattle shall be considered as one horse. For other regulations relating to the number of horses, see HIGHWAY. Any carriage may be drawn with any number of horses upon a turnpike-road, where a weighing-engine shall be erected, provided the carriage be weighed at such engine; and the trustees may allow for hills, the rise of which shall be more than four inches in a yard, such number of horses as they shall think necessary, not exceeding ten for waggons with nine-inch wheels, nor six for carts with nine-inch wheels; and not exceeding seven for waggons with six-inch wheels, nor five for carts with six-inch wheels; and not exceeding five for waggons with wheels of less breadth than six inches, nor four for carts of such dimensions. There is also an exception in favour of carriages that are drawn in deep snow or ice. No carriages, with the fellies of the wheels of less breadth than nine inches, shall be allowed to pass upon any turnpike-road, if the same shall be drawn by horses in pairs; except such, having the breadth of the fellies six inches, authorized by seven or more trustees, and carriages drawn by two horses only. The penalty, on conviction, by confession or oath of one witness, is a forfeiture not exceeding 5*l.* nor less than 10*s.* The penalty of evading the tolls, by unloading goods, is 5*l.*; by turning out of the road, for the owner, any sum not exceeding 5*l.* nor less than 20*s.*; but for the driver, if he be not the owner, any sum not exceeding 50*s.* nor less than 10*s.*; by taking out horses, 5*l.*; or by taking the benefit of any exemptions fraudulently, a sum not exceeding 5*l.* nor less than 40*s.* Exemptions in favour of cattle going to or from water, or pasture, shall extend only to such as shall be driven from one parish to the next adjoining, or that shall not pass upon the turnpike-road more than the space of two miles. Turnpike-roads are kept in repair by the statute-duty, required by the several acts, or if this be insufficient, by contracting for labour, &c. The surveyor of any turnpike-road, who shall suffer to remain in any part, within ten feet on either side of the middle of it, for four days, any heap of stones, rubbish, &c. obstructing the passage of it, shall forfeit 40*s.*; and any person

encroaching on it by a ditch, fence, &c. shall forfeit 40*s.*; and the trustees may direct prosecution by indictment for any nuisance, at the expence of the tolls. See HIGHWAY and ROAD.

If any person shall wilfully or maliciously destroy any turnpike-gate, post, rail, wall, chain, bar, or other fence, set up to prevent passengers from passing without paying toll, or any house erected for the use of such gate, or any weighing-engine, or rescue any person in custody for such offences, he shall be found guilty of felony, and transported for seven years, or committed to prison for any time not exceeding three years. The indictment for such offences may be inquired of, heard, and determined in any adjacent county; and the hundred shall answer damages, as in cases of robbery. If the trustees erect a gate where they have no power, the justices upon complaint may order the sheriff to remove it. As for direction-stones, &c. see HIGHWAY.

The trustees are empowered to let the tolls to farm, in consequence of public notice, to the best bidder; and if the farmer of the tolls shall take a greater or less toll than he ought to do, he shall forfeit 5*l.* and the contract; and every other gate-keeper, offending in the same way, shall forfeit 40*s.* The trustees may also lessen the tolls during such time as they shall think proper, provided that the persons entitled to five-sixths of the money remaining due upon such tolls consent. The penalty for obstructing the execution of any turnpike-act is a forfeiture of a sum not exceeding 10*l.* nor less than 40*s.* to be paid to the surveyor for the use of the road, or commitment to the common gaol, or house of correction, for any time not exceeding three months, unless the money be sooner paid. Persons aggrieved by proceedings in the execution of turnpike acts may appeal, with previous notice, to the general quarter-sessions, when the justices shall determine the appeal, and award costs, &c. But all actions are limited to thirty-three calendar months after the fact committed, and to the county where the defendant resides, or the fact was done; and the defendant may plead the general issue, and if he prevails in the action, have treble costs. 13 Geo. III. c. 84. 14 Geo. III. c. 82. 16 Geo. III. c. 39. 17 Geo. III. c. 16. 18 Geo. III. c. 28. c. 63. Burn's Justice, art. *Highways*.

The first turnpike-road erected by law was A.D. 1663. 16 Car. II. c. 1.

TURNPIKE is also used, in the *Military Art*, for a beam stuck full of spikes, to be placed in a gap, a breach, or at the entrance of a camp, to keep off an enemy. See CHEVAL *de frise*.

TURNSOLE. See TURNSOLE.

TURNSPIT, VERSATOR, in *Zoology*, a variety of the dog (which see), which belonged, in the arrangement of Dr. Caius, to the class of degeneres, curs, or mongrels.

This breed is much on the decline in England; though still used in some other countries.

TURNSTONE, in *Ornithology*, the English name of a bird, the *tringa morinellus* of Linnæus, called by authors *morinellus marinus*, or sea-dotterel.

It is a little larger than the blackbird; its head moderately thick, and its body of a longish shape; its beak a finger's breadth long, thick and whitish at the base, and sharp and black at the point; and its head, neck, shoulders, wings, and the upper part of its breast, are of a brownish colour; its throat and forehead are ash-coloured; the back and rump are white; the middle of its back is marked with a very large triangular black spot; the tail consists of twelve feathers, the lower half white, the upper black, and the tips white; the quill-feathers are dusky, but from the third or fourth the bottoms are white, increasing to about the nineteenth, when

the feathers are entirely of that colour. Its legs are short, and of a reddish-yellow or orange-colour.

These birds take their name from their method of searching for food, by turning up small stones with their strong bills, to get at the insects that lurk under them. Ray and Pennant.

Mr. Pennant mentions another species, which is the turnstone from Hudson's Bay, and the *tringa interpres* of Linnæus; often shot in the north of Scotland and its islands, and also in North America. This bird is of the size of a thrush; the forehead, throat, and belly are white; the breast black; the neck furrowed with a black collar, whence another bounds the sides of the neck, and passes over the forehead; the head and lower part of the neck behind white; the first streaked with dusky lines; the back ferruginous, mixed with black; the coverts of the tail white, crossed with a black bar; the tail black, tipped with white; and legs rather short, and of a full orange.

TURN-UP COMPASSES. See COMPASSES.

TURNWRIST PLOUGH. See PLOUGH.

TURO, in *Geography*, a town of Naples, in the province of Bari; 22 miles S.S.W. of Conversano.

TUROE, a small island of Denmark, in the Little Belt; 12 miles S.W. of Assens, in the island of Funen.

TUOK, a mountain of Persia, in Khorassan; 15 miles S. of Meshed.

TURON, a sea-port town of Cochinchina, in a bay to which it gives name, and which is deeply indented, so as to afford shelter in some or other of its inlets from every blast of wind; the bottom is mud, and the anchorage safe, with a smooth water throughout. N. lat. 16° 9'. E. long. 108° 6'.

As this harbour affords a safe retreat for ships of any burden, during the most tempestuous seasons of the year, Mr. Barrow undertook to draw a plan of it agreeably to geometrical admeasurement. The particulars of the operation and its result are detailed in Macartney's Embassy to China, and minutely illustrated by means of a chart. This chart exhibits an irregular mountainous peninsula, inaccessible on every part of the coast, except that adjacent to the harbour, and at two small sandy bays in the entrance. This peninsula was named New Gibraltar, on account of the local natural advantages which it possesses, and which renders it capable of being made, like our Gibraltar, impregnable. The natives call this peninsula Tien-tcha. United to this peninsula is a level isthmus, from three-quarters of a mile to a mile in width, containing several small villages and patches of ground, under cultivation, chiefly of rice, tobacco, pulse, and sugar-canes. The chart presents also to view the principal town in the vicinity of the harbour, at which the market is held: the adjoining land is well cultivated; and the name given to the place by the natives, as well as to the harbour, is Han-san. Connected with the peninsula by a reef of rocks, unobserved at low water, is the northern point of a small island clothed with trees and thick brush-wood; and as the depth of water is three fathoms within a ship's length of the southern extremity of the island, a convenient place might be prepared, at a small expence, for heaving down and repairing ships. The rocks might be the foundation of a pier or causeway, and thus an excellent dock might be constructed between the island and this peninsula. Such a place would be well adapted for a repository of naval stores, magazines, or warehouses. Other appendages to this harbour are described and represented in the chart; and particularly a valley with a small village, and about forty or fifty acres of land under tillage, mostly bearing rice; a large village on the banks of a considerable river, meandering through an extensive and apparently fertile and po-

pulous valley, a cove with plenty of water for ships of any burden, good anchoring ground, well sheltered, especially from the north-east monsoon, and having at its head an extensive plain, with two villages separated by a small running stream, with forty or fifty acres employed in the culture of rice; and a group of curious marble rocks, extending across the isthmus, one end being washed by the sea, and the other overhanging the river. The adjacent country is supposed to be, in general, healthy, the violent heat of the summer months being tempered by regular breezes from the sea. September, October, and November, are the season of rains; which are also frequent in December, January, and February, attended at this time by cold northerly winds. The inundations, which take place, generally, once a fortnight, and last two or three days at a time, have an effect similar to that of the periodical overflowings of the Nile, in rendering the country one of the most fruitful of the globe. In many parts, the land produced three crops of grain in the year. Its most valuable produce, besides the precious metals, consisted in pepper, cinnamon, sugar, silk, and cotton, which the natives give in exchange for a variety of European manufactures. Not far from the harbour of Turon is the town of Fai-foo, a place of some note, and about eight miles E. of the mouth of a considerable river on the coast of Cochinchina, on the banks of which lies Fai-foo; and opposite to the said mouth of the river is Callao, or, as the Europeans call it, Campello, the bearing of its highest peak from the harbour of Turon being about S.E., and the distance from it thirty miles. Staunton's Emb. to China, vol. i. See CALLAO.

TURONES, or TURONI, in *Ancient Geography*, a people of Gaul, described by Lucan (l. i. v. 437.) under the epithet of *unstable*.

"Instabiles Turones circumfita castra coercent."

According to Ptolemy, they had a town, which he calls "Cæsarodunum," and he names the people "Turupii." Their city was situated in the midst of the Loire, and they inhabited the territory that lay to the N.W. of it, and belonged to the third Lyonnaise, of which their city became the metropolis. They had the character of not being fond of war: Tacitus calls them "Turones imbelles," and Sidonius Apollinaris says of them, "bella timentes defendit Turones." When the Roman empire was destroyed in Gaul, the Visigoths became masters of this city under the reign of Euric, and it belonged to them under that of Alaric in the year 506. But Clovis, having vanquished and killed this prince in 507, took possession of the whole territory from the Loire to the Pyrenées, and also of the city of Turones, the name of which has been since changed to that of *Tours*; which see.

TURONILLA, in *Ichthyology*, a name given by some authors to the common little prickly fish called the *stickle-back*, or *barnstickle*.

TUROOT, in *Geography*, a town of Hindoostan, in Lahore; 25 miles S.E. of Jummoo.

TUROQUA, in *Ancient Geography*, a town of Spain, on the route from Bracara to Asturica, between Burbida and Aquæ Celeniæ. Anton. Itin.

TUROWLA, in *Geography*, a town of Poland; 20 miles S.E. of Ploczko.

TURPE, a town of Westphalia, in the bishopric of Paderborn; 3 miles S.E. of Salzkotten.

TURPENTINE, TEREBINTHINA, a transparent sort of resinous juice, flowing either naturally, or by incision, from several unctuous and resinous trees: as the terebinthus, larch, pine, fir, &c.

Medical writers distinguish four kinds of turpentine; as
3 O that

that of Chio or Cyprus, that of Venice, that of Strasburg, and the common turpentine.

The turpentine of Chio, or Cyprus, which is the finest genuine kind, and that which gives the denomination to all the rest, is generally about the consistence of thick honey, very tenacious, clear, and almost transparent, of a white colour, with a cast of yellow, and frequently of blue, of a warm, pungent, bitterish taste, and a fragrant smell, more agreeable than that of any of the other turpentines.

This is the produce of the common terebinth, or *pistacia terebinthus* of Linnæus (see *PISTACIA*), an evergreen bacciferous tree or shrub, growing spontaneously in the Eastern countries, and in some of the southern parts of Europe. The turpentine brought to us is extracted in the islands whose name it bears, by wounding the trunk and branches a little after the buds have come forth: the juice issues thin and clear as water, and by degrees thickens into the consistence in which we meet with it. A like juice, exuding from this tree in the East, inspissated by a slow fire, is said by Kæmpfer to be used as a masticatory by the Turkish women, for preserving the teeth, sweetening the breath, and promoting the appetite.

The turpentine of Venice is usually thinner than any of the other sorts, of a clear whitish or pale yellowish colour, a hot, pungent, bitterish, disagreeable taste, and a strong smell, without the aromatic flavour of the Chian kind. The true Venice turpentine is said to be obtained from the larch-tree, or *pinus larix* of Linnæus (see *PINUS*), growing in great abundance on the Alps and Pyrenées, and not uncommon in the English gardens. For this purpose, incisions are made at about two or three feet from the ground into the trunk of the trees, and into these they fix narrow troughs, about twenty inches long. The end of these troughs is hollowed, like a ladle; and in the middle is a small hole bored, through which the turpentine runs into a receiver placed below it. The people who gather it visit the trees morning and evening, from the end of May to September, to collect the turpentine out of the receivers. When it flows out of the tree, it is clear, like water, and of a yellowish-white; but as it grows older, it thickens, and becomes of a citron colour. No trees under twelve inches in diameter are tapped; but vigorous trees will yield annually seven or eight pounds for forty or fifty successive years, or during the term of their life. Though this kind of turpentine bears the name of Venice, it is not the produce of the Venetian territories: it is brought from some parts of Germany, and one greatly resembling it, as it is said, from New England. It is also procured in great abundance in the neighbourhood of Lyons, and in the valley of St. Martin, near Lucern, in Switzerland.

The turpentine flowing naturally, and called by the peasants *bijon*, is a kind of balsam, not inferior in virtue to that of Peru. That drawn by incision, after the tree has ceased to yield spontaneously, is also of considerable use in several arts, and it is even of this that varnish is chiefly made. It must be chosen white and transparent; and care should be taken it have not been counterfeited with some other turpentine.

In the shops, turpentine of Venice is often supplied by a composition of rosin, and the distilled oil of common turpentine.

Turpentine of Strasburg is generally of a middle consistence between the two former, more transparent and less tenacious than either, in colour yellowish-brown, in smell more agreeable than any of the other turpentines, except the Chian; in taste the most bitter, yet least acrid. This juice is extracted, in different parts of Germany, from the

silver and red fir, (see *PINUS Picea*), by cutting out successively narrow strips of the bark, from the height which a man can reach, to within two feet of the ground. In some places, a resinous juice is collected from certain knots, under the bark: this, called *lacryma abiegna*, and *oleum abietinum*, is accounted superior to the turpentine. Neither this turpentine, nor any thing under its name, is at present common in the shops.

Common turpentine is about the consistence of honey, of an opaque, brownish, white colour, the coarsest, heaviest, and in smell and taste the most disagreeable, of all the kinds of turpentine. It is obtained from the wild pine, (see *PINUS Sylvestris*), which is extremely resinous; inasmuch that, if not evacuated of its juice, it often swells and bursts. The tree is at its perfection when between seventy and eighty years old; but is fit to yield turpentine at the age of forty. Those trees which are most exposed to the sun, and have the thickest bark, afford it in the greatest abundance. The operations for procuring it commence in the month of May: the outer bark is stripped off for six inches, so as to expose the inner smooth bark, near the foot of the tree, and a wound made with a sharp tool three inches square, and an inch deep. The resinous juice soon begins to exude in transparent drops, which fall into a hole previously dug at the foot of the tree: fresh incisions are successively made till September, when the cold begins to check the further exudation. The warmer the weather is, the greater quantity of turpentine is obtained; and a healthy tree may thus yield from six to twelve pounds of turpentine annually, for a century of years. Part of the juice concretes in the wounds, and is called *galipot* in Provence, and *barras* in Guienne; but although it contains oil, yet it is not used for the purpose of procuring it. The proper turpentine is purified by being exposed to the sun's rays in barrels perforated in the bottom, through which it filters when liquefied by the heat.

The juice, as it issues from the tree, is sometimes received in trenches made in the earth, and afterwards freed of its grosser impurities by colature through wicker baskets. The cones of the tree appear to contain a resinous matter, of a more grateful kind than that of the trunk; distilled while fresh, they are said to yield a fine essential oil, called by the Germans *carpathicum oleum*, much superior to that of the turpentines.

The oil of turpentine is obtained by distilling the resin with water in a common still, when the oil is found in the receiver swimming on the water, from which it is easily separated: the average proportion is 60 lbs. of oil from 250 lbs. of good turpentine. This process is carried on both abroad and at home; but the oil drawn in this country is always preferred.

The Canada turpentine (see *BALSAM*) is obtained from a tree which is a native of North America, that flowers in May, and is brought to this country in casks, each of which contains about one hundred weight. It has a strong not disagreeable odour, and a bitterish taste; it is transparent, whitish, and has the consistence of Copaiva balsam.

Although Linnæus, and several other writers on the *Materia Medica*, refer the common turpentine to the *pinus sylvestris*, and the terebinthina *argentoratensis*, or Strasburg turpentine, to the silver fir-tree; yet upon the authority of Murray, who follows Du Hamel and Haller, Woodville has ascribed the terebinthina *vulgaris* to the *pinus picea*, which pours out the turpentine so freely, that it is seldom necessary to make incisions through the bark for the purpose.

All these juices dissolve totally in rectified spirit, but give out little to watery menstrua: they become miscible with water

TURPENTINE.

water into a milky liquor, by the mediation of the yolk or white of an egg, and more effectually by mucilages. Distilled with water, they yield a considerable quantity of a subtle, penetrating, essential oil, vulgarly called *spirit*. Neumann says, that sixteen ounces of Venice turpentine, being distilled with water, yielded four ounces and three drachms of essential oil; and the same quantity, distilled without water, yielded with the heat of a water-bath, two ounces only. The essential oil cannot without great difficulty be dissolved in spirit of wine: one part of the oil may be dissolved in seven parts of rectified spirit of wine; but on standing a while, the greatest part of the oil separates, and falls to the bottom. After distillation of turpentine with water, a yellow or blackish resin remains in the still, which is the common resin of the shops. See ROSIN and *Burgundy Pitch*.

The essential oil, re-distilled by itself in a retort, with a very gentle heat, becomes more subtle, and in this state is called ethereal; a thick matter remaining behind, called balsam of turpentine. A like balsam is also obtained by distilling with a stronger fire, the common resin; from which there arises, first, a thin yellow oil, and afterwards the thicker dark-reddish balsam, a blackish resin, called colophony, remaining in the retort.

All the turpentines are hot stimulating corroborants and detergents. They are given, where inflammatory symptoms do not forbid the use of them, from half a scruple to half a drachm and upwards, for cleansing the urinary passages, and internal ulcerations in general, and in laxities of the femoral and uterine vessels. They seem to act in a peculiar manner upon the urinary organs, impregnating the water with a violet smell, even when applied externally, particularly the Venice sort. This last is accounted the most powerful as a diuretic and detergent, and the Chio and Straßburg as corroborants. They all loosen the belly, but the Venice most; and on this account they are supposed by Riverius and others to be less hurtful than such irritating diuretics, as are not accompanied with that advantage. Dr. Cullen remarks, that terebinthinate glysters, in obstinate costiveness, are much preferable to saline, as being more certain and durable. When turpentine is carried into the blood-vessels, it stimulates the whole system; and hence its use in chronic rheumatisms and paralysis.

Turpentine readily passes off by urine, which it imbues with a peculiar odour; also by perspiration, and probably by exhalation from the lungs: and to these respective effects are to be ascribed the virtues it may possess in gravelly complaints, scurvy, and pulmonic disorders. In all these diseases, however, and especially the last, this medicine, as well as some of the gums and balsams of the terebinthinate kind, by acting as stimulants, are often productive of mischief, as was first observed by Boerhaave, and since by Fothergill.

Turpentine has been much used in gleets and fluor albus; its efficacy in the former of these disorders is ascribed by Dr. Cullen to its inducing some degree of inflammation of the urethra: in proof of which he says; "I have had some instances, both of turpentine and balsam of copaiva producing a manifest inflammation in the urethra, to the degree of occasioning a suppression of urine; but when these effects went off, the gleet which had subsisted for some time before, was entirely cured." Of those turpentines which we have described, the Venice and Canada turpentines are more generally employed for internal purposes, the Chian not being easily procured; and the common turpentine is offensive to most stomachs, so that its principal use is in some external applications, among the farriers, and for the distillation of the oil.

The oil is a most potent, stimulating, detergent diuretic. It is sometimes given, in doses of a few drops, in rheuma-

tisms and fixed pains of the joints; and some have ventured on much larger quantities. Cheyne recommends (Ess. on the Gout, p. 199, ed. 10.), as a perfect cure for sciaticas, though of many years standing, from one to four drachms of the ethereal oil, to be taken with thrice its quantity of honey, in a morning fasting, with large draughts of sack-whey after it, and an opiate at bed-time: this medicine is to be repeated, with the occasional intermission of a day, if daily repetitions cannot be borne, for four or five days, or eight at farthest. It appears, however, says Dr. Lewis, highly imprudent to venture on such large doses at once, of a medicine so very hot and stimulating. Boerhaave, after recounting, not without some exaggeration, its hypnotic, anodyne, healing, antiseptic, and discutient virtues, when applied hot externally, and its aperient, warming, sudorific, and diuretic qualities, when taken internally, adds, that it must be used with great caution; that when taken too freely, it affects the head, excites heat and pain therein, and, violently urging a diabetes, brings on a flux of the semen and of the liquor of the prostates; and that in venereal runnings, in which it has by some been commended, it tends to inflame the parts, and increase the disorder.

The oil of turpentine, taken in too large a dose, hath often very bad consequences; such as a strangury, bloody urine, and its total suppression, with a fever, violent thirst, and vomiting.

In the Medic. Ess. Edinb. vol. ii. art. 5. we have an account of such symptoms produced by the taking of two drachms of this oil in warm ale. The patient was cured by a warm bath, and drinking plentifully of Fuller's *emulso Arabica*.

The oil has lately been given with beneficial effect in unusually large doses for the expulsion of the tape-worm. It differs in its action from the other remedies which have been employed against tape-worms, by killing the worm before it throws it out, and hence it promises to be more permanently useful. The oil is useful when dropped into the ear in deafness occasioned by defect of wax. As a discutient, it is applied to indolent tumours, and is an useful primary application to burns.

Turpentines are usually given in doses of grs. x to ʒj; either made into pills with powdered liquorice-root, or dissolved in water by means of almonds, mucilage, or yolk of egg. The dose of the oil may be ℥x to ʒj, to produce its diuretic effect; but for the expulsion of tænia, it is necessary to give from ʒʒs to ʒʒj, repeated every eight hours till the worm is thrown out. In these large doses, it is more easily taken when exhibited uncombined. The official preparations of turpentine are, the "oleum terebinthinæ;" the "emplastrum Galbani comp.;" the "unguentum olei comp.;" and of the oil, "linimentum terebinthinæ."

This oil is generally used as a drier, to mix with the other oils; for which purpose it has greatly the advantage of drying-oil, with regard to colour, as it is perfectly transparent and white. It is used without any other preparation than mixing it, either alone or together, with drying-oil, with the other oils and colours. Turpentine is sometimes used with other bodies, to render spirit of wine a fit vehicle for colours.

The balsam and the inspissated resins are used chiefly externally: the balsam is less pungent than the oil, and the resins much less so than the turpentines in substance. The common yellow resin, in taste considerably bitter, is sometimes given as an internal corroborant, in preference to the turpentines themselves, as being divested of the stimulating oil. Turpentine, formerly much used as a digestive application,

cation, is, in modern surgery, almost wholly exploded. Lewis. Woodville. Thomson.

Turpentine may be of use to preserve the bodies of insects. Mr. Boyle took clear Venice turpentine, and evaporating to two-thirds, obtained a reddish transparent gum, clear of bubbles, easily soluble by heat, and as easily rendered brittle by cold. Having first pulverized it, he melted it for use, with a gentle heat, and dipped the body to be preserved several times in it, till it acquired a case of due thickness.

TURPENTINE, *Balsam, Oil, and Spirit of.* See TURPENTINE, *supra*.

TURPENTINE-Tree. See PISTACIA.

This tree, besides its proper fruit, which succeeds the flowers in the usual way, is remarkable for producing what authors of little curiosity have named another fruit, called its *horn*. This horn is a membranous production, of the length and thickness of a man's finger; and what surprised those authors who esteemed it a sort of pod, was to find that it produced, not seeds, but living animals, which they called flies.

The true history of this horn is, that it grows from the surface of the leaves, not from the stalks, in the manner of fruit, and is no natural production of the tree, but a mere accidental thing, occasioned by the wound of an insect on the leaf.

A certain species of animals called pucerons, is peculiarly fond of the juices of the turpentine-tree, and always takes its abode upon its leaves; and these horns are produced in the same manner with the galls of other plants. See PUCERON.

TURPETH. See TURBITH.

TURPIN, F. H., in *Biography*, an historical and biographical writer, was born at Caen in 1709, where he became a professor, but afterwards removed to Paris, and employed himself as a copious writer. As he avowed free principles of government, he was under a necessity of quitting France for some time; but he died at Paris in a state of indigence, betraying neither impatience nor regret, at the advanced age of 90 years. *Nouv. Dict. Hist.*

TURPINIA, in *Botany*, according to De Théis, is a new genus, dedicated by Humboldt and Bonpland, in their 5th fasciculus, to the honour of M. Turpin, an able botanical draughtsman, as well as a distinguished naturalist, the author of several articles in the *Annales du Musée d'Histoire Naturelle*. Respecting the characters, class, or order of this genus, we have no information; but the abilities of the person whose name it bears are conspicuous in the *Flora Parisiensis*, published by M. Poiteau and himself, in folio, with splendid plates, printed in colours, a work which unfortunately remains imperfect, for want of encouragement.

TURPNI, in *Geography*, a mountain of Silesia, in the principality of Teschen; 4 miles E. of Jablunkau.

TURPO, a town of Peru, in the diocese of Guamanga; 36 miles W.N.W. of Guanca Velica.

TURQUOIS. See TURCOIS.

TURRÆA, in *Botany*, received that name from Linnæus; but whether he designed to commemorate George à Turre, superintendent of the botanic garden at Padua, in the latter part of the 17th century, or Anthony Turra, a botanist of his own time, remains uncertain. The former published at Padua, in 1685, a folio history of plants, without figures, entitled *Dryadum, Amadryadum, Cloridisque Triumphus*, which Linnæus, when he wrote his *Bibliotheca Botanica*, had never been able to meet with, and which, when he afterwards acquired it, certainly could contribute little to his information, being a mere compilation of obsolete opinions. Anthony Turra, who lived at Vicenza,

printed in 1765, a 4to. dissertation on the *Farsetia*, a genus now established by Mr. Brown in *Ait. Hort. Kew.* v. 3. 96. He also published, in 1780, a *Flora Italica Prodromus*, and is the author of an Italian dissertation on the febrifuge virtues of Horse-chestnut bark. We cannot but regret that so distinct a genus, remarkable for its elegance as well as rarity, should not be more decidedly or satisfactorily appropriated.—*Linn. Mant.* 2. 150. *Sm. Plant. Ic. fasc.* 1. 10. *Schreb. Gen.* 285. *Willd. Sp. Pl.* v. 2. 555. *Mart. Mill. Dict.* v. 4. *Cavan. Diff.* 7. 360. *Juss.* 264. *Lamarck Illustr. t.* 351.—Class and order, *Decandria Monogynia*. *Nat. Ord. Tribilata, sect.* 1. *Linn. Meliz.* *Juss.*

Gen. Ch. Cal. Perianth inferior, of one leaf, bell-shaped, five-toothed, small, permanent. *Cor.* Petals five, linear, moderately spreading, very long, slightly dilated upward. Nectary a cylindrical tube, as long as the petals, or longer; its margin in ten acute spreading segments, sometimes divided. *Stam.* Filaments ten, very short, inserted between the teeth of the nectary; anthers erect, nearly ovate, emarginate. *Pist.* Germen superior, roundish, style thread-shaped, about the length of the nectary; stigma rather obtuse, corrugated. *Peric.* Capsule roundish, depressed, five-lobed, five-celled, with ten valves, bursting lengthwise. *Seeds* kidney-shaped, two in each cell.

Ess. Ch. Calyx with five teeth. Petals five. Nectary cylindrical, bearing the anthers between its segments. Capsule superior, five-lobed, five-celled. Seeds in pairs. Linnæus knew but one species of *Turraa*, sent him by Koenig. The writer of the present article has delineated that, with two new species, in his *Plantarum Icones*, and has now an opportunity of adding a fourth; making, with one described by Cavanilles, and another by Hellenius, six species in all. The whole are of a shrubby habit, with alternate, stalked, entire, simple, mostly undivided, leaves, without stipules, and stalked, lateral flowers, remarkable for their great length.

1. *T. virens.* Evergreen *Turraa*. *Linn. Mant.* 237. *Willd. n. 1.* *Sm. Plant. Ic. fasc.* 1. t. 10. *Cavan. Diff.* 361. n. 524.—Leaves elliptic-lanceolate, emarginate, very smooth. Calyx and fruit silky.—Gathered by Koenig among the lava of extinct volcanoes in the East Indies. This is an evergreen tree, or shrub, with scattered, divaricated, round, brown, leafy branches, slightly silky in their youngest state only. Leaves about three inches long, on short thick stalks, smooth and shining on both sides, terminating in a short, broad, notched point; furnished with a strong midrib, and innumerable finely reticulated veins; their under side much the palest. Flowers in little, short, axillary tufts, on angular partial stalks, and accompanied by a few small leaves, as well as many linear silky bractæ. Calyx very small, silky, with five angles, and five small teeth. Petals and nectary smooth, slender and delicate, above an inch long; we should suppose them to be white, or pale flesh-coloured; Linnæus thought the former, at least, were yellow. Capsule a quarter of an inch in diameter, clothed with silky prominent hairs.

2. *T. pubescens.* Downy-leaved *Turraa*. "Hellenius in *Stockh. Transf.* for 1788. p. 296. t. 10. f. 3." *Willd. n. 2.*—Leaves ovate, undivided or emarginate; downy beneath. Flowers aggregate. Calyx villous.—Native of the island of Hainan. The fruit of this species has not been observed. We have never seen a specimen, nor are we possessed of that particular volume of the *Stockholm Transactions*, in which alone it is described and figured. Having formerly however examined that work, in order to contrast this with the other species, we have no doubt of its being well defined.

3. *T. maculata.* Spotted-leaved *Turraa*. *Sm. Plant. Ic.*

lc. t. 11. Willd. n. 3. (*T. glabra*; Cavan. Diff. 360. n. 521. t. 204.)—Leaves elliptical, smooth. Calyx fringed.—Gathered by Commerfon in Madagafcar. This appears to be a tree, with deciduous leaves, which are perfectly smooth, of a broad, elliptical figure, bluntly pointed, two inches or more in length; marked with pale blotches on the under fide, especially near the ribs. *Footstalks* channelled, half an inch long. *Flowers* two or three together, on smooth simple stalks, hardly an inch long, erect. *Calyx* quite smooth, except its silky edges; the teeth short. *Petals* three inches long, yellow in the dried fpecimen, a little downy externally at the upper part. *Nectary*, about the fame length, flightly dilated, or funnel-shaped, at the top, with undivided fegments.

4. *T. fericea*. Silky-leaved *Turraea*. Sm. Pl. Ic. t. 12. Willd. n. 4. (*T. tomentosa*; Cavan. Diff. 361. n. 522. t. 205. f. 2.)—Leaves elliptical; villous on both fides. Calyx and flower-ftalks downy. Segments of the nectary divided.—Gathered by Commerfon in Madagafcar. The leaves are denfely clothed, especially when young, on both fides, with fhort, fhaggy, silky hairs, and ftand on downy *footstalks*. Some of them, in our fpecimen, betray fymptoms of being occafionally angular, or very flightly lobed. The flowers are even larger than the laft, their *petals* and *nectary* meafuring each five inches. Their colour appears to be reddifh, and both are externally downy. The fegments of the *nectary*, an inch long, are each divided half way down, into two almod capillary points. The *fruit* of this, as well as the preceding, is unknown.

5. *T. lanceolata*. Pink and Green *Turraea*. Cavan. Diff. 361. n. 523. t. 205. f. 1. Willd. n. 5.—Leaves elliptical-lanceolate, fomewhat wavy, smooth. Teeth of the calyx downy, twice the length of its tube. Nectary longer than the petals, its fegments bearing the anthers.—Gathered likewise in Madagafcar, by Commerfon. The leaves are quite smooth, rounded at each end, about two inches long, rather coriaceous; fome of them wavy at the edge. *Footstalks* rather fhort and ftout. *Flower-stalks* folitary or in pairs, erect, angular, smooth, fcarcely longer than the *calyx* with its teeth. *Petals* linear, an inch and half long; rofe-coloured in their lower half; yellow above; green and externally hairy, at the extremity; they cohere in our fpecimen, forming a tube, fo as to refemble fome of the tubular-flowered *Erica*, whose ftamens moreover are imitated by the pale, prominent, ribbed *nectary*, bearing the feffile anthers, about the middle of its taper-pointed fegments. This peculiar infertion of the anthers, the apparently monopetalous *corolla*, and our ignorance of the *fruit*, have always prevented our publifhing this beautiful plant as a *Turraea*; but Cavanilles feems to have found the *petals* diftinct, and we follow his example in admitting it here, though ftill with great fcruples, on account of the anthers.

6. *T. heterophylla*. Various-leaved *Turraea*.—Leaves ovate; undivided or three-lobed, with downy veins. *Calyx* downy, with fhort teeth. *Petals* fomewhat fpatulate, longer than the nectary.—Gathered on the Cape Coast of Africa, by Mr. William Brads, and communicated to us by the right honourable fir Jofeph Banks, in 1798. This has fender, downy, leafy branches. Leaves two, or two and a half, inches long, on fhortifh, downy stalks; fome of them ovate, pointed, quite undivided; others, rather the largeft, wedge-shaped at the bafe, dilated beyond the middle, into two, more or lefs diftinct, blunt, lateral lobes; all thin, copioufly veined, paler beneath; their principal veins downy on both fides. *Flowers* red, fmallier than any of the foregoing, on downy stalks not an inch long, ftanding in pairs on one fhorter, more downy, axillary common-ftalk, accompanied by a few fmall bractees. *Calyx* angular, with broad,

fhort, pointed teeth. *Petals* fcarcely an inch in length, much dilated upwards, paleft on the infide. *Nectary* two-thirds as long as the petals, exactly cylindrical, smooth. It feems to have almod capillary marginal teeth, between which are feated the large tumid anthers; but our fpecimen is not in fufficiently good order to allow us to fpeak pofitively to this point. The *ftigma* is club-shaped, large and prominent. *Fruit* wanting.

TURREBA, the *Earth-Apple*, in *Natural Hiftory*, a name given by the people of Guinea, and fome other parts of Africa, to a very fine kind of truffe, which they find in great plenty in their barren defarts, four or five inches under the fand.

TURREFF, in *Geography*, a market-town in the diftrict of the fame name, and fhire of Aberdeen, Scotland; is fituated on the banks of the Deveron, 34 miles N. by W. diftant from Aberdeen, and 155 N. by E. from Edinburgh. It is a free burgh of barony, by a charter of James IV. granted in 1511, whereby it was entitled to hold a weekly market and two annual fairs: the market is well fupplied; and the number of fairs has been increafed to feven. The principal manufactures are thofe of linen-yarn, thread, and brown linen; and here is a confiderable bleach-field. The church was rebuilt in 1794. Here was formerly an hofpital belonging to the knights Templars; and alfo one for twelve old men, founded in 1272 by Cumyn, earl of Buchan, and richly endowed in the fucceeding century by king Robert Bruce. The parifh of Turreff extends round the town about $4\frac{1}{2}$ miles in every direction, except to the N.W. where it is bounded by the Deveron. Agricultural improvements have been lately introduced; and here are feveral confiderable plantations. In the population return of the year 1811, the inhabitants of the parifh are ftated to be 2227; the number of houfes 502.—*Beauties of Scotland*, vol. iv. Aberdeenshire, 1806. *Carlift's Topographical Dictionary of Scotland*, 1815.

TURRETS, *Moveable*, in the *Roman Art of War*, were of two forts, the lefs and the greater: thofe of the leffer fort were about 60 cubits high, with fquare fides, 17 cubits broad; they had five or fix, and fometimes ten ftories or divifions, each of which was open on all fides. The greater turrets were 120 cubits high, and 23 cubits fquare, containing fometime fifteen, fometimes twenty divifions. They were of great ufe in making approaches to the walls, the divifions being able to carry foldiers, with engines, ladders, cafting-bridges, and other neceffaries.

The wheels on which they moved were contrived to be within the planks, to defend them from the enemy, and the men who were to drive them forwards flood behind, where they were moft feure; the foldiers within were protected by raw hides thrown over the turrets, and guarding thofe parts that were moft expofed. See TOWER.

TURRET *Island*, in *Geography*, a fmall ifland in the Mergui Archipelago. N. lat. $10^{\circ} 24'$.

TURRETINI, BENEDICT, in *Biography*, an eminent Proteftant divine, was the defcendant of an ancient family of Lucca, and born at Zurich in 1588, being the fon of a refugee from his country on account of his attachment to the principles of the Reformation; and in 1612 became a paftor and profefor of theology at Geneva. He was employed in feveral fuccefsful miffions, by the conduct of which he gained diftinguifhed reputation; and died in 1631, with the character of an eminent theologian, and a man of prudence and moderation. His works were, "A Defence of the Fidelity of the German Verfion of the Bible," written in French, and comprifed in 3 vols. 4to. 1618—20, with a fequel in 1626; a variety of theological difputations in Latin, on the Calviniftic fyftem of divinity; and fermons in Italian and French. Moreri.

His son, FRANCIS TURRETINI, was born at Geneva in 1623, and received his education under several eminent German professors, also at Leyden, and afterwards at Paris, where he attended the lectures of Gassendi. Returning to Geneva, he was admitted to the exercise of his ministry. Having for some time officiated as pastor of the Calvinist church at Lyons, he became, on his return to Geneva in 1653, professor of theology, in which station he continued through life. He was employed in various departments of public business, and died in 1687. Among other theological writings, didactic and controversial, he published "Institutionum Theologiæ Elencticæ Partes tres," 1679—1685, exhibiting a fair and candid view of the points that were controverted between the different communions. Moreri.

A son of the preceding, JOHN ALPHONSO TURRETINI, and the most celebrated of the name, was born at Geneva in 1671, and having, in consequence of distinguished talents and application, the tuition of able masters, access to a well-stored library, and an ample patrimony, laid the foundation of learning at home, he commenced, in his 20th year, his travels, and at Leyden studied ecclesiastical history under Spanheim. During his residence here he published, in 1692, his "Pyrrhonismus Pontificius, five Theses Theologico-Historicæ de Variationibus Pontificiorum, circa Ecclesiæ Infallibilitatem," designed to counteract the influence of Bossuet's book "Les Variations des Eglises Protestantes," by showing that the Roman Catholic church had been equally fluctuating in its opinions. At this time he visited England, and being introduced to Burnet, Tillotson, and Wake, he laboured to cancel the false notions that were entertained by some English divines concerning the Genevan church. Upon his visit to Paris, he is said to have astonished the doctors of the Sorbonne, in a public disputation, by the purity of his Latin, the depth of his reasoning, and his polite manner of arguing. When he returned to Geneva, he commenced the exercise of his ministry in 1694, and was much admired as a preacher. The magistrates established for him, in 1699, a professorship of ecclesiastical history, the duties of which he discharged without any salary. These lectures were introduced with an oration, "De Sacrarum Antiquitatum usu et Præstantia;" and the substance of these lectures comprised a body of ecclesiastical history, divided into more than 300 dissertations. In 1701 he was chosen rector of the academy of Geneva; and in this station, which he occupied for ten years, he delivered ten annual discourses, displaying eloquence united with erudition and excellent moral sentiments. Upon being appointed to the office of professor of theology in 1705, he delivered an inaugural speech, "De Theologo Veritatis et Pacis studio." In his course of divinity lectures, he discussed the most important topics of divinity, without the formality of system; such as natural religion, the excellence and evidences of the Christian revelation, the perfections of the Deity, the interpretation of Scripture, and similar subjects. It was very much the object of his wish to unite all Protestants; and with this view he took part with those German ministers who, in 1706, obtained a dispensation from the necessity of signing the formulary, intitled "Consensus," introduced during the violent disputes that had occurred concerning Grace and Predestination. Some other public offices were devolved upon him, which engaged his attention, and occupied much of his time and labour. His assiduous exertions, together with the uneasiness that was occasioned by the perturbed state of Geneva, are thought to have shortened his life, which terminated in May 1737, at the age of nearly 66 years. His works in 3 vols. 4to. were published in 1737; and after his death appeared his Com-

mentaries on the Epistles to the Romans and Thessalonians. Moreri. Gen. Biog.

TURRITIS, in *Botany*, so called, as Clusius says, from *turris*; a tower, in allusion to its pyramidal form of growth; whence also its English name of Tower-mustard.—Linn. Gen. 341. Schreb. 444. Willd. Sp. Pl. v. 3. 542. Mart. Mill. Dict. v. 4. Brown in Ait. Hort. Kew. v. 4. 108. Sm. Fl. Brit. 715. Prodr. Fl. Græc. Sibth. v. 2. 29. Pursh 438. Juss. 238. Gærtn. t. 143.—Class and order, *Tetradynamia Siliquosa*. Nat. Ord. *Siliquosæ*, Linn. *Crucifera*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of four ovate-oblong, erect leaves, converging in a parallel manner, deciduous. *Cor.* cruciform, of four ovate-oblong, obtuse, erect, undivided petals, with erect claws. *Stam.* Filaments six, awl-shaped, erect, the length of the claws, two of them shorter; anthers simple. *Pist.* Germen the length of the flower, roundish, slightly compressed; style none; stigma obtuse. *Peric.* Pod remarkably long, straight, quadrangular, but with two opposite angles obsolete and flattened, of two cells, and two keeled ribbed valves, scarcely equal in length to the partition. *Seeds* very numerous, roundish, emarginate; their cotyledons accumbent.

Eff. Ch. Pod very long and straight, linear, two-edged; its valves ribbed and keeled. Calyx closed, erect. Corolla erect.

All botanists, who have examined into the subject, have found great difficulty in distinguishing this genus from *ARABIS* (see that article); the character of the four prominent scales, or nectariferous glands, in the latter, being very uncertain. The best attempt at discriminating these genera that has ever perhaps been made, is Mr. Brown's, in the *Hortus Keewensis*, which is founded on the seeds of *Arabis* being ranged in a simple row in each cell, while those of *Turritis* compose a double one; for this is, in fact, the only real difference in our learned friend's characters. By his rule, *Turritis hirsuta* and *alpina* are removed to *Arabis*; while *Brassica arvensis* and *Sisymbrium Loefselii*, with probably some others, become species of *Turritis*. In the latter case, great violence is offered to natural affinity, but perhaps the character itself is not clear in *S. Loefselii*, and its merit is therefore not invalidated by this species, whose close relationship to *S. Irio* we have noticed in the proper place. (See *SISYMBRIUM*.) We are almost persuaded of the merit of the above distinction, in sending away to *Arabis* all the species of *Turritis* which have a simple row of seeds, and some of which have always been ambiguous. They meet in that genus with their natural allies. Nevertheless, as we have not yet treated of these species, we shall retain them here, for the present at least, indicating under each Mr. Brown's alterations, for the guidance of those who may wish to judge of his sentiments, or hereafter to conform to them. On subjects connected herewith, the reader will find some remarks under *TETRADYNAMIA*.

1. *T. glabra*. Common Smooth Tower-mustard. Linn. Sp. Pl. 930. Willd. n. 1. Ait. n. 2. Fl. Brit. n. 1. Engl. Bot. t. 777. Curt. Lond. fasc. 4. t. 47. Fl. Dan. t. 809. (*Turritis*; Ger. Em. 272. *Turrita vulgarior*; Clus. Hist. v. 2. 126.)—Radical leaves toothed, hairy; the rest entire, clasping the stem, smooth.—Native of dry open gravelly places, in most parts of Europe, from Sweden to Greece, flowering early in summer. In England it is not one of the most common plants, being confined to a gravelly, chalky, or limestone soil. The root is annual, or biennial, tap-shaped. Stem simple, erect, wand-like, two or three feet high, round, smooth; covered with numerous, somewhat crowded or imbricated, erect, very smooth, ovate, acute, glaucous leaves, arrow-shaped at their base; while the

TURRITIS.

the numerous spreading radical leaves are very rough with partly forked hairs, toothed, or pinnatifid. Flowers cream-coloured, corymbose, very numerous, their common stalk greatly elongated, after flowering, into a dense cluster of long, slender, smooth, erect, stalked pods, each two inches long, and full of numerous small seeds, imbricated in two rows, as we have already mentioned, and not alternately crossing each other, so as to form a simple row. These seeds were formerly an article of the *Materia Medica*, being esteemed hot and dry, stimulating to the generative faculty, preserving against apoplexy, &c. virtues scarcely intelligible, or consistent.

2. *T. levigata*. American Smooth Tower-mustard. Willd. n. 2. Muhlenb. Cat. 61. Pursh n. 1.—Leaves all smooth, glaucous; radical ones obovate, stalked, serrated; the rest linear-lanceolate, entire, clasping the stem.—Sent from Pennsylvania by the Rev. Dr. Muhlenberg. On rocks from Pennsylvania to Virginia; rare; flowering in May and June. Very smooth and glaucous, about a foot high. Pursh. Root biennial. Stem quite simple. Radical leaves obtuse, slightly serrated; those of the stem arrow-shaped, the lowermost an inch long, lanceolate, obtuse, serrated at the extremity; the rest smaller, narrower, entire. Flowers like the first species, but rather less. Pods erect. Willdenow.

3. *T. strida*. Slender Tower-mustard. Allion. Auctuar. 18. Willd. n. 3.—Leaves all smooth and shining; radical ones ovate, somewhat stalked, slightly toothed; the rest lanceolate, strongly toothed, sessile.—In meadows, and rather moist pastures, in several parts of Piedmont. Root white, woody. Stem two feet high, erect, quite simple, round, smooth, firm, clothed from top to bottom with alternate, close-pressed leaves, which are tapering, not arrow-shaped, at the base. Flowers small, white. Pods linear, flat, acute, erect, above an inch long, thin at the margin; the lower ones on longish stalks, and least crowded. This species is akin to *T. hirsuta*. Allioni.

4. *T. hirsuta*. Hairy Tower-mustard. Linn. Sp. Pl. 930. Willd. n. 4. Fl. Brit. n. 2. Engl. Bot. t. 587. Jacq. Ic. Rar. t. 126. Fl. Dan. t. 1040. Ehrh. Herb. 159. (*T. n.* 456; Hall. Hist. v. 1. 198. *Arabis hirsuta*; Scop. Carn. v. 2. 30. Brown in Ait. n. 11. *Erysimo similis hirsuta alba*; Bauh. Prodr. 42. *Barbaræa muralis*; Bauh. Hist. v. 2. 869.)—Leaves all rough, toothed in the middle. Stem hairy; the hairs simple and spreading. Branches straight, erect. Pod slightly quadrangular.—Native of dry open pastures, and old walls, in moist parts of Europe; not very common in England; flowering in May. The root is strong, woody, and, we believe, perennial. Stems generally several, one of which is much stronger than the rest, erect, a foot or eighteen inches high, leafy, branched, round, clothed with thick-set, prominent, simple hairs, the flowering part only being smooth. Leaves toothed, chiefly about the middle, bluntish, all more or less hairy; the radical ones obovate, slender at the base, but not stalked; those on the stem sessile, or partly embracing it, rarely dilated at each side into a small auricle. Flowers numerous, small, white, not coloured. Pods forming a very long, close, erect cluster, all narrow, compressed, but the valves are more or less strongly keeled, so as to render the pod quadrangular; its surface is smooth and shining, beaded, in a manner, with the projecting seeds, which though inserted, of course, alternately, in two rows, range in one simple series. When ripe the pods droop a little. Linnæus originally confounded with this his *T. alpina*, whose leaves are all smooth on both surfaces; and also the following.

5. *T. præcox*. Early Tower-mustard. (*T. n.* 2; Ge-

rard Galloprov. 367.)—Leaves all rough, obtuse, toothed in the middle. Stem hairy; the hairs forked and depressed, like those on the leaves. Branches straight, erect. Pod flat.—Native of Provence and Switzerland. Nearly out of flower when the *hirsuta* first expands, being full a month earlier than that species, from which, though very like in general habit, it differs in having larger flowers, tinged with purple in both calyx and petals; pods nearly flat, their valves with scarcely any sign of a rib or keel; and the hairs of the stem forked, or branched, depressed and entangled, as are all those on the leaves. The late Mr. Davall of Orbe in Switzerland first distinguished this plant from the foregoing.

6. *T. patula*. Spreading Tower-mustard. Ehrh. Beitr. v. 7. 159. Pl. Select. n. 28. Willd. n. 5. (Tourrete cotoneuse; Reyn. Mem. de la Suisse v. 1. 169. *Arabis faxatilis*; Allion. Ped. v. 1. 268.)—Leaves all rough with spreading forked hairs, ovate, toothed, clasping the stem. Branches spreading.—Native of rocks in Switzerland, in a southern exposure. Favrod. Root annual, tapering. Stem one, or more, erect, about a foot high, round, leafy, clothed with forked or starry hairs, intermixed with longer simple ones. Branches axillary, alternate, slender, loosely spreading. Leaves hardly an inch long, clasping the stem with their heart-shaped base, hoary with minute, bristly, divided hairs, and bordered with tooth-like serratures; radical ones contracted at their base, disappearing early. Flowers corymbose, very small, white. Calyx not always, as Ehrhart describes it, quite smooth; we find it sometimes tipped with fine hairs. Pods spreading, very slender, an inch and a half long, their valves without any ridge or keel. The general habit of this species, except the pods, is more like *Draba muralis* than any other *Turritis*. Allioni's synonym, hinted by Reynier, is confirmed by a Piedmontese specimen from Dr. Moleneri.

7. *T. pubescens*. Downy Tower-mustard. Desfont. Atlant. v. 2. 92. t. 163. Willd. n. 6.—Leaves all rough with prominent hairs, coarsely toothed; those of the stem sessile. Branches spreading. Pods erect, downy.—Native of hills about Algiers, flowering early in the spring. This resembles *T. hirsuta*, but is less shaggy, rather larger, with more spreading branches, and downy, less crowded, pods. The leaves are all more deeply serrated or toothed.

8. *T. ovala*. American Hairy Tower-mustard. Pursh n. 2. (*T. hirsuta*; Muhlenb. Cat. 61.)—Radical leaves stalked, ovate, toothed, obtuse, rough on both sides with starry hairs; those of the stem oblong, somewhat arrow-shaped, serrated, smooth above. Hairs on the stem depressed. Pods flat, smooth, scarcely keeled.—On rocks from Pennsylvania to Virginia, flowering in May and June. Biennial. Pursh. This also resembles *T. hirsuta*, to which we have formerly been disposed, like Dr. Muhlenberg, to refer it. The close-pressed hairs of the stem, less prominent keels of the pods, and the smoothness of the upper surface of the stem-leaves, appear sufficient marks of distinction.

9. *T. alpina*. Alpine Tower-mustard. Linn. Syst. Veg. ed. 13. 502. Willd. n. 8. Sm. Compend. ed. 2. 101. Engl. Bot. t. 1746. (*T. ciliata*; Willd. n. 7. Schleich. Catal. 59. Tourrete ciliée; Reyn. Mem. de la Suisse, v. 1. 171. *Arabis ciliata*; Brown in Ait. n. 10.)—Leaves somewhat toothed, smooth, distantly fringed and bearded; the radical ones obovate; the rest elliptical, half-embracing the stem.—Native of Gothland, Austria, Switzerland, and the west of Ireland, flowering about July or August. It was first observed in the latter country by Mr. J. T. Mackay, who gathered this plant by the sea-side at Rinville, Cunnara, in 1806. Linnæus originally considered his own Gothland specimens as a mere variety of *hirsuta*

hirfuta (see Fl. Suec. 236.), but afterwards corrected that error. The *root* is apparently biennial. *Stem* one, or more, from two to twelve inches high, simple, erect, leafy, round, mostly smooth. *Leaves* all smooth on both sides, fringed with simple or forked, scattered, spreading hairs, a few of which are often clustered into a little tuft at the tips; the radical ones are frequently tinged with red. The more evidently the *leaves* are toothed, the less they seem to be fringed, as observed in Engl. Bot. *Flowers* white, larger than in *T. hirfuta*, forming a simple corymb, soon becoming a long cluster of narrow smooth *Pods*, whose valves are very perceptibly keeled. Reynier's original specimen from Favrod proves his plant, and consequently that of Schleicher and Willdenow, to be the Linnæan *T. alpina*.

The *T. cerulea* of Allioni, Fl. Pedem. v. 1. 270. t. 40. f. 2, being considered as an *Arabis* by Wulfen, who is followed by Willdenow, *Sp. Pl.* v. 3. 537, as well as by Mr. Brown in Ait. Hort. Kew. v. 4. 104, we shall leave it there. However naturally allied this plant may seem to be to our last-described *Turritis*, it is at least as much akin to *A. alpina*, *bellidifolia*, and others of that genus.

TÜRORÁH, in *Geography*, a town of Hindoostan, in Goondwana; 20 miles S.W. of Coomtah.

TURROW, a town of Hindoostan, in Bahar; 26 miles S.W. of Arrah.

TURRUNG, a river of Asia, which empties itself into a lake, 18 miles S. of Candahar.

TURSHISH, sometimes written *Terchiz* and *Terfiz*, a town and district of Persia, in the province of Khorassan, 63 furlongs W.N.W. of Herat, lately taken possession of by the troops of his Persian majesty. The old city, called Saltanabad, is small; but to this a new one has been added, where the governor and his principal officers reside. They both together contain about 20,000 people, amongst which are 100 Hindoo families. The trade of this place arises principally from the importation of indigo, and other drugs, from the westward; wool and cloths, and rice, from Herat; and the chief export is iron, wrought in thick plates. The trifling quantity of European goods required is brought from Mazanderaun. Between this city and Herat the country is in general mountainous, wild, and uncultivated. Kinnier's Mem. of the Persian Empire.

TURSI, a town of Naples, in the Basilicata, the see of a bishop, suffragan of Matera; 24 miles S. of Matera. N. lat. 40° 17'. E. long. 16° 30'.

TURSIO, in *Ichthyology*, a name by which Bellonius, Scaliger, and several others, have called the *phocæna*, or porpoise, distinctively from the dolphin, with which it is confounded by the vulgar. See PORPESSE.

TURSOSKA, in *Geography*, a town of Hungary; 16 miles N. of Bolefko.

TURTALA, a town of Sweden, in West Bothnia; 45 miles N. of Tornea.

TURTEREBES, a town of Hungary; 14 miles N.N.E. of Zatmar.

TURTLE, in *Ornithology*. See COLUMBA.

TURTLE, in *Ichthyology*, the name by which we commonly call the great sea-tortoise. See TORTOISE.

TURTLE-Shell. See TORTOISE and TORTOISE-Shell.

TURTLE Bay, in *Geography*, a bay on the west coast of Africa. S. lat. 14° 56'.—Also, a bay on the south coast of New Ireland, so called by captain Carteret. Dampier before called it "St. George's Bay;" and from Bougainville it obtained the name of "Prallin Bay."

TURTLE Creek, a branch of the Monongahela river. At the head of this creek general Braddock was killed in 1755.—Also, a township of Ohio, in the county of Warren, containing 3442 inhabitants.

TURTLE Inlet, a channel between two small islands, on the coast of New Jersey. N. lat. 39° 2'. W. long. 74° 47'.

TURTLE Island, a small island in the East Indian sea. S. lat. 6° 35'. E. long. 132° 51'.—Also, a small island in the South Pacific ocean, surrounded by a reef of coral rocks. S. lat. 19° 50'. W. long. 177° 57'.

TURTLE Lake, a small lake of Canada. N. lat. 48° 34'. W. long. 71° 31'.

TURTLE Point, a cape on the south coast of Java. S. lat. 7° 42'. E. long. 109° 58'.—Also, a cape on the coast of West Florida, in the gulf of Mexico. N. lat. 29° 54'. W. long. 89° 4'.

TURTLE River, a river of the state of Georgia, which runs into the sea, N. lat. 31° 12'. W. long. 81° 40'.

TURTON, a township of England, in Lancashire, with 1782 inhabitants; more than half employed in trade and manufactures; 6 miles S. of Blackburn.

TURTUCAIA, a town of European Turkey, in Bulgaria, on the Danube. In 1773, it was taken and burned by the Russians; 34 miles S.W. of Driftra.

TURTUR, in *Ornithology*. See COLUMBA.

TURTUR, in *Ichthyology*, a name given by Paulus Jovius, and some other writers, to the fish called the *passinaca marina*.

TURTUR, the *Turtle-shell*, in *Natural History*, the name given by the collectors of shells to a very beautiful species of *murex*, common in the cabinets, but not found any where on the shores. This is owing to its having greatly altered its appearance in polishing; for it is no other than the white and brown-mouthed *murex*, which is common in its rough state, with its outer coat taken off.

TURTURA, in *Geography*, a town of Naples, in Basilicata; 40 miles S. of Potenza.

TURTURANO, a town of Naples, in the province of Otranto; 5 miles S. of Brindisi.

TURUCHAN, a river of Russia, which rises from a lake, N. lat. 67° 42'. E. long. 84° 14', and runs into the Enisei, a little south of Turuchansk.

TURUCHANSK, a town of Russia, in the government of Tobolsk, on the Enisei, formerly called "Mangafæa." According to an old tradition delivered down from father to son, a colony from Archangel built the old ostrog of Mangafæa, before any other Russian town existed in Siberia. It derives its name from a Samoiedean tribe, who inhabited this country, calling themselves Mangafæ; who, by promising to pay tribute to the Russians, occasioned the building of the town. Old Mangafæa, which stood on the river Taz, gradually fell to decay; in 1600, the present town was built, and the inhabitants of the old ostrog were removed hither. This new ostrog was also called "Mangafæa;" but as it lies at the mouth of the river Turukan, it had also the name of Turukansk, which it retains to this day. As this ostrog proved the means of several nations becoming tributary to the Russians, it was probably on that account afterwards endowed with the privileges of a town. The houses in this town are not contiguous, and at most do not exceed one hundred. The greatest part of it is inclosed within a small wooden fortification, with four pieces of cannon; and in this stands the house of the governor or prefect, and the principal church; and without it are two other churches. Most of the inhabitants have always been Cossacks; who were placed here, in order to subdue, or at least to check, the Pagan nations, of this country, particularly the Tungusians and Samoiedes; 724 miles N.E. of Tobolsk. N. lat. 65° 40'. E. long. 88° 44'.

TURUNDA, a tent, so called in *Surgery*, is usually composed of a bit of lint rolled up, or else of a piece of common sponge, or prepared sponge. Its general use is to keep an

an opening from healing up too soon, in cases of abscesses, diseased bone, &c. Sometimes, also, it is used for dilating the aperture, by which means extraneous substances can be removed, without employing the knife. Tents have even been used for dilating the meatus urinarius, and thus enabling the surgeon to extract stones of considerable size from the bladders of female subjects.

TURUNGA, in *Geography*, a town of Hindoostan, in the circar of Ruttunpour; 24 miles N. of Raypour.

TURZA, or **TURCETA**, in *Ancient Geography*, *Boufha*, a town of Africa, 6 leagues S.W. of Tunis, now a heap of ruins.

TURZEC, in *Geography*, a town of Lithuania, in the palatinate of Novogrodek; 24 miles E. of Novogrodek.

TURZO, **TRUZZA**, in *Ancient Geography*, a town of Africa, mentioned by Ptolemy, situated eight leagues W. of Vicus Augusti.

TURZONZA, in *Geography*, a town of Mexico, in the province of Mechoacan, on the side of a lake; 25 miles W. of Mechoacan.

TUS. See **MESCHID**.

TUSA, a fortress on the north coast of Sicily; 8 miles S.E. of Cefalu.

TUSANTLU, a town of Mexico, in the province of Mechoacan.

TUSBY, a town of Sweden, in Nyland; 15 miles N. of Helingsfors.

TUSCA, the *Zaine*, in *Ancient Geography*, a river of Africa, which separated Africa Propria from Numidia. Pliny.

TUSCAN, in *Architecture*, the first, simplest, and most massive of the five orders.

The Tuscan order takes its name from the ancient people of Lydia, who, coming out of Asia to people Tuscany, first executed it in some temples, which they built in their new plantations.

Vitruvius calls the Tuscan the *rustic order*; with whom agrees M. de Cambray, who, in his *Parallel*, says, it ought never to be used but in country-houses and palaces. M. le Clerc adds, that in the manner Vitruvius, Palladio, and some others, have ordered it, it does not deserve to be used at all. But in Vignola's manner of composition, he allows it a beauty, even in its simplicity; and such as makes it proper not only for private houses, but even for public buildings, as in the piazzas of squares and markets, in the magazines and granaries of cities, and even in the offices and lower apartments of palaces.

The Tuscan has its character and proportions, as well as the other orders; but we have no ancient monuments to give us any regular Tuscan pillar for a standard.

M. Perrault observes, that the characters of the Tuscan are nearly the same with those of the Doric; and adds, that the Tuscan is, in effect, no other than the Doric, made somewhat stronger, by shortening the shaft of the column; and simpler, by the small number, and largeness of the mouldings.

Vitruvius makes the whole height of the order 14 modules, in which he is followed by Vignola, M. le Clerc, &c. Serlio only makes it 12. Palladio gives us one Tuscan profile, much the same as that of Vitruvius; and another too rich; on which side Scamozzi is likewise faulty. Hence it is, that that of Vignola, who has made the order very regular, is most followed by the modern architects. See **COLUMN**.

Of all the orders, the Tuscan is the most easily executed, as having neither triglyphs nor dentils, nor modillions to

cramp its intercolumns. On this account, the columns of this order may be ranged in any of the five manners of Vitruvius, *viz.* the pycnostyle, systile, eustyle, diastyle, or aræostyle. For the parts and members of the Tuscan order, their proportions, &c. see **CAPITAL**, **BASE**, **PEDESTAL**, **FREEZE**, &c.

TUSCANY, in *Geography*, now called *Etruria* (which see), a grand duchy or kingdom, long celebrated for the arts; the capital of which is *Florence*, which see. Pinkerton states its length at about 120 British miles, and its breadth at 90; and its area of 7040 square miles as containing about 1,250,000 persons. The revenue is computed at about half a million sterling; but the forces do not exceed 6000 or 8000. Tuscany is one of the most beautiful and fertile regions of Italy, with a temperate and healthy climate. It abounds in corn and cattle, and produces excellent wines and fruit. The mountains in the Siennese, or southern part of Tuscany, contain valuable ores of antimony, copper which is wrought at Massa, and other metals, with slate and yellow marble. The serpentine of Impruneta, 7 miles S. from Florence, presents beautiful varieties used in ornamental architecture. Borax has been found in the lakes of Tuscany, near Sienna and Volterra. The Florentine marble is remarkable for picturesque representations of ruins, &c. caused by the infiltration of iron between the laminae. The river Arno receives many small streams; and the Ombrone is a considerable river which pervades the Siennese.

TUSCARAWA, a county of the district of Ohio, containing 3045 inhabitants.—Also, a township of Stark county, in the district of Ohio, containing 145 inhabitants.

TUSCARORA, a village of New York, inhabited by a tribe of Indians of the Tuscarora nation, consisting of about 300 souls, in the county of Niagara, about 2½ miles E. of Lewiston. They have a good meeting-house and a Presbyterian clergyman; and also an English school. These Indians are sober and orderly in their general deportment, and many of them are respectable in point of wealth, as well as moral conduct. This tribe came from the S. about the year 1712, and joined the Five Nations or Iroquois. The land on which they now live was given them many years ago by the Senecas.

TUSCARORA, a town of North Carolina; 20 miles S.E. of Halifax.

TUSCARORA Creek, a river of Pennsylvania, which runs into the Juniatta, 12 miles S.E. of Lewiston.

TUSCHAMA, a town of Russia, in the government of Irkutsk; 28 miles N.N.W. of Ilimsk.

TUSCHAMSKA, a town of Russia, in the government of Irkutsk; 100 miles N.W. of Ilimsk.

TUSCHGER SEE, a lake of Carinthia; 11 miles N. of Millstatt.

TUSCHNITZ, a town of Bavaria, in the bishopric of Bamberg; 10 miles N.E. of Lichtenfels.

TUSCI, in *Ancient Geography*, a people of Asiatic Sarmatia, between mount Caucasus and the Ceraunian mountains, according to Ptolemy.

TUSCOMARTEE, in *Geography*, a town of Curdistan, pleasantly situated to the north of the Tigris, at the foot of some hills, and well watered by several clear streams that flow from them. It commands a very fine prospect over an extensive vale to the south. In the summer season the sun is so powerful as to destroy all vegetation, except near the rivulets that flow from the mountains, where are found numerous flocks of sheep and herds of cattle. These, however, the shepherds are always obliged to drive to the town

in the evening, on account of the wild beasts. In this vale no single habitation is visible for near 15 or 20 miles. Jackson's Journey from India, p. 120.

TUSCULAN, in *Matters of Literature*, is a term which frequently occurs in the phrase *Tusculan Questions*. Cicero's "Tusculan Questions" are disputations on several topics in moral philosophy, which that great author took occasion to denominate, from *Tusculum*, the name of a country seat, or villa, where they were composed, and where he lays the scene of the dispute.

They are comprised in five books; the first on the contempt of death; the second of enduring pain; the third on assuaging grief; the fourth on the other perturbations of the mind; and the last, to shew, that virtue is sufficient to a happy life.

TUSCULUM, in *Ancient Geography*, a town of Latium, at a small distance from Rome, towards the S.E. Its origin was referred to the time of Ulysses, whose son Telegonus, by Circe, is said to have been its founder. Its inhabitants were distinguished for their courage, and placed themselves at the head of the allies in the war of the Latin people. It was afterwards subdued by Rome and became municipal. Its situation on a mountain and between the hills induced the rich inhabitants of Rome to select it as the site of their country-houses. It had a citadel of no less importance with regard to this city than the Capitol with regard to Rome. It had also an amphitheatre and aqueducts. It was afterwards denominated *Frescati* or *Frascati*, which see.

TUSCUM, or **THUSUM Mare**, the name of a part of the Mediterranean sea, which washed the coasts of Etruria, as far as the coasts of Sicily.

TUSGEL, in *Geography*, a town of Asiatic Turkey, in Caramania; 42 miles N.W. of Cogni.

TUSHES, in the *Manege*, are the fore-teeth of a horse, seated beyond the corner teeth, upon the bars, where they shoot forth on each side of the jaws, two above, and two below, about the age of three, three and a half, and sometimes four; and no milk or foal-teeth ever come up in the place where they grow. See **TEETH**.

TUSHETI, in *Geography*, a town of Asia, in Daghestan; 80 miles S. of Teflis.

TUSIAGATH, in *Ancient Geography*, a town of Africa, in the interior of Mauritania Cæsariensis, according to Ptolemy.

TUSIS, in *Geography*, a town of the Helvetic republic, in the Grisons, on the Rhine. In 1799, it was taken by the French; 15 miles S. of Coire. N. lat. 46° 32'. E. long. 9° 30'.

TUSK, in *Carpentry*, a bevel-shoulder, made to strengthen the iron of the joint, which is let into the girder.

Tusk, in *Zoology*, is used to denote the long tooth of a fighting animal; and in the same sense with tushes, as applied to other animals besides horses.

TUSKAR, in *Geography*, a small island, or rather rock, off the coast of the county of Wexford, Ireland, forming a conspicuous object for mariners. N. lat. 52° 13'. W. long. 6° 10'.

TUSKAU, a town of Bohemia, in the circle of Pilsen; 6 miles N.W. of Teinitz.

TUSKAWARA, a township of Muskiagum county, in the district of Ohio, containing 1151 inhabitants.

TUSO, in *Ancient Geography*, a river of India, on this side of the Ganges, into which it runs.

TUSPA, in *Geography*, a town of Mexico, in the province of Mechoacan; 25 miles N.N.E. of Colima.—Also,

a town of Mexico, in the province of Tlaxcala, at the mouth of a river so called; 140 miles N.N.E. of Puebla de los Angeles.—Also, a river of Mexico, which runs into the gulf of Mexico, N. lat. 21° 28'. W. long. 98°.

TUSSER, JOHN, in *Biography*. In Henry VIIIth's time, when music was more cultivated in England than it had ever been before, an arbitrary and oppressive power was given to the deans of cathedrals and collegiate churches, to impress children possessed of good voices, in order to supply their several choirs with choristers. And John Tuffer, the subject of this article, and the unfortunate author of the "Five Hundred Pointes of Good Husbandrie," one of the most pleasant and instructive poems of the time, tells us, that he was impressed from Wallingford college, in Berkshire, into the King's chapel. Soon after, by the interest of friends, he was removed to St. Paul's, where he received instructions in music from John Redford, an excellent contrapuntist, and organist of that cathedral. There seems, however, to have been care taken of the general education of boys so impressed, as we find that Tuffer was sent from St. Paul's to Eton school, and thence to Cambridge. He afterwards tried his fortune in London about the court, under the auspices of his patron lord Paget, where he remained ten years; then he retired into the country, and embraced the occupation of a farmer, in the several counties of Suffex, Suffolk, and Essex; but not prospering, he procured a singing-man's place in the cathedral of Norwich; where he does not seem to have remained long before he returned to London. But being driven thence by the plague, he retired to Trinity college, Cambridge; returning afterwards, however, to the capital, he there ended his restless life in 1580; not, as has been said, *very aged*, if he was born about 1523.

TUSSEY, in *Geography*, the name of mountains of Pennsylvania; 10 miles N. of Huntingdon.

TUSSILAGO, in *Botany*, an ancient name, composed of *tuffis*, a cough, and *ago*, to act upon, or cure; in allusion to the reputed virtues of this herb, as a remedy for coughs and other pectoral diseases.—Linn. Gen. 423. Schreb. 554. Willd. Sp. Pl. v. 3. 1962. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 5. 34. Sm. Fl. Brit. 878. Prodr. Fl. Græc. Sibth. v. 2. 175. Pursh 531. Juss. 181. Tourn. t. 276. Lamarck Illustr. t. 674. Gært. t. 170. (Petasites; Tourn. t. 258. Gært. t. 166.)—Class and order, *Syngenesia Polygamia-supersilua*. Nat. Ord. *Compositæ discoideæ*, Linn. *Corymbifera*, Juss.

Gen. Ch. *Common Calyx* cylindrical, tumid at the bottom, of from fifteen to twenty linear-lanceolate, equal, somewhat membranous scales, the length of the disk. *Cor.* compound, various. Florets in some all perfect, tubular, funnel-shaped, with an acute, four or five-cleft, reflexed limb, longer than the calyx; in others such florets are found in the disk only. Female florets when present either ligulate, very narrow, undivided, longer than the calyx; or tubular, and rather longer than the perfect florets. *Stam.* in the perfect florets, filaments five, capillary, very short; anthers more or less united into a cylindrical tube. *Pist.* Germen in the perfect florets, short; style thread-shaped, longer than the stamens; stigma thickish, emarginate: in the female ones, Germen short; style thread-shaped, the length of the former; stigma deeply divided, acute. *Peric.* none, except the scarcely altered calyx. *Seeds* solitary, oblong, compressed, generally abortive in the florets of the disk, or centre thereof. Down capillary, sometimes stalked. *Recept.* naked, dotted.

Eff. Ch. Receptacle naked. Seed-down simple. Calyx simple,

TUSSILAGO.

simple, of many equal, somewhat membranous leaves; tumid at the base.

Obf. Linnæus remarks, that *Petasites* of Tournefort has no ligulate florets in the radius, though some female naked ones occur: *Tussilago* of the same author has always female florets in the radius, furnished with a ligulate corolla: *Anandria* of Linnæus himself, Am. Acad. v. 1. 243, has sessile feed-down; and *T. frigida* varies with or without a radius. These circumstances are indeed variable at all times, but especially in the genus now under consideration. We have mentioned in Fl. Brit. that some reputed species appear to be but different sexes of one and the same. Of this the British *T. hybrida* and *Petasites* are one instance. We shall indicate other similar cases, in which it seems Ehrhart has forestalled us, in his Beiträge, v. 3. His discoveries are confirmed by Hoppe; and both these authors are followed by Willdenow, without any reference to the *Flora Britannica*, to which however the publication of Hoppe is three years posterior. We are well assured that this apparent neglect was not intentional, and the observations in question, having been made by each person independently, derive from thence the more authority. The whole genus of *Tussilago* is herbaceous, without any stem. Leaves stalked, simple, angular, toothed, more or less heart-shaped. Pubescence of the herbage cottony, dense, generally remarkable for its pure whiteness, and soft texture. Flowers white, or pale red; sometimes yellow; either solitary, or densely paniced. Seed-down of a brilliant silvery white.—Willdenow reckons up twenty-one species, but his first two; *T. Anandria* and *lyrata*, will be found under our article PERDICUM, sp. 3. and 4; his *T. lyrata* being Gmelin's t. 67. f. 2, mentioned under our *Perdicium populifolium*, n. 4, as a probable variety of *Anandria*. Willdenow's 4th species, *T. integrifolia*, is *Chaptalia tomentosa*, Venten. Jard. de Cels 61. Pursh 577. If not a good genus, it must be referred to *Perdicium*; being certainly no *Tussilago*. Very possibly the third species of Willdenow may also belong to *Perdicium*; but this being a very uncertain plant, known from Plumier's figure only, we must leave it as we find it, amongst other species placed here by authors, but which to us are by no means free from doubt as to their generic characters; nor can that question be decided without an investigation and comparison of their fresh flowers.

1. *T. dentata*. Toothed West Indian Colt's-foot. Linn. Sp. Pl. 1213. Willd. n. 3. (After acaulos, hieracii villosis foliis; Plum. Ic. 28. t. 40. f. 2.)—Stalk single-flowered, naked. Flower radiated, erect. Leaves sessile, oblong, wavy, toothed, villous.—Gathered by Plumier in the West Indies. The root appears to be fibrous. Leaves numerous, three or four inches long, with an undulated strongly toothed margin. Flower-stalks also numerous, though fewer than the leaves, smooth. Flowers radiated, somewhat like our common *T. Farfara*, but much smaller.

2. *T. albicans*. Whitish Jamaica Colt's-foot. Swartz Ind. Occ. 1348. Willd. n. 5. (Leontodon tomentosum; Linn. Suppl. 347.)—Stalk single-flowered, naked; cottony at the top. Flower radiated, drooping. Leaves stalked, obovate, with slight reversed ferratures; cottony beneath; tapering at the base.—Native of dry grassy inland pastures, in the western part of Jamaica. Swartz. Sent to Linnæus in Browne's herbarium. Root fibrous, probably perennial, though marked annual. Leaves two or three inches long, of a narrow obovate form; green and nearly naked above; snow-white beneath; their margin slightly wavy, beset with minute distant teeth, all pointing backwards. Stalks few, often a foot high, round, reddish, destitute of scales or bractæas, clothed about the top, for near two inches, with dense cottony down. Flower white, drooping as it

fades; according to Swartz's description it answers to the characters of this genus. Seed-down shining, with a reddish, or pink, hue.

3. *T. pumila*. Dwarf Jamaica Colt's-foot. Swartz Ind. Occ. 1350. Willd. n. 6.—Stalk single-flowered, naked, downy. Flower radiated, erect. Leaves obovate, with reversed teeth; sinuated at the base; downy beneath.—Found on the lofty calcareous mountains of the fourth part of Jamaica, near Cold-spring, flowering in summer. Smaller than the last, to which it seems nearly allied; but the leaves, only an inch or two in length, are pinnatifid in a lyrate manner. Stalk mostly solitary, from three to six inches high, roundish, cottony; purplish in the lower part. Flower small, white; erect according to Willdenow, and the specific character of Swartz, though the latter calls it drooping in his description. Its structure is that of a *Tussilago*.

4. *T. nutans*. Drooping Jamaica Colt's-foot. Linn. Sp. Pl. 1213. Am. Acad. v. 5. 406. Willd. n. 7. Ait. n. 1. Swartz Obf. 305. (Leontodon n. 1; Browne Jam. 310. Dens leonis, folio fultus incano, flore purpureo; Sloane Jam. v. 1. 255. t. 150. f. 2. After primulae veris folio, flore singulari purpureo; Plum. Ic. 29. t. 41. f. 1.)—Stalk single-flowered, naked, cottony. Flower radiated, pendulous. Leaves stalked, oblong-heart-shaped, wavy, toothed; cottony beneath; sinuated at the base.—Native of cultivated and grassy places in Jamaica. Swartz describes it as annual. Mr. Aiton marks it biennial, flowering in the stove in June and July. The much larger leaves, near a span long, pinnatifid in a lyrate manner, and the stalks twelve or fifteen inches high, distinguish this species from all the preceding. The flower is pendulous, with a white disk and radius, but the slender points of the calyx-scales being tipped with purple, have, as it appears to us, been mistaken for a purple radius by Sloane, and even by the more learned professor Swartz. When in seed, the stalk becomes erect. The down is rather tawny, or reddish.

5. *T. trifurcata*. Three-forked Colt's-foot. G. Forster, Pl. Magell. 28. Willd. n. 8.—Stalk single-flowered, scaly. Flower radiated, erect. Leaves spatulate, with three or more oblong segments, smooth.—Native of dry hilly situations about the straits of Magellan. Root perennial, somewhat tuberous. Leaves radical, tufted, an inch long, divided into three, four, or five, oblong, erect, finger-like segments, spreading, quite smooth and naked. Stalk from one to three inches high, round, clothed with awl-shaped scaly bractæas. Flower white, with all the characters of its genus. Inner scales of the calyx largest, with spreading horizontal points.

6. *T. alpina*. Alpine Colt's-foot. Linn. Sp. Pl. 1213. Willd. n. 9. Ait. n. 2. Jacq. Auftr. t. 246. Curt. Mag. t. 84. (T. alpina secunda; Cluf. Hist. v. 2. 113. Afarina; Matth. Valgr. v. 1. 34. A. Matthioli; Ger. Em. 836.)—Stalk single-flowered, with oblong scattered bractæas. Flower without rays. Leaves kidney-shaped, toothed, smooth on both sides.—Native of the alps of Austria, Bohemia, Switzerland, &c. flowering in June and July. The root is perennial, tuberous, and creeping, brown, with many long fibres. Leaves few, radical, stalked, from one to two inches broad, bluntly toothed; quite smooth, and of a shining green, reticulated with depressed branching veins above; paler beneath, but equally smooth, except some hairs on the ribs or veins. Stalk solitary, a foot or more in height, erect, purplish, hairy, bearing a few distant, variously shaped, concave, upright bractæas. Flower erect, half an inch broad. Calyx purple, smooth. Florets white, sometimes purplish, all regular and five-cleft, with purple anthers and stigmas.

7. *T. discolor*. Two-coloured Colt's-foot. Jacq. Auftr. t. 247.

t. 247. Willd. n. 10. Ait. n. 3. (*T. alpina* β; Linn. Sp. Pl. 1214. *T. alpina* prima; Cluf. Hist. v. 2. 112. *T. alpina*; Ger. Em. 812.)—Stalk single-flowered, nearly naked. Flower without rays. Leaves kidney-shaped, toothed, downy and white beneath.—Native of the alps of Austria, Carniola, &c. growing along with the last, and flowering at the same season. This is rather smaller than the preceding, usually with fewer *bracteas*. The under side of the *leaves* is clothed with dense white cottony down, which affords the most distinguishing mark of the plant, and presumed by recent authors to prove it specifically distinct. Linnæus thought it but a variety.

8. *T. sylvestris*. Lobed Alpine Colt's-foot. Scop. Carn. v. 2. 157. Jacq. Austr. v. 5. Append. 33. t. 12. Willd. n. 11.—Stalk mostly single-flowered, with dilated scattered *bracteas*. Flower without rays. Leaves smooth, kidney-shaped, many-lobed and toothed.—Native of mountainous, chiefly beech, woods of Styria, Carinthia, Carniola, &c. flowering in May. Allied to *T. alpina*, with which its synonyms have been confounded by Scopoli, Haller, and even Jacquin; but the last has the merit of subsequently distinguishing this very well-marked species. It is larger than *alpina*, and the *stem* sometimes bears two or three *flowers*, scarcely differing from those of *alpina* or *discolor*. The *bracteas* however are broader, often terminating in a leafy appendage, particularly the lower ones. The radical *leaves* are very different, being cut into about seven rather shallow lobes, of which the middle ones more especially have about three pointed teeth. The upper surface is green, sometimes roughish to the touch, slightly marked with veins; the under paler, peculiarly smooth and even, a little shining. We have not heard of this plant in any British garden, nor had Linnæus a specimen.

9. *T. Farfara*. Common Colt's-foot. Linn. Sp. Pl. 1214. Willd. n. 12. Fl. Brit. n. 1. Engl. Bot. t. 429. Curt. Lond. fasc. 2. t. 60. Woodv. Med. Bot. t. 13. Bulliard Herb. de la Fr. t. 329. Fl. Dan. t. 195. (*Tussilago*; Ger. Em. 811. Matth. Valgr. v. 2. 198. Camer. Epit. 590, 591.)—Stalk single-flowered, scaly. Flower radiated. Leaves heart-shaped, angular, toothed; downy beneath.—Native of moist chalky shady situations, throughout Europe, flowering in March or April, before the leaves appear. Dr. Sibthorp met with it about rills and inundated places in Greece, nor can there be any doubt of our Colt's-foot being the *βηξιον* of Dioscorides, of which *PARFARA*, see that article, is an ancient synonym. The *roots* of this species are perennial, creeping to a great extent. *Stalks* five or six inches high, erect, simple, downy, clothed with numerous, alternate, ovate, erect, purplish, nearly smooth scales, three-quarters of an inch long. *Flower* drooping before it expands, then erect, yellow, an inch broad; the radius of very numerous, long, narrow, spreading, ligulate *florets*, which Dr. Stokes has observed to be the only ones that ever perfect their *seed*. Indeed the plant increases so much by root, that scarcely any *seeds* are ever ripened. The *leaves* come forth on erect *footstalks*, after the flowers and their stalks have withered, and are from three to six inches wide, sharply toothed; very smooth, and rather glaucous, above; covered beneath with dense, white, cottony down. They are mucilaginous and astringent, slightly bitter, and are recommended either in infusion, or smoked like tobacco, as a cure for coughs. The latter mode of application is advised by Dioscorides in difficulty of breathing, dry cough, &c. and he prescribes these leaves bruised, with honey, as an external remedy for erysipelas, and other inflammations of the skin. The cottony web of this herb serves extremely well for tinder, and to stanch the blood of

slight wounds.—Willdenow says there is a variety with perfectly smooth leaves.

10. *T. japonica*. Japan Colt's-foot. Linn. Mant. 113. Willd. n. 13. Thunb. Jap. 313. Banks Ic. Kämpf. t. 27, 28. (*Arnica tussilaginea*; Burm. Ind. 182. *Doronicum tussilaginis folio*, &c.; Pluk. Amalth. 71. t. 390. f. 6. Tsua; Kämpf. Am. Exot. 827.)—Stalk with several radiated flowers, corymbose, bracteated. Leaves roundish-heart-shaped, toothed; slightly downy beneath.—Native of Japan, flowering in October. *Root* perennial, tuberous. *Stalks* twelve or fifteen inches high, angular, furrowed, reddish, downy in the upper part, bearing a few scattered scaly *bracteas*, and terminating in from five to eight large yellow radiated *flowers*, on downy alternate partial stalks. *Rays* wedge-shaped. The *seed-down* is sessile, like the last. *Leaves* coming after the flowers, on long upright footstalks; their breadth three or four inches; length much less; their under side paler, but scarcely downy. The *root*, according to Thunberg, is bitter, and esteemed a counter-poison by the Japanese. Kämpfer says the stalks are used as a pot-herb.

11. *T. frigida*. Lapland Colt's-foot. Linn. Sp. Pl. 1214. Fl. Lapp. ed. 2. 246. Willd. n. 14. Ait. n. 5. Pursh n. 1. Fl. Dan. t. 61. (*T. n. 128*; Gmel. Sib. v. 2. 150. t. 70.)—Stalk with many radiated flowers, corymbose, bracteated. Leaves triangular-heart-shaped, with deep triangular teeth; downy beneath.—Found by Linnæus plentifully in woods and pastures among the Lapland alps, flowering towards the end of May, and scattering its seeds about a month afterwards. It occurs likewise in Norway and Siberia, as well as, according to Mr. Pursh, in Canada, and on the highest peaks of the Vermont and New Hampshire mountains, at the same season. The *root* is somewhat tuberous and creeping, though less fleshy than the last, with copious long fibres. *Leaves* and *flowers* appearing nearly together, on *stalks* about equal in height, from ten to fifteen inches; the former remarkable for their very large angular teeth. The *flower-stalk* bears several alternate, large, tumid, smooth *bracteas*, sometimes ending in a small leaf. *Flowers* white; the *florets* of the disk tinged with pale purple, especially their large, club-shaped, hairy, prominent, but we believe useless, *stigmas*. *Seed-down* sessile, above an inch long, silvery.

12. *T. fragrans*. Sweet-scented Colt's-foot. Villars Actes de la Soc. d'Hist. Nat. de Paris, v. 1. 72. t. 12. Willd. n. 15. Ait. n. 6. Curt. Mag. t. 1388.—Stalk panicled, level-topped, somewhat leafy. Flowers radiated. Leaves roundish-heart-shaped, obtuse, equally and finely toothed; rather hairy beneath.—Native of the neighbourhood of Naples, and of Sicily near Palermo; introduced into England by Messrs. Lee and Kennedy in 1806. It flowers in the winter, or early spring. The *leaves*, which are green on both sides, rounded, obtuse, not at all lobed or cut, appear with the *flowers*. The latter are large, fragrant like *Heliotropium peruvianum*, with broad light-purple rays, and a white disk, the tumid *stigma* of whole *florets* is dark-purple. The *panicle* is compound, rather dense; its *stalk* taller than the foliage, clothed with very large inflated *bracteas* having leafy terminations.

13. *T. levigata*. Smooth Straw-coloured Colt's-foot. Willd. n. 16. (*T. scapo imbricato, floribus spicatis radiatis, foliis utrinque glaberrimis*; Gmel. Sib. v. 2. 148. n. 126.)—Stalk panicled, level-topped. Flowers radiated. Leaves heart-shaped, acute, slightly angular, toothed, smooth on both sides.—Abundant about the banks and shallows of rivers in Siberia, flowering in spring, at which time all but the flowers is generally under water. Gmelin. *Root* fleshy, purplish,

TUSSILAGO.

purplish, creeping to the extent of many feet, with many long, thick, simple fibres. *Leaves* about two inches broad at the flowering period, but when full grown, eighteen inches in diameter; bright green and smooth on both sides, purplish at the edges, fleshy; copiously veined beneath; their margin irregularly and sharply toothed, sometimes angular. *Footstalks* smooth, a foot or more in length. *Flower-stalk* taller than the leaves, thick, succulent, reddish, striated, slightly cottony, bearing many large, inflated, sheathing *bracteas* and terminating in a more or less compound, level-topped, or corymbose, *panicle*, whose downy stalks are furnished with many smooth, linear-lanceolate, flat, much smaller *bracteas*. *Flowers* from eight to twenty, scarcely half an inch broad, straw-coloured, with shortish rays. Willdenow's opinion of this being a very distinct species, is confirmed by Gmelin's own specimens in the Linnæan herbarium; which also, unless we are greatly mistaken, shew n. 127. t. 69, D, E, of the same author, to be the very same plant, totally different from the common *T. Petasites*, with which he compares it, in many other points besides the colour of the *flowers*.

14. *T. alba*. White Colt's-foot, or Double-toothed Butter-bur. Linn. Sp. Pl. 1214. Willd. n. 17. Ait. n. 7. Fl. Dan. t. 524. (*Petasites flore albo*; Camer. Epit. 593. P. n. 139; Hall. Hist. v. 1. 61.)—*Panicle* dense, level-topped. *Flowers* without rays. *Leaves* roundish-heartshaped, doubly and sharply toothed; white and shaggy beneath.—In mountainous woods, and about the banks of rivers, in the alpine parts of Europe, not rare in Switzerland, but unknown as a native of Britain. It appears to have been cultivated at Edinburgh in the time of Sutherland, 1683, and we obtained a specimen from the botanic garden there 100 years after, under the erroneous name of *T. hybrida*. This is a large species, distinguished from all the rest, of those which bear many flowers on a stalk, by its strongly, doubly, and acutely-toothed *leaves*; quite smooth above; very veiny and cottony beneath, when young, but afterwards the pubescence of that side becomes more grey, shaggy, and loose. The tall downy *flower-stalk* bears a great number of broad, concave, rather cottony *bracteas*, and terminates in a branched many-flowered corymbose *panicle*. The *flowers* are rather small, snow-white, without rays. *Down* sessile. Willdenow and other botanists have observed, that some individual plants have but very few, and others many, female *florets*, in comparison to those furnished with both *stamens* and *pistils*; but the author just named has been misled by Villars to cite, as the female plant of this species, Gmelin's t. 69. f. D, E, which has yellow *florets*; see our n. 13.

15. *T. nivea*. Snowy Colt's-foot, or White-leaved Butter-bur. Villars Actes de la Soc. d'Hist. Nat. de Paris, v. 1. 73. t. 12. f. 2. Willd. n. 18. Ait. n. 8. (*T. frigida*; Villars Dauph. v. 3. 175. *T. paradoxa*; Retz. Obl. fasc. 2. 24. t. 3. *Petasites* n. 141; Hall. Hist. v. 1. 62. P. minor, tussilaginis *floretis*; Morif. sect. 7. t. 10. f. 4.)—*Panicle* dense, rather oblong. *Flowers* without rays. *Leaves* triangular-heartshaped, simply toothed, with spreading angular lobes; densely downy and white beneath.—Native of the mountains of Switzerland, Germany, Dauphiny, &c. flowering in April. Differs from the last in the snowy whiteness, and dense pubescence, of the under side of the *leaves*, as well as in their triangular form, and their simple series of marginal teeth. *Flowers* pale flesh-coloured. *Common stalk* clothed with similar large *bracteas*. *Seed-down* near an inch long. The female plant, termed *paradoxa*, as a distinct species, by Retzius, has but about three apparently perfect *florets* in each *calyx*, and of these the *anthers*

are unconnected. In a remark on the sexes of this tribe of plants, at p. 431 of Engl. Bot. *T. alba* is inadvertently mentioned for *nivea*.

16. *T. Petasites*. Common Butter-bur. Linn. Sp. Pl. 1215. Willd. n. 19. Fl. Brit. n. 3. Engl. Bot. t. 431. Curt. Lond. fasc. 2. t. 59. Fl. Dan. t. 842. Bulliard Herb. de la Fr. t. 391. (*T. major*; Matth. Valgr. v. 2. 199. Camer. Epit. 592. *Petasites*; Ger. Em. 814. Fuchf. Hist. 644. P. n. 138; Hall. Hist. v. 1. 61.)
 β . *T. hybrida*; Linn. Sp. Pl. 1214. Fl. Brit. n. 2. Engl. Bot. t. 430. (*Petasites major*, floribus pediculis longis infidentibus; Dill. Elth. 309. t. 230. P. n. 140; Hall. Hist. v. 1. 61.)—*Panicle* dense, ovate-oblong. *Flowers* without rays. *Leaves* roundish-heartshaped, unequally toothed, slightly angular, with rounded converging lobes; paler and somewhat shaggy beneath.—Native of moist, boggy, shady meadows, the borders of rivers, pools, &c. throughout Europe. Dr. Sibthorp found it in Greece, but not common, except in rather mountainous, as well as watery situations. There can, however, be little doubt of this plant being, as all botanists have thought, the $\pi\epsilon\tau\alpha\sigma\iota\tau\eta\varsigma$ of Dioscorides. Our β grows with the common kind, though far less frequently. Both flower in April, before the leaves expand, and are, of course, perennial. The *root* is thick and fleshy, creeping very far, and hard to be extirpated. *Stalks* a span high, thick, downy, clothed with oblong reddish *bracteas*, partly leafy at their extremity, and terminating in a dense ovate *panicle*, of pale dusky flesh-coloured *flowers*. The *florets* are all tubular, furnished with united red *anthers* and a thick cloven *stigma*. The younger Linnæus, and Haller, have detected a few female ones, said to afford good *seed*; but many botanists have remarked that the Common Butter-bur never perfects *seed*, nor does even its *seed-down* make a very conspicuous appearance. *T. hybrida*, which we have marked as a variety, because its *leaves* are rather smaller, and the *panicle* rather longer, with smaller *flowers*, is allowed to be the female plant, or at least an individual in which that sex prevails. In this most of the *florets* are female, with a slender *corolla*, and a taper, acute, efficient *stigma*. One or two of the central ones only are male, having separate *anthers*, and a thick useless *stigma*. The *panicle* when in seed is much elongated, and becomes cylindrical, conspicuous for its copious, brilliant, though short, *seed-down*, forming an elegant silvery plume, a foot or more in length. The *leaves* of the common *T. Petasites* are the largest of any British plant, being often three feet broad. They are grey or hoary beneath, far less white than those of *T. nivea*, as well as more rounded, and with their lobes approaching each other.

17. *T. spuria*. Cloven-lobed Butter-bur, or Colt's-foot. Retz. Obl. fasc. 1. 29. t. 2. Willd. n. 20. (*T. tomentosa*; Ehrh. Beitr. v. 3. 65.)—*Panicle* corymbose. *Flowers* without rays. *Leaves* triangular-heartshaped, simply and finely toothed, with spreading, angular, cloven lobes; densely downy beneath.—Native of Lapland, Scania, and Germany, about the banks of rivers. The general outline of the *leaves*, with their spreading acute lateral lobes, is most like *nivea*, n. 15, but those lobes are remarkable for being always divided, or double. The marginal teeth of the whole *leaf* are also more numerous, crowded, regular, and smaller, as well as more obtuse, than in *nivea*; the soft, cottony, very white downiness of the under side nearly accords with that species; the upper is green, and quite smooth, except when young. *Flowers* corymbose, rather than panicled, cream-coloured, with linear *bracteas*. Authors have distinguished two varieties; one with a more short dense *inflorescence*, and only three female *florets*, all destitute

destitute of a *corolla*, which is Ehrhart's *tementosa*; the other with a more elongated *corymb*, and numerous female *florets*, each with an oblique tubular *corolla*, but whose *stigma* nevertheless is said to be small and barren; this is the original *paradoxa*. We presume the idea of the barren *stigma* may be a mistake of Retzius; that part, when imperfect, being, in this tribe of plants, always thickened; but we have had no opportunity of examining living specimens of *T. spuria*, which is a stranger to the gardens of England.

18. *T. sagittata*. Arrow-leaved Colt's-foot. Herb. Banks. Pursh n. 2.—“Panicke dense, ovate, level-topped. Flowers radiated. Radical leaves oblong, acute, arrow-shaped, entire; with obtuse lobes.”—Gathered by Mr. Hutchinson, at Hudson's Bay. Perennial. *Pursh*.

19. *T. palmata*. Cut-leaved Colt's-foot. Ait. n. 10. ed. 1. v. 3. 188. t. 11. Willd. n. 21.—Flowers corymbose, level-topped, radiated. Leaves seven-lobed, palmate, cut; downy beneath.—Native of Newfoundland and Labrador. Introduced into England by Dr. Fothergill, in 1777. Perennial, flowering in April. The *stalk* and *inflorescence* resemble the last. The *flowers* are light flesh-coloured, or purplish, with short obtuse rays. The *leaves*, which by Willdenow's account vary in the depth of their lobes, afford a clear specific difference from all the other species.

TUSSILAGO, in *Gardening*, comprehends plants of the low, hardy, herbaceous, creeping-rooted perennial kinds; among which, the species most commonly cultivated in gardens for different purposes are, the common tussilago or colt's-foot (*T. farfara*); the mountain colt's-foot (*T. alpina*); the Siberian colt's-foot (*T. anandria*); the petasites, tussilago major, or common butter-bur (*T. petasites*); the hybrid German tussilago, greater colt's-foot, or long-stalked butter-bur (*T. hybrida*); and the white alpine tussilago, or smaller butter-bur (*T. alba*).

The first sort has a creeping perennial root, short, thickish stalk, with fine roundish hoary leaves; which are produced after the stem and flower; hence it is denominated one of the *filii ante patrem*, or son before the father, tribe or class of plants, or those in which the flowers rise before the leaves.

It is not much cultivated in the garden manner, except in herbaceous collections as a medicinal herb for making decoctions and other mild balsamic drinks, and for the use of its leaves as a principal ingredient in the preparation of the British herb tobacco, and other similar compositions. Sometimes, however, it is employed for variety in patches in the borders and other parts of ornamented grounds.

In the second kind, there is a variety which has round hoary leaves.

The fourth sort is also sometimes cultivated and employed as a medicinal plant in different intentions.

Method of Culture.—They are all capable of being raised and increased by sowing the seeds of them in any proper and suitable soil and situation in the early spring season, but not to too great a depth, when they will freely rise and become good plants. But the best and most expeditious method is that of parting the roots and planting them, which may be done either in the autumnal or spring season, when the smallest slip will readily take root and grow, multiplying in a very quick manner.

Most of the sorts possess the singular property of producing and sending up their flowers and stalks before the leaves are formed and seen.

The plants mostly affect rather moist soils and situations, but they will grow and succeed almost any where, and may

be employed for affording greater variety and ornament, as well as some of them for the purposes and intentions which have been suggested above.

TUSSIS. See COUGH.

TUSSELENG, in *Geography*, a town of Bavaria; 4 miles W.S.W. of New Oetting.

TUT, in *Armory*, &c. an imperial ensign of a golden globe, with a cross on it.

TUT Bargain, among the *Miners*, denotes a bargain by the lump; as when they undertake to perform a piece of work at a fixed price, however it may prove.

TUTACORIN, or TUTUCORIN, in *Geography*, a town of Hindoostan, in the Carnatic, where the Dutch have a factory; 25 miles E. of Palamcotta.

TUTARY, a town of Sweden, in the province of Smaland; 24 miles W. of Wexio.

TUTBURY, or STUTESBURY, a market-town in the hundred of Offlow, and county of Stafford, England; is situated on the western bank of the river Dove, at the distance of 4 miles N.W. by N. from Burton-upon-Trent, and 134 miles in the same bearing from London. It was erected a free borough at an early period, and the burgesses and other inhabitants were invested with a variety of privileges and immunities; but never had the right of sending members to parliament, though the town still retains the appellation of a borough. The parish-church is an ancient and spacious edifice, with a square embattled tower surmounted by four small pinnacles; its principal entrance is decorated with fine specimens of Saxon sculpture. A free school was founded and endowed by Richard Wakefield in the year 1730: it was rebuilt in 1789. Here is also a meeting-house for Dissenters. According to the population return of the year 1811, the parish of Tutbury contained 242 houses, occupied by 1235 persons. Wool-combing constitutes the principal business of the inhabitants; and a cotton manufactory, recently established, gives employment to a considerable number. Three fairs are held annually, and a market weekly, on Tuesdays. On the north side of the town are the remains of the castle of Tutbury, which was erected soon after the Conquest, by Henry de Ferrars, a noble Norman, to whom the Conqueror gave large estates in this county. In the family of Ferrars it continued till the reign of Henry III., when, being forfeited by the attainder of Robert de Ferrars, earl of Derby, the king granted it to his second son Edmund, earl of Lancaster. It again reverted to the crown, in consequence of the rebellion of Thomas, earl of Lancaster, who fortified it against Edward II., but was obliged to surrender. Having sustained considerable damage during this contest, and being afterwards suffered to fall into decay, John of Gaunt rebuilt the greater part of it upon the ancient site in 1350. This castle, being the principal seat of the dukes of Lancaster, was long distinguished as the scene of much festivity and splendour. So great was the number of minstrels resorting to it, that it was found necessary to adopt special regulations for the preservation of order. Accordingly, one of their body was invested with the title of king of the minstrels, with officers under him for the due execution of the laws. A charter for that purpose was granted by John of Gaunt in 1381: and a court was established for determining all controversy connected with minstrelsy. At this court, which was annually held with great formality, the king and his officers were appointed for the year ensuing; and the business of the day concluded with a bull-running and baiting. This barbarous custom was abolished, by commutation, about the middle of the last century; but the court still continues to be held. Tutbury castle was twice the residence, or rather prison, of Mary queen

queen of Scots; in 1568, and again in 1585. At the commencement of the civil war in the reign of Charles I. it was garrisoned by lord Loughborough, a zealous supporter of the royal cause; but was besieged and taken by sir William Brereton, one of the parliamentary commanders. The damage sustained by the castle on this occasion was very great; but it was not doomed to total destruction till 1646, when, by order of the parliament, it was reduced nearly to its present ruinous condition. What still remains, sufficiently declares its former extent and grandeur; the ancient gateway is tolerably entire; and towers, staircases, divisions of rooms, and fire-places, can yet be discovered in different parts of the walls, which appear to have been of immense strength and thickness: the whole was surrounded by a broad and deep ditch, over which, Dr. Plott informs us, there was in his time an extraordinary timber-bridge, composed of distinct pieces of wood, none of them above a yard long, yet unsupported by any arch-work, pillars, or other prop. Coeval with the castle, and founded by the same person, was a Benedictine priory, largely endowed by king William Rufus. The site was granted by Edward VI. to sir William Cavendish. Scarcely a vestige of the ancient building is now left, and we know little more of its structure, than that it was of large extent, and contained a splendid monument to the memory of the founder. A portion of the old priory church constitutes a part of the present parish-church.—Description of the Castle and Priory of Tutbury, 8vo. 1796. Beauties of England and Wales, vol. xiii. Staffordshire, 1814.

TUTELA, in *Ancient Geography*, a town of Spain, in Celtiberia, according to Martial.

TUTELA, in *Mythology*, a goddess worshipped at Bourdeaux, of which city she was patroness, and where she had a magnificent temple. She is supposed by learned antiquaries to have been a divinity peculiar to sailors and merchants, who trafficked upon the rivers, as it was a common practice to put upon their ships the figures of certain gods, who gave names to them, and were called by the ancients "Tutela Navis," the tutelar divinity of the ship.

TUTELARY, TUTELARIS, one who has taken something into his patronage and protection.

It is an ancient opinion, that there are tutelary angels of kingdoms and cities, and even of particular persons, called *guardian angels*.

The ancient Romans, it is certain, had their tutelary gods, whom they called *Penates*; which see. And the Romish church to this day, hold an opinion not much unlike it; they believe that every person, at least every one of the faithful, has, from the time of his birth, one of those tutelary angels attached to his person, to defend him from all temptations; and it is on this, principally, that their practice of invoking angels is founded.

F. Antony Macedo, a Portuguese Jesuit of Coimbra, has published a large work in folio on the tutelary saints of all the kingdoms, provinces, and great cities of the Christian world; "Divi Tutelares Orbis Christiani," at Lisbon, 1678.

TUTELINA, or TUTILINA, in *Mythology*, the goddess of corn, who had the care of it when deposited in the granary. She had a chapel on the Aventine mount, and a statue in the Circus.

TUTENAG, a name given in India to the semi-metallic zinc. It is also sometimes applied to denote a white metallic compound, brought from China, called also *Chinesse*, or *white copper*, the art of making which is not known in Europe. It is the best imitation of silver which has been made: it is very tough, strong, malleable, may be easily cast, ham-

mered, and polished; and the better kinds of it, when well manufactured, are very white, and not more disposed to tarnish than silver is.

Three ingredients of this composition may be discovered by analysis, viz. copper, zinc, and iron. See *Alloys of COPPER*.

TUTESERAJ, in *Geography*, a town of Hindoostan, in Lahore; 14 miles E.S.E. of Sultanpour.

TUTIA, or TUTTIA, in *Ancient Geography*, a town of Hither Spain.

TUTICUM, a town of Italy, in Samnium, called in the Itinerary of Antonine, "Equus Tuticus."

TUTLING, in *Geography*, a town of Bavaria; 10 miles N. of Passau.

TUTOR, in the *Civil Law*, is one chosen to look to the person and estate of children left by their fathers and mothers in their minority. See *GUARDIAN*.

By the custom of Normandy, the father is the natural tutor of his children. A person nominated tutor, either by testament, or by the relations of the minor, is to decline that office if he have five children alive; if he have any other considerable tutorage; if he be under twenty-five years of age; if he be a priest, or a regent in an university; or if he have any law-suit with the minors, &c.

The marriage of a pupil, without the consent of his tutor, is invalid. Tutors may do any thing for their pupils, but nothing against them; and the same laws which put them under a necessity of preserving the interest of the minors, put them under an incapacity of hurting them. See *PARENT*.

TUTOR, *Honorary*. See *HONOURARY*.

TUTOR is also used in our universities for a member of some college or hall, who takes on him the instruction of young students in the arts and faculties.

TUTORAGE, TUTELA, in the *Civil Law*, a term equivalent to guardianship in common law, signifying an office imposed on any one, to take care of the person and effects of one or more minors. See *GUARDIAN*.

By the Roman law there are three kinds of tutorage. *Testamentary*, which is appointed by the father's testament. *Legal*, which is given by the law to the nearest relation. *And dative*, which is appointed by the magistrate.

But in all customary provinces, as France, &c. all tutorages are dative and elective; and though the father have by testament nominated the next relation to his pupil, yet is not that nomination of any force, unless the choice be confirmed by that of the magistrate, &c.

By the Roman law, tutorage expires at fourteen years of age; but in France, not till twenty-five years. A minor quits his tutorage, and becomes free by marriage; in which case a curator is given him.

TUTOVA, in *Geography*, a river of Moldavia, which runs into the Birlat, 4 miles S. of Birlat, in the province of Moldavia.

TUTSAN, in *Botany*. See *HYPERICUM*.

TUTTI, in the *Italian Music*, is used to signify that all the parts are to play together, or to make a full concert.

In this sense, *tutti* stands opposed to *foli* or *solo*.

It is often found expressed by *omnes*, *ripieno*, *choro*, &c.

TUTTI, in *Geography*, a town of Bengal; 13 miles N.N.E. of Burwa.

TUTTLINGEN. See *DUTTLINGEN*.

TUTTUM, a town of Hindoostan, in Bundelcund; 20 miles N.E. of Chatterpour.

TUTTY, *Tutia Alexandrina*, or *Lapis Tutie*, an argillaceous ore of zinc, found in Persia, formed on cylindrical moulds into tubulous pieces, like the bark of a tree, and baked

baked to a moderate hardness. This account of its original is supported by the authority of Teixeira and Douglas, and by its chemical properties. That the common opinion of its being a sublimate produced in the European founderies, where zinc is melted with other metals, is erroneous, appears from hence, that tutty is not found, upon strict enquiry, to be known at those founderies; and by its consisting, in a great part, of an earth not capable of rising in sublimation. This, however, is probable, that sublimate, or the common ores of zinc, are often mixed with argillaceous earths, and baked hard, in imitation of the genuine oriental tutty.

Bontius, in his animadversions upon Garcias ab Orta, informs us, that it is made of a glutinous or argillaceous earth, like clay, found in great quantities in a province of Persia, called Kirman, which the Indians, who gather it, put into earthen pots made on purpose, and, adding water to it, stir it with a stick: these pots are then placed in furnaces till the water is evaporated; afterwards removing the dregs which remain at the bottom, they pick off from the sides of the pots the calcined earth or tutty, which they carefully preserve for sale. He adds, that it is used in India as a cosmetic for destroying hair, more especially by the women, when they bathe.

Tutty is generally of a brownish colour, and full of small protuberances on the outside, smooth and yellowish within, sometimes whitish, and sometimes with a blueish cast. Like other argillaceous bodies, it becomes harder in a strong fire; and after the zinc has been revived and dissipated by inflammable additions, or extracted by acids, the remaining earthy matter affords with oil of vitriol, an aluminous salt.

Tutty, levigated into an impalpable powder, is, like the lapis calaminaris and calces of zinc, an useful ophthalmic, and frequently used as such in ointments and collyria.

Ointments for this intention are prepared in the shops, by mixing the levigated tutty with so much viper's fat as is sufficient to reduce it to due consistence, or, by adding one part to five parts of a simple liniment made of oil and wax. See ZINC.

TUTUACA, in *Geography*, a town of Mexico, in the province of Hiaqui; 100 miles E. of Riochico.

TUTULUS, among the *Romans*, a manner of dressing the hair, by gathering it up on the forehead into the form of a tower.

TUTULUS likewise signifies a woollen cap with a high top.

TUTURA, in *Geography*, a town of Russia, in the government of Irkutsk, on the Lena; 160 miles N. of Irkutsk. N. lat. $54^{\circ} 40'$. E. long. $105^{\circ} 44'$.

TUTZIS, in *Ancient Geography*, a town of Egypt, between Talmæ and Pselcis. Anton. Itin.

TUUE, in *Geography*, a lake of Norway, about 20 miles in circumference; 52 miles from Christianfand.

TUXAL, a town of Hindoostan, in the circar of Sirhind; 60 miles N.N.E. of Sirhind.

TUXFORD, a small market-town in South Clay division of the wapentake of Basselaw, in the county of Nottingham, England; is situated 24 miles N.E. by N. from the county-town, and 138 miles N. by W. from London. It was destroyed by fire September 8, 1702; consequently its appearance is more modern than that of many other towns in the county. Great part of it consists of farm-houses; agriculture being the chief employment of the inhabitants. Scarcely any trade is carried on here, except in hops, of which a considerable quantity is raised in this and the adjacent parishes. A fair for this article is annually held in September; and another in May for cattle, sheep, pigs, and poultry.

A weekly market on Mondays is well supplied in proportion to the population of the parish; which, in the return to parliament in the year 1811, is stated to be 841, occupying 197 houses. The church is an ancient structure, and consists of a nave, side-aisles, and chancel; with a spire. It contains the mutilated remains of monuments and other sculpture of a remote period. A rude representation of St. Laurence on a gridiron is still entire: one man is employed in blowing the fire, another is turning the saint with tongs, and a third appears to be a spectator, or director. A free grammar-school, still in high repute, was founded, and liberally endowed, by the will of Mr. Charles Read, dated the 30th of July, 1699. A manuscript copy of the regulations, as contained in the will, is preserved in the British Museum.—History of Nottinghamshire, by J. Throsby, 3 vols. 4to. 1797. Beauties of England and Wales, vol. xii. Nottinghamshire.

TUXIUM, in *Ancient Geography*, a town of Italy, and capital of Samnium. When Fabius Fabricianus pillaged this city, he removed the statue of the victorious Venus, worshipped here, to Rome. Plutarch.

TUY, in *Geography*, a town of Spain, in Galicia, situated on a mountain, near the north side of the Minho, opposite Valença, in Portugal; the see of a bishop, suffragan of Compostella. In a war between Spain and Portugal, this is one of the places of rendezvous for the Spanish troops; 50 miles S. of Compostella. N. lat. $42^{\circ} 3'$. W. long. $8^{\circ} 37'$.

Tux, a navigable river of Caraccas, which discharges itself into the ocean, 30 leagues E. of the port of Guayra. It rises in the mountains of San Pedro, 10 leagues from Caraccas, and being joined by the Guayra, becomes navigable, and serves for the transportation of produce, abounding in the vallies of Aragoa, Tacata, Cua, Sabana, Ocumara, St. Lucia, and St. Theresa, through which it passes, and particularly cacao, which is here of the best quality.

TUYU, a country of South America, in Patagonia, to the south of the viceroyalty of Buenos Ayres.

TUZ-KURMA, a town of Curdistan; 50 miles S.S.W. of Sherezur.

TUZLA, a town of Asiatic Turkey, in Caramania, situated at the western extremity of a lake, to which it gives name. The lake is 36 miles in length, and about 4 in breadth; 28 miles N. of Cogni.—Also, a town of Asiatic Turkey, in Natolia; 24 miles E. of Constatinople.

TWAGER, a town of Sweden, in the province of Halland; 28 miles N.N.W. of Halmstad.

TWAITE, in *Ichthyology*. See SHAD.

TWAITE, in our *Old Writers*, a wood grubbed up and converted into arable land.

TWA-NIGHTS GESTE, in our *Ancient Customs*. See THIRD-night *even Hynde*.

If the *twa-night's geste* did any harm to any, his host was not answerable for it, but himself.

TWARDONICE, in *Geography*. See TURNITZ.

TWARSIMIRKA, a town of Silesia, in the principality of Oels; 6 miles N.E. of Militsch.

TWASHTA, or TWASHTI, in the *Mythology of the Hindoos*, a name of the sun, or of its regent Surya. The name occurs as of the sun in the article SARASWATI. Other legends make Twashta the parent of Suranuh, one of Surya's wives. In some points he corresponds with Vulcan, or Dædalus; being profoundly skilled in the mechanical arts, and hence deified in gratitude for his useful inventions. He seems to be the same personage with Viswakarma: being, like him, called the "chief engineer of the gods." Mr. Wilford's learned Essay on the sacred isles of the West, in the

the eleventh volume of the Asiatic Researches, contains many curious particulars of this deified person, proving his identity with some western fable. See SURANUH, SURYA, and VISWAKARMA.

TWAT, in *Geography*, a country of Africa, in the Great Desert. N. lat. 22° to 25° . E. long. 1° to 6° .

TWEDA, a town of Sweden, in the province of Smaland; 42 miles N.N.W. of Calmar.

TWEDS, a town of Norway, in the province of Christianland; 4 miles N. of Christianland.

TWEED, a large river, which rises in the parish of Tweedsmuir, in the shire of Peebles, Scotland. It is remarkable, that from the base of the same hill three large rivers have their source. The river Annan rises on its south side, the Clyde on the north-west, and the Tweed on the north-east side. Taking a north-east direction, the Tweed runs a serpentine course of about forty miles through the county of Peebles. When it has reached the town of that name, which is about the centre of the shire, it has fallen nearly 1000 feet, as that town stands only about 500 feet above the level of the sea. In its course from Peebles, running nearly east, its stream is augmented by the Etterick near Selkirk, the Gala at Galashiels, the Leader near Melrose, and the Teviot at Kelso. A few miles below the latter town it leaves Roxburghshire, and forms, for 22 miles, the boundary between Berwickshire and England, till it falls into the German ocean at the town of Berwick: its whole course is 102 miles, being the longest river in the south of Scotland.

On the banks of the Tweed are many beautiful and romantic seats, embosomed in plantations of various kinds of trees: but small are the vestiges that now remain of those extensive natural woods with which its banks were once adorned. Being near the southern borders of the kingdom, and exposed to the frequent incursions of the English, there is perhaps no river in Scotland, on the banks of which are to be seen so many places of defence against their hostile depredations. Still the ruins of castles and towers (as they are called) are visible; but they now only exhibit faint remains of their former magnitude, the wealth of their ancient inhabitants, and the depredatory spirit which formerly prevailed. The Tweed abounds with trout of every species: the salmon-fishery was formerly very productive, but has been nearly destroyed through interested artifice. The Tweed is open to fishing from the 10th of January to the 10th of October. On this river, 41 different salmon fisheries have been rented for several thousand pounds a year.—*Beauties of Scotland*, vol. ii. Tweeddale, 1805. Chalmers's *Caledonia*, vol. ii. 4to. 1810.

TWEEDMOUTH, a sea-port of England, in the county of Durham, separated only by the Tweed from Berwick. In 1811 the number of inhabitants was 3917.

TWEELING, an operation in weaving, which is performed by multiplying and varying the number of leaves in the harness; by the use of a back harness, or double harness; by increasing the number of threads in each split of the reed; by an endless variety of modes in drawing the yarns through the harness; and by increasing the number of treadles, and changing the manner of treading them. When the number of treadles requisite to raise all the variety of sheds necessary to produce very extensive patterns would be more than one man could manage, recourse is had to a mode of mounting, or preparing the loom, by the application of cords, &c. to the harness; and a second person is necessary to raise the sheds required, by pulling the strings attached to the respective leaves of the back harness, which are sunk to their first position by means of leaden weights underneath.

VOL. XXXVI.

This is the most comprehensive apparatus used by weavers for fanciful patterns of great extent, and it is called the draw-loom. In weaving very fine silk tweels, such as those of sixteen leaves, the number of threads drawn through each interval of the reed is so great, that, if woven with a single reed, they would obstruct each other in rising and sinking, and the shed would not be sufficiently open to allow the shuttle a free passage. To avoid this inconvenience, other reeds are placed behind that which strikes up the weft; and the warp threads are so disposed, that those which pass through the same interval in the first reed are divided in passing through the second, and again in passing through the third. By these means the obstruction, if not entirely removed, is greatly lessened.

In the weaving of plain thick woollen cloths, to prevent obstructions of this kind, arising from the closeness of the set, and roughness of the threads, only one-fourth of the warp is sunk and raised by one treddle, and a second is pressed down to complete the shed, between the times when every shot of weft is thrown across. See WEAVING.

TWELFTH-HIND, in our *Ancient Customs*, imports much the same with *thane*.

Among the English Saxons, those who were worth 1200s. were called *twelve-hindi*; and if any injury was done to them, satisfaction was to be made accordingly. See HINDENI.

TWELFTH-Day, or *Twelfth-tide*, the festival of the Epiphany, or the manifestation of Christ to the Gentiles, so called, as being the twelfth-day, exclusive, from the Nativity, or Christmas-day.

TWELVE MEN, *duodecim homines legales*, otherwise called *jury*, or *inquest*, is a number of twelve persons, or upwards, as far as twenty-four; by whose oath, as to matters of fact, all trials pass, both in civil and criminal cases, through all courts of the common law in this realm. See JURY.

TWELVE Tables, *Laws of the*. See TABLE.

TWELVE Apostles, in *Geography*, a number of small islands at the west extremity of the Straits of Magellan, on the coast of Terra del Fuego, between Cape Pillar and Cape Deseada.

TWELVE Isles, or *Twelve Apostles*, islands on the south side of lake Superior.

TWELVE Pins, *The*, or *Beannabozla*, a vast ridge of almost perpendicular rocks in the western part of the county of Galway, Ireland, called Cunnemara. These mountains belong to the primitive formation.

TWELVE-MILE CREEK, a river of South Carolina, which runs into the Saluda, N. lat. $34^{\circ} 50'$. W. long. $81^{\circ} 16'$.

TWELVE-MONTH, the space of a year, according to the calendar months.

TWENTE, in *Geography*, a district of the state of Overissel, of which Oldenzel is the capital.

TWENTY-FOUR MEN, men chosen every half year to redress the grievances of the mines and miners; but every man generally serves his year when chosen.

TWENTY-MILE CREEK, in *Geography*, a branch of the river Tombighe, in Georgia.

TWICE-LAID CORDAGE, is made of cast rigging, as shrouds, stays, mooring and other cables, which, if not much worn, will make good ropes, &c. for many purposes, as small cable-laid ropes for warping ships, worming and wooding for cables, worming for large stays, netting for ships' sides, &c.; ratlings, scaffolding-ropes, spun-yarn for seizings, &c.

To open a cable for making it into small ropes, hang the strand

strand upon three hooks in the tackle-board, stretch it out tight upon the hooks in the sledge, and heave till they are untwisted; then draw out the yarn.

When the yarn of this worn stuff is overhauled, a little thin tar should be poured upon it, which will make it pliable, and lie better. The yarn unfit for knotting will pick into oakum for caulking.

TWICKENHAM, in *Geography*, an extensive and populous village in the hundred of Isleworth, and county of Middlesex, England; is situated on the banks of the river Thames, at the distance of twelve miles W.S.W. from St. Paul's cathedral, London. The parish extends about three miles and a half in length, one and a half in breadth, and is nine miles in circumference: it is bounded on the east and north by Isleworth, on the west by Hanworth, Hampton, and Teddington, and on the south by the river Thames. It contains about 1850 acres, of which, according to a survey taken in the year 1635, about 630 were arable, 490 pasture, 40 wood, and 690 common: which does not much vary from the present proportion, reckoning the fruit gardens, of which there are above 150 acres, among the arable land. The gardens have long been celebrated for good management and abundant produce, and they afford a constant supply to the London markets: one gardener, Mr. West, has, in a good season, sent upwards of 4000 gallons of raspberries to a distiller within fifteen days. Twickenham is not mentioned in the Domesday record, as the whole of this hundred seems to have been included, when that survey was made, in the manor of Isleworth. In ancient records, the name is written Twitham, Twittanham, and Twiccanham: and the most popular writers of the early part of the last century often termed it Twitenham. The manor of Twickenham appears to have been possessed by the religious long antecedent to the Norman conquest; for the jurisdiction of the lord of Isleworth did not extend to church lands. This manor appears to have been vested in the crown in the time of Henry VIII., and by him annexed to the honor of Hampton-Court. By Charles I. it was settled as part of the jointure of his queen, on whose death, Charles II. settled it for life on his consort, Catherine. A lease under the crown has since been granted to several persons. The manor-house stands opposite to the church, and is traditionally said to have been the residence of Catherine of Aragon, the divorced queen of Henry VIII. The parish-church is situated near the river-side: the old church fell to the ground in the night of April 9, 1713; the tower, which is composed of freestone, is still remaining; the body was rebuilt, and completed in the year 1715. This is a brick fabric of the Tuscan order, with stone coignes and cornices, and was erected after the design of John James, architect, who likewise built the churches of St. George, Hanover-square, and St. Luke, Middlesex. The interior is spacious, with galleries on the two sides, and at the west end. The monuments, tablets, and other sepulchral memorials, are numerous. A chapel, called Montpelier, was built about the year 1720, and is the private property of the Rev. G. O. Cambridge, archdeacon of Middlesex. Here is also a meeting-house for Wesleyan Methodists. A charity-school for boys, and a similar institution for girls, were established many years back: an extensive and appropriate building has been recently erected by subscription; and one hundred boys and seventy girls are now educated according to Dr. Bell's plan. Thirty of the boys, and twenty-four girls, are likewise clothed. Here are also two Sunday schools. Six alms-houses were built in 1704, and six more in 1721. In the population return of the year 1811, this parish is stated to contain 685 houses, and 3757 inhabitants. The principal manufacture is that of gun-

powder: the powder-mills, formerly the property of Mr. Hill, but now of Mr. Butts, are seated on the small river Crane, which, rising in the vicinity of Harrow, is here augmented by an artificial cut from the Colne. Accidents frequently occur in this dangerous business: one corning-house for graining powder was thrice blown up in the year 1796; in the months of January, July, and November. Fourteen lives were lost by the three explosions. Five similar casualties have since happened, by which twelve men were killed. Yet, notwithstanding the frequency of these accidents, and though the wages of the workmen is but small, employment in the mills is eagerly sought after: the only apparent reason is, that the labour is light.

Twickenham Park, Isleworth Park, or the New Park of Richmond, was, towards the end of the sixteenth century, the property of the great sir Francis, afterwards lord, Bacon, who passed in this retirement the earlier and more happy part of his life. He here entertained queen Elizabeth, on which occasion he presented her with a sonnet in praise of her favourite, the earl of Essex. The estate has recently been divided into lots, and the greater part purchased by Francis Gosling, esq. The grounds contain some fine cedars: and it is believed, that the first weeping willow known in this kingdom was planted in this park in the early part of the last century. Part of the mansion is in the parish of Isleworth: in the meadows, between this house and the river, was the original site of Sion monastery, founded by king Henry V. in 1414.

Twickenham has for a century past been the retreat of persons distinguished by their rank or literary fame; and has been embellished with various mansions and villas, to which a degree of celebrity has attached. We shall briefly notice the most interesting.

Marble Hill was built by king George II. as a villa for his mistress, the countess of Suffolk. The purchase of the estate is said by lord Orford to have cost the king ten or twelve thousand pounds. The house was erected after a design of Henry, earl of Pembroke, who superintended the progress of the structure. Its exterior is of a plain but well-proportioned character; the interior contains the principal attractions, and is finished in a delicate, costly, and ornamental style. The great staircase is entirely composed of mahogany, finely carved; and the flooring of the best rooms are of the same wood. This seat is now the residence of Charles Augustus Tulk, esq.

Pope's Villa, as it has long been emphatically called, from its having been, for nearly thirty years, the residence of our great poet Alexander Pope, was purchased by him in the year 1715. The improvement of the house and gardens was for many years his favourite employment; and he was particularly interested in the construction of a grotto, which he enriched with many curious spars and gems; from the grotto was a subterraneous passage to the gardens. On the decease of Pope, which occurred May 30, 1744, the estate was sold to sir William Stanhope, who added wings to the house and enlarged the gardens. From him it passed to his son-in-law, Welbore Ellis, afterwards lord Mendip, who guarded every memorial of the poet as a sacred relic, particularly a fine willow planted by his own hand. This tree his lordship propped with assiduous care, but notwithstanding his utmost attention, it perished and fell to the ground in 1801, about a year before the death of its noble owner. The estate was afterwards sold to sir John Brisco, on whose decease it was purchased by baroness Howe in 1807; under whose direction the house has been taken down, and a new dwelling erected about a hundred yards distant from the site. The grotto has been stripped of its most curious spars and minerals, by the zeal of those who wished

wished to preserve a memorial of the poet. For a particular description of this celebrated villa, with a beautiful engraving, we refer to "The Fine Arts of the English School," by J. Britton, F.A.S. See also a very interesting work by Messrs. W. and G. Cooke, entitled "The Thames," 2 vols. 4to. and 8vo.

Strawberry Hill, the well-known residence of the late Horace, earl of Orford, better known as Mr. Horace Walpole, was originally a small tenement, built in 1698, by the earl of Bradford's coachman, and let as a lodging-house. Colley Cibber was one of its first tenants. Dr. Talbot, bishop of Durham, lived in it eight years; and after him Henry, marquis of Carnarvon. In 1747, Mr. Walpole bought the lease, and in the following year purchased the fee-simple of the estate. Having formed a design of enlarging his villa, and fitting it up in the old English style, he commenced his improvements in 1753, and completed them in 1776. The interior is arranged in strict accordance with the outside of the structure; the ceilings, screens, niches, and other decorations, even the more ordinary articles of furniture, are consonant in style with the leading features of the fabric. The extensive collection of curiosities and works of art, with which every apartment is stored, was progressively made by Mr. Walpole during the affluent leisure of a long life, which was chiefly devoted to the light parts of literature and the fine arts. The most considerable part consists of miniatures, enamels, and portraits of remarkable persons. The noble owner drew up a complete catalogue of his collection, together with what he calls a description of the villa: this work occupied 113 quarto pages; of which more than twenty are filled with the contents of one small room, called the Tribune, or Cabinet. A private printing-press was fitted up by Mr. Walpole in 1757. Most of his own works, and several other books, were here printed under his inspection. Strawberry Hill was bequeathed by lord Orford to the honourable Mrs. Damer for life, together with 2000*l.* for keeping the building in repair. She resided here for several years, but has lately declined possession in favour of the countess dowager of Waldegrave, in whom, and her heirs, the remainder was vested under his lordship's will.

At Whitton, a hamlet in Twickenham parish, is a villa which was built about the year 1711 by sir Godfrey Kneller, and was his principal residence during the latter part of his life. It is a substantial brick mansion, now the property of Mr. Calvert.

On the edge of Hounslow-Heath, within this parish, are two villas of considerable elegance, formerly in the possession of Archibald, duke of Argyle, now occupied, one by sir Benjamin Hobhouse, bart. the other by George Gosling, esq.—Lysons's *Environs of London*, 5 vols. 4to. 1792—1811. *Beauties of England and Wales*, vol. x. Middlesex, by J. N. Brewer, 1816.

TWIFALLOW, in *Agriculture*, a term used to signify a second stirring or fallowing of land.

TWIFALLOWING, the operation or work of repeating the tillage of land in fallowing, which is mostly best performed about the middle of the summer. It is sometimes written twyfallowing.

TWIGGS, in *Geography*, a county of Georgia, in the United States, containing 3495 inhabitants.

TWIGHTWEES, Indians in the state of Ohio, near the river Miami.

TWI-HINDI, or TWYHINDI, among our Saxon ancestors, were men valued at 200*s.* See HINDENI.

These men were of the lowest degree; and if such were killed, the mulct was 30*s.* Thus in Leg. Hen. I. cap. 9. "de twihindi homines interfecti, vera debet reddi secundum legem." Where note, that this was not an introduction of a new law, but a confirmation of the old, made in the reign of king Alfred.

TWILIGHT, in *Astronomy*, denotes the dubious or faint light which is reflected to us by means of the atmosphere, for some time before the sun rises, and after he sets. See CREPUSCULUM and ATMOSPHERE.

The following table shews the duration of twilight in different latitudes: it is calculated on a supposition that the twilight begins and ends when the sun is 18° below the horizon: the letters *c. d.* signify that it is then continual day; *c. n.* continual night; *w. n.* that the twilight lasts the whole night.

Alt. Pole	0	10	20	30	40	45	50	52½	55	60	65	70	75	80	85	90
☉ enters	H. M.															
☽	1 18	1 21	1 28	1 41	2 8	2 39	w. n.	c. d.								
♁	1 16	1 19	1 25	1 36	1 58	2 19	3 3	w. n.	w. n.	w. n.	w. n.	c. d.				
♂	1 13	1 15	1 20	1 28	1 43	1 55	2 12	2 25	2 41	3 55	w. n.	w. n.	w. n.	c. d.	c. d.	c. d.
♀	1 12	1 13	1 17	1 24	1 35	1 44	1 55	2 2	2 10	2 33	3 8	4 18	w. n.	w. n.	w. n.	w. n.
♃	1 13	1 14	1 18	1 24	1 35	1 43	1 54	2 0	2 8	2 27	2 56	3 41	5 2	17 32	w. n.	w. n.
♄	1 16	1 17	1 21	1 28	1 40	1 49	2 1	2 8	2 18	2 43	3 26	11 38	11 14	10 32	8 38	c. n.
♅	1 18	1 19	1 23	1 30	1 43	1 53	2 6	2 15	2 26	2 57	4 4	10 24	9 30	7 46	c. n.	c. n.

Long's Astron. vol. i. p. 258.

TWIN, in *Geography*, a township of Prebble county, in the district of Ohio, containing 719 inhabitants.—Also, a township of Ross county, in the same district, containing 1053 inhabitants.

TWIN, *North*, an island in James's Bay, Hudson's Bay. N. lat. 53° 20'. W. long. 80° 40'.

TWIN, *South*, an island in James's Bay, Hudson's Bay. N. lat. 53° 10'. W. long. 80° 36'.

TWIN Oat, in *Agriculture*, a name sometimes applied to an early kind of white oat, which is very productive on deep good land, and which affords full crops on moist sorts that

are not too poor in quality. It commonly yields somewhat more than the pollard fort. See OAT.

TWINE. *Bolt-rope twine*, used in sewing sails to their bolt-rope, is made of the long hemp, or from the long rough hemp unbeat. It contains two or three threads, is twisted slack, and wound into half-pound skains containing two hundred yards. Eight threads are spun out of half a pound of hemp, each fifty yards long.

Seal-twine, for seal-nets, is made of twelve threads, two threads first twisted together, then six of them hardened together, and wound up into half-skains, or eighty yards.

Seaming or sail-maker's twine, for sewing the seams of sails, is made of the best long hemp, beaten, spun fine, and well dressed over a fine clearer : eighteen threads are spun out of half a pound of hemp, every thread being fifty yards in length : two threads are twisted together slack, and wound on a reel, in half-pound skains containing four hundred and fifty yards : but twine of three threads is used in the navy.

Seam-twine is made from good long hemp, each thread spun fifty-four yards : three threads are laid together. When hardened and stretched, each cord stands fifty yards ; nine hundred yards are wound on a reel, and eighteen cords weigh two pounds.

Store-twine, used by sail-makers for old work and on board of ships, is made from good long hemp, well dressed. Fourteen threads are spun from half a pound ; two threads are twisted together, and wound into half-pound skains of three hundred and fifty yards.

Turtle-twine, for turtle-nets, is made of good bar hemp, spun one hundred yards : three threads are laid together, stand ninety yards, and weigh one pound.

Whipping-twine, the same as bolt-rope twine.

TWINING IRONS, square bars with an eye-hook at one end, which grasp the porter or the shank of an anchor to turn it over.

TWINKLING of the Stars, denotes that tremulous, vibratory, intermitting motion, which is observed in the light proceeding from the fixed stars : Alhazen, an Arabian philosopher of the twelfth century, considers refraction as the cause of this phenomenon.

Vitellio, in his *Optica*, published in 1270, p. 449, ascribes the twinkling of the stars to the motion of the air in which the light is refracted ; and he observes, in confirmation of this hypothesis, that they twinkle still more when they are viewed in water put into motion.

Dr. Hooke (*Microgr.* p. 231, &c.) very reasonably attributes this phenomenon to the inconstant and unequal refraction of the rays of light occasioned by the trembling motion of the air and interspersed vapours, in consequence of variable degrees of heat and cold in the air, producing corresponding variations in its rarity or density, and also of the action of the wind, which must cause the successive rays to fall upon the eye in different directions, and consequently upon different parts of the retina at different times, and also to hit and miss the pupil alternately ; and this is also the reason, he says, why the limbs of the sun, moon, and planets appear to wave or dance.

These tremors of the air are manifest to the eye by the tremulous motion of shadows cast from high towers ; and by looking at objects through the smoke of a chimney, or through streams of hot water, or at objects situated beyond hot sands, especially if the air be moved transversely over them. But when stars are seen through telescopes that have large apertures, they twinkle but little, and sometimes not at all. For, as sir Isaac Newton has observed, (*Opt.* p. 98.) the rays of light which pass through different parts of the aperture, tremble each of them apart, and by means of their various, and sometimes contrary tremors, fall at one and the same time upon different points in the bottom of the eye, and their trembling motions are too quick and confused to be separately perceived. And all these illuminated points constitute one broad lucid point, composed of those many trembling points confusedly and insensibly mixed with one another by very short and swift tremors, and thereby cause the star to appear broader than it is, and without any trembling of the whole.

Dr. Jurin, in his *Essay upon Distinct and Indistinct Vision*, has recourse to sir Isaac Newton's hypothesis of fits of

easy refraction and reflection for explaining the twinkling of the stars : thus, he says, if the middle part of the image of a star be changed from light to dark, and the adjacent ring be at the same time changed from dark to light, as must happen from the least motion of the eye towards or from the star, this will occasion such an appearance as twinkling.

Mr. Michell (*Phil. Trans.* vol. lvii. p. 262.) supposes that the arrival of fewer or more rays at one time, especially from the smaller or more remote fixed stars, may make such an unequal impression on the eye, as may, at least, have some share in producing this effect : since it may be supposed, that even a single particle of light is sufficient to make a sensible impression upon the organs of sight ; so that a very few particles arriving at the eye in a second of time, perhaps not more than three or four, may be sufficient to make an object constantly visible. See **LIGHT**.

Hence, he says, it is not improbable, that the number of the particles of light which enter the eye in a second of time, even from Sirius himself, may not exceed three or four thousand, and from stars of the second magnitude they may, therefore, probably not exceed a hundred. Now the apparent increase and diminution of the light, which we observe in the twinkling of the stars, seem to be repeated at not very unequal intervals, perhaps about four or five times in a second. He, therefore, thought it reasonable to suppose, that the inequalities which will naturally arise from the chance of the rays coming sometimes a little denser, and sometimes a little rarer, in so small a number of them, as must fall upon the eye in the fourth or fifth part of a second, may be sufficient to account for this appearance. An addition of two or three particles of light, or perhaps a single one, upon twenty, especially if there should be an equal deficiency, out of the next twenty, would, he supposed, be very sensible, as he thought was probable from the very great difference in the appearance of stars, the light of which does not differ so much as is commonly imagined. The light of the middlemost star in the tail of the Great Bear does not, he thinks, exceed the light of the very small star that is next to it, in a greater proportion than that of about 16 or 20 to 1 ; and M. Bouguer found, that a difference in the light of objects, of one part in sixty-six, was sufficiently distinguishable.

Since these observations were published, Mr. Michell (as we are informed by Dr. Priestley, *Hist. of Light*, p. 495.) has entertained some suspicion, that the unequal density of light does not contribute to this effect in so great a degree as he had imagined ; especially in consequence of observing that even Venus does sometimes twinkle. This he once observed her to do remarkably when she was about six degrees high, though Jupiter, which was then about sixteen degrees high, and was sensibly less luminous, did not twinkle at all. If, notwithstanding the great number of rays, which, without doubt, come to the eye from such a surface as this planet presents, its appearance be liable to be affected in this manner, it must be owing to such undulations in the atmosphere, as will probably render the effect of every other cause altogether insensible.

M. Muschenbroeck (*Introd. ad Phil. Nat.* vol. ii. sect. 1741, p. 707.) suspects, that the twinkling of the stars arises from some affection of the eye, as well as the state of the atmosphere. For, he says, that in Holland, when the weather is frosty, and the sky very clear, the stars twinkle most manifestly to the naked eye, though not in telescopes ; and since he does not suppose there is any great exhalation, or dancing of the vapour at that time, he questions whether the vivacity of the light, affecting the eye, may not be concerned in the phenomenon.

But this philosopher might have satisfied himself with respect to this hypothesis, by looking at the stars near the zenith, when the light traverses but a small part of the atmosphere, and therefore might be expected to affect the eye most sensibly. For he would not have perceived them to twinkle near so much as they do near the horizon, when much more of their light is intercepted by the atmosphere.

Some astronomers have lately endeavoured to explain the twinkling of the fixed stars, by the extreme minuteness of their apparent diameter; so that they suppose the sight of them is intercepted by every mote that floats in the air. To this purpose Dr. Long observes (*Astron.* vol. i. p. 170.) that our air near the earth is so full of various kinds of particles, which are in continual motion, that some one or other of them is perpetually passing between us and any star which we look at, and this makes us every moment alternately see it and lose sight of it: and this twinkling of the stars, he says, is greatest in those which are nearest the horizon, because they are viewed through a great quantity of thick air, where the intercepting particles are most numerous; whereas stars that are near the zenith do not twinkle so much, because we do not look at them through so much thick air, and therefore the intercepting particles being fewer, come less frequently before them.

With respect to the planets, it is observed, that they, because they are much nearer to us than the stars, have a sensible apparent magnitude, so that they are not covered by the small particles floating in the atmosphere, and therefore do not twinkle, but shine with a steady light. The fallacy of this hypothesis appears from the observation of Mr. Michell, that no object can hide a star from us that is not large enough to exceed the apparent diameter of the star, by the diameter of the pupil of the eye; so that if a star was a mathematical point, the interposing object must still be equal in size to the pupil of the eye: and, indeed, it must be large enough to hide the star from both eyes at the same time.

The principal cause, therefore, of the twinkling of the stars is now acknowledged to be, the unequal refraction of light, in consequence of inequalities and undulations in the atmosphere.

Besides a variation in the quantity of light, it may here be added, that a momentary change of colour has likewise been observed in some of the fixed stars. Mr. Melville (*Edinb. Ess.* vol. ii. p. 81.) says, that when one looks steadfastly at Sirius, or any bright star, not much elevated above the horizon, its colour seems not to be constantly white, but appears tinged, at every twinkling, with red and blue. Mr. Melville could not entirely satisfy himself as to the cause of this phenomenon; observing, that the separation of the colours by the refractive power of the atmosphere is, probably, too small to be perceived. Mr. Michell's hypothesis above-mentioned, though inadequate to the explanation of the twinkling of the stars, may pretty well account for this circumstance. For the red and blue rays being much fewer than those of the intermediate colours, and therefore much more liable to inequalities, from the common effect of chance, a small excess or defect in either of them, will make a very sensible difference in the colour of the stars.

TWINS, two young ones delivered at a birth by an animal which ordinarily brings forth but one.

It has been greatly disputed, which of two twins is to be esteemed the elder? The faculty of Montpellier have given it, that the latter born is to be reputed the elder, because first conceived: but by all the laws which now obtain, the

first-born enjoys the privilege of seniority; and the custom is confirmed by the scripture instance of Esau and Jacob.

But if two twins be born so intermixed, that one cannot distinguish which of the two appeared first, it should seem that neither the one nor the other can pretend to the right of primogeniture, which ought to remain in suspense by reason of their mutual concurrence. In such case, some would have the decision left to the father, and others to the chance of a lot.

In cattle, twins are seldom desirable, as they can rarely be well supported, though occasionally cows are capable of suckling two calves; but in sheep, it is often greatly desirable in different breeds or varieties. The frequency of twins in sheep is much influenced both by the condition of the ewes, and the state of vigour in the rams. Such flocks as are well fed, and pasture easily about the tugging time, usually produce a far larger proportion of twins, than those which have higher walks, or pastures which are of inferior quality. Twins too are the most frequent in the early part of the lambing season: all which shew the propriety of keeping the ewes well supported, and of not letting the rams have too great a number put to them at such seasons.

Nice attention is necessary to twins at the time of lambing, by the person who has the charge of the business, to see that they are in every way properly taken care of. See SHEEP.

TWINS, in *Astronomy*. See GEMINI.

TWINS, in *Geography*, two small islands in the East Indian sea, near the island of Paraguay. N. lat. $9^{\circ} 18'$. E. long. $118^{\circ} 3'$.—Also, two small islands in the East Indian sea, near the north coast of the island of Flores. S. lat. $8^{\circ} 2'$. E. long. $122^{\circ} 33'$.

TWIST of a Rope, Cord, &c. See ROPE.

TWIST, again, is used for the inside, or flat part of a man's thigh, upon which a true horseman rests when on horseback.

Twist a Horse, To, is violently to wring or twist his testicles twice about, which causes them to dry up, and deprives them of nourishment, and reduces the horse to the same state of impotency with a gelding.

TWISTE, in *Geography*, a river of Germany, which runs into the Erpe, near Valckmarfen, in the duchy of Westphalia.

TWISTED COLUMN. See COLUMN.

TWISTED Silks. See SILK.

TWISTED Thumb-Band, in *Rural Economy*, a term used to signify the band of hay or straw which is formed by means of the thumb and fingers, by twisting it with them, and employed in binding up trusses of these kinds for sale. See TRUSS.

TWITCH, in *Agriculture*, a name often applied to a very troublesome plant of the weed kind in tillage-land, of which there are several sorts, as the black, white, creeping, and some others. See COUCH-Grass.

TWITCH-Rake, a name sometimes applied to a large tool of this kind, made use of in dragging and collecting the roots of couch together in arable land, by means of a horse. See COUCH and RAKE.

TWITE, in *Ornithology*. See LINNET.

TWO BROTHERS, in *Geography*, two small islands in the Chinese sea. N. lat. $8^{\circ} 30'$. E. long. $105^{\circ} 48'$.—Also, two small islands in the East Indian sea, near the W. coast of Borneo. S. lat. $1^{\circ} 32'$. E. long. $109^{\circ} 13'$.—Also, two small islands in the East Indian sea, 27 miles from the E. point of the island of Madura. S. lat. $6^{\circ} 50'$. E. long. $114^{\circ} 43'$.—Also, two small islands in the East Indian

Indian sea, near the W. coast of the island of Celebes. S. lat. $4^{\circ} 40'$. E. long. $119^{\circ} 22'$.—Also, two small islands in Cook's Straits, near the N.E. coast of the southern island of New Zealand. S. lat. $40^{\circ} 5'$. E. long. $184^{\circ} 35'$.—Also, two small islands in the East Indian sea, near the S. coast of Borneo. S. lat. $4^{\circ} 10'$. E. long. $114^{\circ} 4'$.—Also, two small islands in the East Indian sea, between the island of Borneo and the continent of Asia. S. lat. $9^{\circ} 10'$. E. long. $109^{\circ} 24'$.

Two-Head Island, a small island near the S. coast of Ireland, and county of Kerry; 1 mile W. of Lamb's-Head.

Two-Headed Point, a cape on the S.W. coast of the island of Kodiak, in the North Pacific ocean, composing a small island, which terminates to the N.E. by a low flat rocky point. South-westward from Two-headed island the coast is low, and appears to be compact; but immediately to the northward of it, the shores descend abruptly into the sea, appear to be much broken, and form an extensive sound, of which the flat rocky point may be considered as its S.W. point of entrance; from this, its N.E. point being low projecting land, lies N. 58° E. at the distance of nine miles. The several branches that appeared to flow into the Sound, seemed to wind toward the base of a connected range of high snowy mountains, which no doubt gave boundaries to their extent. N. lat. $56^{\circ} 54'$. E. long. $207^{\circ} 5'$.

Two Hills, a small island among the New Hebrides, in the South Pacific ocean. S. lat. $17^{\circ} 15'$. E. long. $160^{\circ} 38'$.

Two-Hill Island, a small island in the Mergui Archipelago. N. lat. $11^{\circ} 27'$.

Two Keys, two small islands in the bay of Honduras. N. lat. $17^{\circ} 30'$. W. long. $87^{\circ} 52'$.

Two-Saddle Island, an island in the Mergui Archipelago, about four miles long, and two broad. N. lat. $10^{\circ} 42'$.

Two Sisters, two small islands in the East Indian sea, covered with wood, and surrounded by a reef of coral-rocks. S. lat. 5° . E. long. $106^{\circ} 12'$.—Also, two small islands in the Spanish main, near the Mosquito shore. N. lat. $11^{\circ} 17'$. W. long. $82^{\circ} 55'$.

Two Spots, small islands in the bay of Honduras, surrounded with rocks. N. lat. $16^{\circ} 40'$. W. long. $88^{\circ} 20'$.

TWOBILL, in *Agriculture*, the name of a tool commonly employed in cutting up roots in the work of paring and burning in the old mode. It is seen in *fig. 7.* in the plate on paring ploughs. It has sometimes the title of double-bitted mattock.

TWO-FURROW PLOUGH, a term sometimes applied to that of the double kind. It is often useful for cross-cutting land in different cases, and in giving the last earth for turnip-crops.

TWO-FURROWING, a term used to signify double furrows, or the breaking up land by the double plough: it also implies trench-ploughing and sod-burying.

TWO-MEAL CHEESE, in *Rural Economy*, a term applied to that sort which is made from the skimmed milk of the evening, added to the new milk of the meal of the morning; that made from the neat milk being termed one-meal. In some districts, as that of Gloucester, two-meal cheese is made of one meal or portion of coward or clean milk, and the same of such as is skimmed; but often two of the latter are used to one of the former. Hence this sort is sometimes called coward-cheese.

TWO-MOULD-BOARDED *Cleaning and Earthing*

Hoe for Potatoes, in *Agriculture*, a tool of somewhat the plough kind, contrived for the purpose of cleaning and earthing up these crops with. It has a wheel before to direct the depth of its working, with handles behind to regulate it. There is a sharp hoe attached to a sort of coultter-bar in front, with a mould-board on each side, capable of being set to different distances, by a kind of screw in the middle, by which means the ground is pared and laid to the crops. It is considered a tool that produces much saving and advantage in the culture of potatoes, and which performs its work very effectually.

TWOPENCE, HERB, in *Botany*, a species of *Lysimachia*; which see.

TWO-THIRDS SUBSIDY. See **DUTY** and **SUBSIDY**.

TWUNT, in *Geography*, a town of Algiers, on the coast of the Mediterranean, defended by a fort; 30 miles N.W. of Tremecen. N. lat. $35^{\circ} 18'$. W. long. $1^{\circ} 2'$.

TWYBLADE, in *Botany*. See **OPHIRYS**.

TYACUL, in *Geography*, a town of Hindoostan, in Mysore; 10 miles S. of Colar.

TYAHTATOOA BAY, a bay on the coast of Owhyhee, one of the Sandwich islands. N. lat. $19^{\circ} 37'$. E. long. $203^{\circ} 54'$.

TYANA, in *Ancient Geography*, a town of Cappadocia, in the Tyanide prefecture; the only one in this prefecture, according to Strabo; but according to Ptolemy, there were three others. It was known as the native country of Apollonius Tyanæus, the celebrated impostor.

TYANA, in *Geography*, a town of Asiatic Turkey, in Natolia; 25 miles S.W. of Sis.

TYBEE, an island near the coast of Georgia, at the mouth of the Savanna: on it is a light-house. N. lat. 32° . W. long. 81° .

TYBEIN. See **DUINO**.

TYBER. See **TIBERIS** and **TYBERINUS**. The Tyber appears on the reverse of a medal of Vespasian, not only as a divinity, but also as the patron and protector of Rome. When Æneas resided in Italy, he performed religious ceremonies to this river, gave himself up to his protection, and prayed that he might be propitious to him.

TYBERINUS, a king of Alba, and from this prince having drowned himself in the Albula, that river gained the name of Tyber, which it has ever since retained.

TYBOINE, in *Geography*, a township of Pennsylvania; 100 miles W. of Philadelphia.

TYCHE, in *Ancient Geography*. See **SYRACUSE**.

TYCHONIC System, or *Hypothesis*, is an order or arrangement of the heavenly bodies, of an intermediate nature between the Copernican and Ptolemaic, or participating alike of them both. See **SYSTEM**.

TYDAL, in *Geography*. See **RUDEN**.

TYDII, in *Ancient Geography*, a people of Asiatic Sarmatia, who inhabited mount Caucasus, according to Pliny.

TYE, DR. in *Biography*, the best English composer of church music, anterior to Tallis, that our country can boast; for though his name does not appear in the list of musicians of the chapel royal, or household establishment in the short reign of Edward VI., he was, doubtless, at the head of all ecclesiastical composers of that period. Neither the state of the church, nor religious principles of its nominal members, were so settled as to render it possible to determine, in these times, who among quiet and obedient subjects were Protestants, and who Catholics; for, during the conflict between the zealots of both religions, the changes were so violent and rapid, that great flexibility or great

great dissimulation must have been practised by those who not only escaped persecution, but still continued in offices, either of church or state. The few who seem to have been truly pious and conscientious on both sides, suffered martyrdom in support of their opinions; the rest seem to have been either unprincipled, or fluctuating between the two religions. One of the principal evils which the champions for reformation combated, was the use of the Latin language in the service of the church; however, the best choral compositions produced by the masters of these times, that are come down to us, are to Latin words. Specimens remain of Dr. Tye's clear and masterly manner of composing for the church in that language, when he was at least a nominal Catholic, either during the reign of Henry VIII. or queen Mary; and the late worthy Dr. Boyce has given an admirable example of his abilities in the anthem for four voices, "I will exalt thee, O Lord," inserted in the second volume of his excellent "Collection of Cathedral Music, by English Masters." There is hardly any instance to be found in the productions of composers for the church during his time, of a piece so constantly and regularly in any one key, as this is in the key of C minor, and its relatives; the harmony is pure and grateful; the time and melody, though not so marked and accented as in those of the best compositions of the last century, are free from pedantry, and the difficulty of complicated measures which this composer had the merit of being one of the first to abandon. That he translated the first fourteen chapters of the Acts of the Apostles into metre, in imitation of Sternhold's Psalms, which were the delight of the court in which he lived, was doubtless an absurd undertaking, and was not rendered less ridiculous by the elaborate music to which he set them, consisting of fugues and canons of the most artificial and complicated kind. Dr. Tye, however, if compared with his contemporaries, was perhaps as good a poet as Sternhold, and as great a musician as Europe could then boast; and it is hardly fair to expect more perfection from him, or to blame an individual for the general defects of the age in which he lived.

TYE, in *Geography*, a river of Virginia, which runs into James river, N. lat. $37^{\circ} 30'$. W. long. $79^{\circ} 8'$.

TYE, in *Mining*. See **STREAMING**.

TYE, in *Sea Language*, denotes a sort of runner, or thick rope, used to transmit the effort of a tackle to any yard or gaff, which extends the upper part of a sail.

The tye is either passed through a block fixed to the mast-head, and afterwards through another block moveable upon the yard or gaff intended to be hoisted; or the end of it simply fastened to the sail, yard, or gaff, after communicating with the block at the mast-head. Falconer. See **JEERS**.

TYER, in *Geography*, a river of South Carolina, which runs into the Cangaree, N. lat. $34^{\circ} 30'$. W. long. $81^{\circ} 45'$.

TYERS, JONATHAN, in *Biography*, the late proprietor, and indeed the creator of Vauxhall gardens, (see **VAUXHALL**,) deserves a place among our biographical articles on many accounts. His taste, liberality, and spirit in supporting and ornamenting this elegant place of amusement with paintings by Hogarth and Hayman; an excellent band of music; an orchestra in the form of a temple in the open air, with an organ equal in size and workmanship to many of the most noble instruments of that kind in our churches; and a constant succession of ingenious exhibitions; rendered it a public place more attractive, admired, and imitated by foreigners, than any one our country could boast. In every part of Europe a nominal Vauxhall has been established; nor

was there a theatre on the continent thirty years ago, with scenery and ballet pantomimes, without an attempt at representing Vauxhall.

The proprietor began with a small band of wind-instruments only, before he erected an orchestra, and furnished it with an organ; but in the summer of 1745, to render it still more attractive, he added, for the first time, vocal to his instrumental performances. Here the talents of many of our national musicians were first displayed and first encouraged; here Collet and Pinto on the violin, Snow on the trumpet, Millar on the bassoon, Worgan on the organ, &c. annually increased in merit and favour. Here Messrs. Arne, Lowe, and the elder Reinhold sung during many years, with great applause, Dr. Arne's ballads, duets, dialogues, and trios, which were soon after circulated throughout the kingdom, to the great improvement of our national taste. During this first summer, his little dialogue of Colin and Phœbe, written by the late Mr. Moore, author of "Fables for the Female Sex," was constantly encored every night for more than three months successively.

But here the good sense, sound judgment, and good taste of the spirited proprietor of Vauxhall, deserve a record for the veneration and respect which he manifested for Handel; at a time when the health and favour of this great master were on the decline, and opposition had almost ruined him: it was then that Tyers erected, at his sole expence, the marble statue which still adorns the gardens; an honour which has seldom been conferred on a subject and a professional man, during his life-time, in any country, since the flourishing state of the Greeks and Romans. And as this transaction does honour, not only to the genius of Handel, but to the public spirit of his votary, we shall relate it as recorded in the registers of the times.

April 15th, 1738, in the London Daily Post, a paragraph says: "The effigies of Mr. Handel, the famous composer of music, is going to be erected at Vauxhall gardens, at the expence of Mr. Jonathan Tyers." And on the 18th of the same month, "We are informed, from very good authority, that there is now near finished a statue of the justly celebrated Mr. Handel, exquisitely done by the ingenious Mr. Roubillac, of St. Martin's-lane, statuary, out of one entire block of marble, which is to be placed in a grand niche, erected on purpose in the great grove at Vauxhall gardens, at the sole expence of Mr. Tyers, conductor of the entertainments there; who, in consideration of the real merit of that inimitable master, thought it justice and propriety that his effigies should preside in that place, where his harmony has so often charmed even the greatest crowds into the most profound silence and attention. It is believed, that the expence of the statue and niche cannot cost less than 300*l.*; the said gentleman, likewise, very generously took at Mr. Handel's benefit, fifty of his tickets."

May 2d, we have a farther account of this species of apotheosis, or laudable idolatry, in the following words: "Last night at the opening of the Spring-gardens Vauxhall, the company expressed great satisfaction at the marble statue of Mr. Handel, who is represented in a loose robe, sweeping the lyre, and listening to its sounds; which a little boy sculptured at his feet seems to be writing down on the back of a violoncello. The whole composition is in an elegant taste."

Soon after, the following verses appeared:

"That Orpheus moved a grove, a rock, or stream,
By music's power, will not a fiction seem;
For here as great a miracle is shewn—

A Handel breathing, though transform'd to stone."

TYFORY,

TYFORY, in *Geography*, a small island in the East Indian sea; 45 miles W. of Gilolo. N. lat. $1^{\circ} 6'$. E. long. $126^{\circ} 28'$.

TYGART'S VALLEY, a district of Pennsylvania, watered by the Monongahela river.

TYGER, in *Zoology*. See TIGER.

TYGER, in *Geography*, a river of South Carolina, which joins the Saluda, 5 miles N. of Columbia; and both together form the Cangaree.

TYGER'S POINT, a cape of Asia, on the south-west coast of Ava, at the mouth of the Perfaim. N. lat. $15^{\circ} 50'$. E. long. $94^{\circ} 45'$.

TYGER'S CREEK, a river of Kentucky, which runs into the Ohio, N. lat. $38^{\circ} 22'$. W. long. 83° .

TYGER'S ISLAND, a small island in the Chinese sea, near the coast of Chiampa. N. lat. $10^{\circ} 47'$. E. long. $107^{\circ} 45'$.—Also, a small island in the Chinese sea, near the coast of Cochinchina. N. lat. $16^{\circ} 51'$. E. long. $106^{\circ} 13'$.

TYGER ISLAND, a small island in the Pacific ocean, at the entrance of the bay of Amapalla. N. lat. $13^{\circ} 10'$.

TYGER'S ISLANDS, a cluster of small islands and shoals in the East Indian sea; 30 miles E. from the island of Saleyer.

TY-GWYN, a village of South Wales, in the county of Caermarthen, where Howel Dha, first monarch of all Wales, had a palace: and in the year 942, a council was held, to form a body of laws. On this spot a Cistercian monastery was founded, called Whetsand Abbey; 5 miles W. of St. Clare.

TYING, in *Music*. See LEGATE-Note and SYNCOPE.

TYKOCZYN, in *Geography*, a town of Poland, in the palatinate of Bielsk. In 1705, Augustus II. instituted the order of the White Eagle in this town; 28 miles N.N.W. of Bielsk.

TYLANGIUM, in *Ancient Geography*, a town of the Peloponnesus, in Triphylia, according to Polybius.

TYLE, or TILE, in *Building*, a sort of thin, factitious, laminated brick, used on the roofs of houses, or, more properly, a kind of fat clayey earth, kneaded and moulded of a just thickness, dried and burnt in a kiln, like a brick, and used in the covering and paving of houses.

It is thus called from the French *tuille*, of the Latin *tegula*, which signifies the same.

Tyles are made, says Mr. Leyburn, of better earth than brick-earth, and something near akin to the potter's earth.

By 17 Geo. III. c. 42. all combinations for enhancing the price of tiles and bricks, shall be void; and every tyle-maker, or brick-maker, offending, shall forfeit 20*l.*, and every clerk, agent, or servant, 10*l.*; half to the poor, and half to him who sues within six calendar months.

By 43 Geo. III. c. 69. schedule (A.) and the 45 Geo. III. c. 30. in lieu of any duties of excise then subsisting, new duties were imposed.

The said duties on bricks and tiles to be paid by the maker or makers thereof respectively.

For the duties on exportation and importation, see the schedules annexed to the said act of 43 Geo. III. c. 69.

Provided always, that tiles made for the sole purpose of draining land, 19 $\frac{1}{16}$ inches long by 13 $\frac{3}{16}$ inches broad, and bent into a semi-elliptical form, the inside of the crown of the arch thereof being not less than seven inches perpendicular, from a straight line drawn from the one to the other side thereof after the same is so bent, and such sides not being at any part thereof more than five inches distant from each other on the inside, and as nearly of the dimensions, and bent as nearly into the form aforesaid as may be, to be used for the purposes aforesaid, shall not be subject to any

of the said duties. 34 Geo. III. c. 15.—And the exemption is extended to tiles made for such purpose not less than nine inches long; such being in every other respect of the same description and dimension as before prescribed. 42 Geo. III. c. 93.

And by the 46 Geo. III. c. 138. it is further enacted, that semi-elliptic tiles not exceeding in inside width six inches, and the height of which from the outside of the crown of the arch in a perpendicular line to the extreme edge shall in all cases exceed the width, but with a foot from the bottom of the arch where necessary, not exceeding two inches in breadth, made for draining wet or marshy lands, are exempted from the excise duty.

And any person using any such tyle for any other purpose than above-mentioned, incurs the penalty of 6*l.* each tyle so used.

And every maker of bricks or tiles, before he begins to make, shall leave or give notice in writing at the next excise office of his name and place of abode, and of the sheds, workhouses, or other places where such bricks or tiles are intended to be made; on pain of 100*l.* 24 Geo. III. c. 24. s. 2.

All bricks and tiles chargeable with the said duties shall be taken account of and charged by the officer whilst they are drying, after being turned out of the moulds, and before removed to the kiln or clamp for burning, for which purpose any officer may enter into the fields, sheds, or other places where making, and shall take an account thereof in writing, and leave a copy (if demanded) with such maker, on pain of 40*s.*: and if any person shall obstruct such officer, he shall forfeit 50*l.*

The officer charging the duty shall allow ten for every hundred when charged in the field before burned, in compensation for all waste, loss or damages.

And if the maker shall remove any bricks or tiles to the kiln or clamp or other place of burning from out of the field or place where they shall be put or placed to dry before the officer shall have taken an account thereof, he shall forfeit 50*l.* And all so carried away, and found in the possession of any maker, or trader therein, or person for his use, shall be forfeited and may be seized, or the value thereof shall be forfeited. 25 Geo. III. c. 66.

Provided, that no such maker shall be subject to the said penalty, if the officer shall fail to take an account, on due notice given him three days before such removal. 24 Geo. III. c. 24. s. 2.

The maker shall keep the bricks and tiles unfurveyed separate from those that have been furveyed; on pain of forfeiting 50*l.* 25 Geo. III. c. 66.

And such maker shall, while the same are drying, place them in such manner as the officer may easily and securely take an account thereof; and if he shall place them in an irregular or unusual manner, with intent to make it difficult or unsafe for the officer to take such account, he shall forfeit 50*l.*

If any maker shall fraudulently conceal or hide any bricks or tiles in any part of the operation of making, with intent to evade the duties, he shall forfeit the same, and also 20*l.* 24 Geo. III. c. 24. s. 2.

Every such maker shall once in every six weeks make entry in writing upon his oath, or on the oath of his chief workman, at the next excise office, of all bricks and tiles by him made within that time, on pain of 50*l.* And shall also, within six weeks after such entry, clear off all the duties then due thereon; on pain of double duty. And if any person shall carry away such bricks or tiles before the duty be cleared off, he shall forfeit double the value thereof. But such

such maker shall not for making such entry be obliged to go further than the next market-town.

And all tools, implements, and utensils used in making such bricks or tyles, in custody of the maker, &c. shall be liable to be seized for any debts or penalties, (arising or incurred under this act,) whether the debtor or offender be the lawful owner thereof or not. 28 Geo. III. c. 37.

Bricks or tyles for which the duties have been paid may be exported, and on security given before the shipping thereof that the same shall not be reloaded, the person exporting the same shall be allowed a drawback of such duties; and in case such bricks or tyles shall be reloaded, the same shall be forfeited to the use of his majesty, over and above the penalty of such bond. 27 Geo. III. c. 13. sched. (F.)

All penalties and forfeitures are to be sued for, levied, and mitigated as by the laws of excise, or in the courts at Westminster, and to be distributed half to the king, and half to him that shall sue. 24 Geo. III. c. 24. sect. 2.

For the method of burning tyles, see BRICK.

As to the applying of tyles, some lay them dry, as they come from the kiln, without mortar, or any thing else; others lay them in a kind of mortar made of loam and horse-dung. In some parts, as in Kent, they lay them in moss.

There are various kinds of tyles for the various occasions of building; as *plain*, *thack*, *ridge*, *roof*, *creafe*, *gutter*, *pan*, *crooked*, *Flemish*, *corner*, *hip*, *dorman* or *dormar*, *scallop*, *astragal*, *traverse*, *padding*, and *Dutch* tyles.

TYLES, *Plain* or *Thack*, are those in ordinary use for the covering of houses. They are squeezed flat, while yet soft, in a mould. They are of an oblong figure, and by stat. 17 Edw. IV. c. 4. are to be ten inches and a half long, six and a quarter broad, and half an inch and half a quarter thick. But these dimensions are not strictly observed.

Plain tyles are not laid in mortar, but only pointed in the inside.

TYLES, *Ridge*, *Roof*, or *Creafe*, are those used to cover the ridges of houses, being made circular, breadthwise, like a half cylinder. These are what Pliny calls *laterculi*, and are by statute to be thirteen inches long, and of the same thickness with the plain tyles.

TYLES, *Hip* or *Corner*, are those which lie on the hips or corners of roofs. As to form, they are first made flat, like plain tyles, but of a quadrangular figure, whose two sides are right lines, and two ends arcs of circles; one end being a little concave, and the other convex. The convex end is to be about seven times as broad as the concave end; so that they would be triangular, but that one corner is taken off: then, before they are burnt, they are bent on a mould, breadthwise, like ridge tyles. They have a hole at their narrow end to nail them on by, and are laid with their narrow end upwards. By statute, they are to be ten inches and a half long, and of a convenient breadth and thickness.

These, as well as the ridge tyles, are to be laid in mortar, because they seldom lie so close as not to admit any water to pass between them.

TYLES, *Gutter*, are those which lie in gutters or valleys in cross-buildings. They are made like corner tyles, only the corners of the broad end are turned back again with two wings. They have no holes in them, but are laid with the broad end upwards, without any nailing. They are made in the same mould as corner tyles, and have the same dimensions on the convex sides. Their wings are each four inches broad, and eight long.

These tyles are seldom used where lead is to be had.

TYLES, *Pan*, *crooked*, or *Flemish*, are used in covering

of sheds, stables, out-houses, and all kinds of flat-roofed buildings. They are in form of an oblong parallelogram, as plain tyles, but are bent breadthwise forwards and backwards, in the form of an S, only one of the arches is at least three times as big as the other, which biggest arch is always laid uppermost, and the less arch of another tyle lies over the edge of the great arch of the former. They have no holes for pins, but hang on the laths by a knot of their own earth. By 17 Geo. III. c. 42. they are to be, when burnt, not less than thirteen inches and a half long, nine and a half inches wide, and half an inch thick, on pain that the maker shall forfeit 10s. for every 1000.

Pan-tyles are laid in mortar, because the roof being flat, and many tyles being warped in the burning, they will not cover the roof so well as that no water pass between them.

TYLES, *Dorman* or *Dormar*, consist of a plain tyle, and a triangular piece of a plain one, standing up at right angles to one side of the plain tyle, and swept with an arc of a circle from the one end, which end terminates in a point. Of these tyles there are two kinds; the triangular piece, in some, standing on the right, in others on the left side of the plain tyle. And of each of these, again, there are two kinds, some having a whole plain tyle, others but half a plain tyle. But in them all, the plain tyle has two holes for the pins, at that end where the broad end of the triangular piece stands.

Their use is to be laid in the gutters, betwixt the roof and the cheeks or sides of the dormars, the plain part lying on the roof, and the triangular part standing perpendicularly by the cheek of the dormar. They are excellent to keep out the wet in those places, and yet they are hardly known any where but in Suffex. The dimensions of the plain tyle part are the same as those of a plain tyle, and the triangular part is of the same length, and its breadth at one end seven inches, and at the other nothing.

TYLES, *Scallop* or *Astragal*, are, in all respects, like plain tyles, only their lower ends are in form of an astragal, viz. a semicircle, with a square on each side. They are used in some places for weather tyling.

TYLES, *Traverse*, are a kind of irregular plain tyles, having the pin-holes broken out, or one of the lower corners broken off. These are laid with the broken end upwards, upon the rafters, where pinned tiles cannot hang.

TYLES, *Flemish* or *Dutch*, are of two kinds, *ancient* and *modern*. The ancient were used for chimney foot-paces; they were painted with antique figures, and frequently with postures of soldiers, some with compartments, and some with morefque devices; but they came greatly short, both as to the design and colours, of the modern ones.

The modern Flemish tyles are commonly used plastered up in the jambs of chimneys, instead of chimney corner-stones. These are better glazed, and such as are painted (for some are only white) are much better performed than the ancient ones.

But both kinds seem to be made of the same whitish clay as our white-glazed earthen-ware. The ancient ones are five inches and a quarter square, and about three-quarters of an inch thick; the modern ones six inches and a half square, and three-quarters of an inch thick.

When these tyles are set with good mortar they look beautiful, and cast a greater heat than stone: for, being very smooth and glazed, the rays of heat striking upon them are all reflected into the work, especially when the sides of the chimneys are oblique, or in the form of circular arches. But they are little used.

Tyling is measured by a square of 100 square feet; and the number of tyles required for such a square depends on the

the distance of the laths, which, when six inches, requires 800: when six and a half inches, 740; when seven inches, 690; when seven and a half inches, 640; and when eight inches, 600 tyles.

TYLE, in *Affaying*. See TILE.

TYLER, one that covers or paves with tyles.

Tylers and bricklayers were incorporated 10 Eliz. under the name of "Master and Wardens of the Society of Freemen of the Mystery and Art of Tylers and Bricklayers." See COMPANY.

TYLERS, *Great*, in *Geography*, a small island in the Gulf of Finland. N. lat. 59° 50'. E. long. 27° 12'.

TYLERS, *Little*, a small island in the Gulf of Finland. N. lat. 59° 48'. E. long. 26° 54'.

TYLERY. See TUILERIE.

TYLIS, in *Ancient Geography*, a town of Thrace, on mount Hæmus.

TYLOPHORA, in *Botany*, from *τυλος*, a wart or tubercle, and *φερον*, to bear, apparently in reference to the five fleshy tumid leaves of the crown of the flower; though no explanation is given by the author.—Brown Tr. of the Wern. Soc. v. 1. 28. Prodr. Nov. Holl. v. 1. 460.—Class and order, *Pentandria Dignia*. Nat. Ord. *Contortæ*, Linn. *Apocynæ*, Juss. *Asclepiadæ*, Brown.

Eff. Ch. Corolla wheel-shaped, in five deep segments. Crown of the stamens of five depressed fleshy leaves, whose inner angle is simple, without a tooth. Anthers terminated by a membrane; masses of pollen erect, attached by their base, with simple margins. Stigma pointless. Follicles smooth. Seeds comose.

The plants of this genus have twining, either herbaceous or shrubby, stems. Leaves opposite, membranous, flat. Umbels standing between the footstalks. Flowers for the most part small. Four of the species are natives of New Holland, chiefly within the tropic, but extending as far as thirty-three degrees of south latitude. As many are found either in the East Indies or the equinoctial parts of Africa, but of these four latter, none of them described in any botanical work, the learned author has favoured us with no account. We can therefore merely give the characters of the New-Holland species, from his *Prodromus*. It only remains for us to observe, that *Tylophora* comes very near HOYA, see that article; differing scarcely in any part of the essential character, except the want of a tooth at the inner angle of each leaf of the crown; and with respect to habit, distinguished from one only of the two species of that genus, by having membranous, not fleshy, leaves.

1. *T. grandiflora*. Large-flowered *Tylophora*. Br. n. 1.—Umbels nearly sessile, simple, of few flowers; their partial stalks smooth. Leaves heart-shaped, ovate, acute, downy as well as the branches.—Native of Port Jackson, New South Wales.

2. *T. barbata*. Bearded *Tylophora*. Br. n. 2.—Umbels mostly in pairs; their common stalk shorter than the leaves. Corolla bearded. Leaves ovate, acute, very smooth.—Gathered near Port Jackson, by Mr. Brown himself.

3. *T. flexuosa*. Zigzag *Tylophora*. Br. n. 3.—Umbels alternate, sessile on a zigzag common stalk. Leaves heart-shaped, oblong, veiny. Corolla beardless.—Found by Mr. Brown, in the tropical part of New Holland.

4. *T. paniculata*. Panicked *Tylophora*. Br. n. 4.—Panicles forked. Segments of the corolla ligulate upwards. Leaves ovate, pointed, nearly smooth; the lowermost somewhat heart-shaped.—Discovered in the neighbourhood of Port Jackson, by Mr. Ferdinand Bauer, the botanical companion of Mr. Brown, to whose exquisite pencil the duty of perpetuating the acquisitions of their hazardous expedition,

undertaken at the national expence, was entrusted. Yet so little has the engagement to the public been fulfilled, that except a small but exquisite fasciculus of plates, and the excellent but incomplete publications of Mr. Brown, all the discoveries of these naturalists have as yet remained fruitless: not, certainly, for want of their ability or inclination to complete what they have undertaken, but because, as we presume, the due injunctions, as well as the necessary aids, have been withheld.

TYLOS, in *Ornithology*, a name by which many authors have called the *turdus iliacus*, or redwing.

TYLOTICA, medicines supposed to promote the formation of callus.

TYLSEN, in *Geography*, a town of Brandenburg, in the Old Mark, on the Dichme; 5 miles S.W. of Salzwedel.

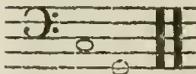
TYLUS, in *Ancient Geography*, a town of the Peloponnesus, on the coast of the gulf of Messenia, between the isles Tyrides and the town of Leuctrum, according to Strabo; it is called *Ætyle* by Pausanias, who places it between the port of Messa and Talama.—Also, an island of the Persian gulf, at the distance of twenty-four hours' navigation from the mouth of the Euphrates, according to Arrian.—Also, Tylus minor, distant 10 miles in the same gulf from the greater Tylus; named Arados by Strabo, and Arathos by Ptolemy.

TYLWITH, in matters of *Heraldry* and *Descent*, is sometimes used for a tribe or family branching out of another, which the modern heralds more usually call the *second* or *third* house.

TYLYDAN, in *Geography*, a river on the S. coast of the island of Java, which runs into the sea, S. lat. 7° 38'. E. long. 108° 47'.

TYMARA, a town of Hindoostan, in Bahar; 25 miles E. of Chuta Nagpour.

TYMBALES, Fr. kettle-drums, instruments of percussion, consisting of two metalline globes covered with parchment; beaten with two drum-sticks, in the form of round hammers or mallets, from eight to nine inches long. The tone is short and dull. They are tuned 4ths to each other. The smallest drum produces the key-note of the compositions in which they are employed, and the largest, the 4th below; as in the key of C the tones are these:



There are braces, by which the pitch

can be raised or lowered at pleasure. See DRUM, and KETTLE-DRUM.

TYMBER of Skins. See TIMBER.

TYMBRA, in *Ancient Geography*, a town of Asia, in Pisidia.

TYMBRE, Fr. in *Music*, is a term used to express that quality of tone or sound which renders a voice or instrument rough or smooth, harsh or sweet, coarse or mellow in tone. Sweet-toned instruments seem always feeble, and harsh-toned too loud. A perfect voice or instrument would be that which united force with sweetness. The quality of tone generally determines our idea of its force. The voice of Manzoli, at once extremely powerful and extremely sweet, was miraculous.

There are perhaps no instruments that can be at once loud and sweet, except those of the violin family, played with a bow; as the violin, tenor, and violoncello.

TYMENÆUM, in *Ancient Geography*, a mountain of Asia, in the vicinity of Phrygia.

TYMES, a town of Africa, in Libya.

TYMIUM, a small town of Asia, in Phrygia.

TYMNISSUS, a town of Asia Minor, in Caria.

TYMNUS, a town of Asia Minor, in Caria, which derived its name from the promontory called by Mela Tymnius.

TYMPAN, or TYMPANUM, in *Architecture*, the area of a pediment, being the part which is in a level with the naked of the freeze. Or it is the space included between the three cornices of a triangular pediment, or the two cornices of a circular one.

Sometimes the tympan is cut out, and the part filled with an iron lattice, to give light; and sometimes it is enriched with sculpture, in basso-relievo, as in the west front of St. Paul's, in the temple of Castor and Pollux at Naples, &c.

Tympan is also used for that part of a pedestal called the trunk or dye.

TYMPAN, among *Joiners*, is also applied to the pannels of doors.

TYMPAN of an *Arch*, is a triangular space or table in the corners or sides of an arch, usually hollowed and enriched, sometimes with branches of laurel, olive-tree, or oak; or with trophies, &c.; sometimes with flying figures, as Fame, &c. or sitting figures, as the cardinal virtues.

TYMPAN, in *Anatomy, Mechanics, &c.* See TYMPANUM.

TYMPAN, among *Printers*, is a double frame belonging to the press, covered with parchment, on which the blank sheets are laid in order to be printed off. See *PRINTING-Press*.

TYMPANA, *τυμπανα*, among the Athenians, a capital punishment, in which the criminal, being affixed to the pole, was beaten to death with cudgels. Potter, *Archæol. Græc.* lib. c. 25. tom. i. p. 134.

TYMPANIA, in *Ancient Geography*, a town of the Peloponnesus, in the interior of the Elide. Ptolemy.

TYMPANITES, in *Medicine*, from *τυμπανον*, *tympanum*, a drum, a flatulent distension of the belly, which, when struck, emits a sound which has been compared to the noise produced by that instrument. It has been called, in English, the *tympany*, and *windy dropfy*.

The tympanites is a swelling of the abdomen, in which the integuments appear to be much stretched by some distending power within, and they are equally stretched in every position of the body. The swelling does not very readily yield to any pressure; and so far as it does, being extremely elastic, it very quickly recovers its former state, when the pressure is removed. Being struck, it gives an obscure sound, somewhat like that of a drum, or other stretched animal membrane. No fluctuation within is to be perceived; and the whole feels less weighty than might be expected from its bulk. The uneasiness from the distension is partially relieved by the discharge of wind from the alimentary canal, either upward or downward.

These are the characters, then, by which the *tympanites*, or flatulent swelling of the belly, may be distinguished from the *ascites*, or dropfy of that cavity, and from *physeonia*, or solid tumours, sometimes occurring there; and many experiments shew that the *tympanites* always depends upon a preternatural collection of air somewhere within the teguments of the abdomen. But the situation which the air occupies in different instances is somewhat different; and this produces the different species of the disease which nosologists have described.

One species, and indeed the most common and curable species, is that in which the collected air is confined within the cavity of the alimentary canal, and chiefly in that of the intestines. This species, therefore, has been named the *tympanites intestinalis*. (See Sauvages *Nofol. Method.*

Clafs. x. spec. 1.) To this species, indeed, which is the most frequent, the character above given especially belongs.

A second species is, when the air collected is not entirely confined to the cavity of the intestines, but is also present between their coats; and such is that which is named by Sauvages *tympanites enterophyodes*. (Sauv. *spec. 3.*) This has certainly been a rare occurrence; and has probably occurred only in consequence of the *tympanites intestinalis*, by the air escaping from the cavity of the intestines into the interstices of the coats. It is, however, possible, that an erosion of the internal coat of the intestines may give occasion to the air, so constantly present in their cavity, to escape into the interstices of their coats, though in the whole of their cavity there has been no previous accumulation.

A third species is, when the air is collected in the sac of the peritoneum, or what is commonly called the cavity of the abdomen, that is, the space between the peritoneum and viscera; and then the disease is named *tympanites abdominalis*. (Sauv. *sp. 2.*) The existence of such a *tympanites*, without any *tympanites intestinalis*, has been disputed; and it certainly has been a rare occurrence; but from several dissections, it is unquestionable that such a disease has sometimes truly occurred.

A fourth species of *tympanites* is, when *tympanites intestinalis* and *abdominalis* are joined together, or take place at the same time. With respect to this, it is probable that the *tympanites intestinalis* is the primary disease; and the other only a consequence of the air escaping, by an erosion or rupture of the coats of the intestines, from the cavity of these, into that of the abdomen. It is indeed possible, that in consequence of erosion or rupture, the air which is so constantly present in the intestinal canal, may escape from thence in such quantity into the cavity of the abdomen, as to give a *tympanites abdominalis*, whilst there was no previous considerable accumulation of air in the intestinal cavity itself; but we have no facts by which to ascertain this matter properly.

A fifth species has also been enumerated. It is when a *tympanites abdominalis* happens to be joined with the *ascites*, or dropfy of the belly; and such a disease therefore is named by Sauvages *tympanites asciticus*. (Sauv. *spec. 4.*) In most cases of *tympanites*, indeed, some quantity of serum has, upon dissection, been found in the sac of the peritoneum; but that is not enough to constitute the species now mentioned; and when the collection of serum is more considerable, it is commonly where, both from the causes which have preceded, and likewise from the symptoms which attend, the *ascites* may be considered as the primary disease; and therefore that this combination does not exhibit a proper species of the *tympanites*.

As this last is not a proper species, and as some of the others are not only extremely rare, but even, when occurring, are neither primary nor to be easily distinguished, nor, as considered in themselves, admitting of any cure, it will be unnecessary to take any farther notice of them; we shall therefore confine ourselves, in what follows, to the consideration of the most frequent case and almost the only object of practice, the *tympanites intestinalis*.

With respect to this, it does not appear that it arises in any peculiar temperament, or depends upon any predisposition, which can be discerned. It occurs in either sex, at every age, and frequently in young persons.

Various remote causes of it have been assigned; but many of these have not commonly the effect of producing this disease; and although some of them have been truly antecedents of it, we can in few instances discover the

manner in which they produce the disease, and therefore cannot certainly ascertain them to have been causes of it.

The phenomena of this disease, in its several stages, are the following.

The tumour of the belly sometimes grows very quickly to a considerable degree, and seldom in the slow manner the ascites commonly comes on. In some cases, however, the tympanites comes on gradually, and is introduced by an unusual flatulency of the stomach and intestines, with frequent borborygmi, and an uncommonly frequent expulsion of air upwards and downwards. This state is also frequently attended with colic pains, especially felt about the navel, and upon the sides towards the back; but generally, as the disease advances, these pains become less considerable. As the disease proceeds, there is a partly constant desire to discharge air, but it is accomplished with difficulty; and when obtained, although it give some relief from the sense of distension, this relief is commonly transient and of short duration. While the disease is coming on, some inequality of tumour and tension may be perceived in different parts of the belly; but the distension soon becomes equal over the whole, and exhibits the phenomena mentioned in the character. Upon the first coming on of the disease, as well as during its progress, the belly is bound, and the fæces discharged are commonly hard and dry. The urine, at the beginning, is usually very little changed in quantity or quality from its natural state; but as the disease continues, it is commonly changed in both respects, and at length sometimes a strangury, and even an ischuria, comes on. The disease has seldom advanced far, before the appetite is much impaired, and digestion ill performed; and the whole body, except the belly, becomes considerably emaciated. Together with these symptoms, a thirst and uneasy sense of heat at length come on, and a considerable frequency of pulse occurs, which continues throughout the course of the disease. When the tumour of the belly rises to a considerable bulk, the breathing becomes very difficult, with a frequent dry cough. With all these symptoms, the strength of the patient declines; and the febrile symptoms daily increasing, death at length ensues, sometimes probably in consequence of a gangrene coming upon the intestines.

The tympanites is commonly of some duration, and to be reckoned a chronic disease. It is very seldom quickly fatal, except where such an affection suddenly arises in fevers. To this, Sauvages has properly given a different appellation, that of *meteorismus*; and it may perhaps always be considered as a symptomatic affection, entirely distinct from the tympanites which we are now considering.

The tympanites is generally a fatal disease, seldom admitting of cure: but we shall mention what may be attempted in this way, after having endeavoured to explain the proximate cause, which alone can lay the foundation of what may be rationally attempted towards its cure.

To ascertain the proximate cause of tympanites is somewhat difficult. It has been supposed, in many cases, to be merely an uncommon quantity of air present in the alimentary canal, owing to the extrication and detachment of a greater quantity of air than usual from the alimentary matters taken in. Our vegetable aliments probably always undergo some degree of fermentation; and in consequence, a quantity of air is extricated and detached from them in the stomach and intestines; but it appears, that the mixture of the animal fluids which our aliments meet with in the alimentary canal, prevents the same quantity of air from being detached from them that would have been in their fermentation without such mixture; and it is probable that the same mixture contributes also to the re-absorption of

the air that had been before in some measure detached. The extrication, therefore, of an unusual quantity of air from the aliments, may, in certain circumstances, be such, perhaps, as to produce a tympanites; so that this disease may depend upon a fault of the digestive fluids, by which they become unfit to prevent the too copious extrication of air, and unfit also to occasion that re-absorption of air, which in sound persons commonly happens. An unusual quantity of air in the alimentary canal, whether owing to the nature of the aliments taken in, or to the fault of the digestive fluid, does certainly sometimes take place; and may possibly have, and in some measure certainly has, a share in producing certain flatulent disorders of the alimentary canal; but cannot be supposed to produce the tympanites, which often occurs when no previous disorder had appeared in the system. Even in those cases of tympanites which are attended at their beginning with flatulent disorders in the whole of the alimentary canal, as we know that a firm tone of the intestines both moderates the extrication of air, and contributes to its re-absorption or ready expulsion, so the flatulent symptoms which happen to appear at the coming on of a tympanites, are probably referred to a loss of tone in the muscular fibres of the intestines, rather than to any fault in the digestive fluids.

These, and other considerations, lead us to conclude, that the chief part of the proximate cause of tympanites, is a loss of tone in the muscular fibres of the intestines. But further, as air of any kind accumulated in the cavity of the intestines should, even by its own elasticity, find its way either upwards or downwards, and should also, by the assistance of inspiration, be entirely thrown out of the body; so when neither the re-absorption nor the expulsion takes place, and the air is accumulated so as to produce tympanites, it is probable that the passage of the air along the course of the intestines is in some places interrupted. This interruption, however, can hardly be supposed to proceed from any other cause than spasmodic constrictions in certain parts of the canal; and we may conclude, therefore, that such constrictions concur as part in the proximate cause of tympanites. Whether these spasmodic constrictions are to be attributed to the remote cause of the disease, or may be considered as the consequence of some degree of atony first arising, cannot with certainty be determined.

Cure of Tympanites—Having thus endeavoured to ascertain the proximate cause of tympanites, we proceed to treat of its cure; which indeed has seldom succeeded, and almost never but in a recent case of the disease. It may be proper, however, to state what may be reasonably attempted; what has commonly been attempted; and what attempts have sometimes succeeded in the cure of this disease.

It must be a first indication to evacuate the air accumulated in the intestines: and for this purpose, it is necessary that those constrictions, which had especially occasioned its accumulation, and continue to interrupt its passage along the course of the intestines, should be removed. As these, however, can hardly be removed but by exciting the peristaltic motion in the adjoining portions of the intestines, purgatives have been commonly employed; but it is at the same time agreed, that the more gentle laxatives only ought to be employed, as the more drastic, in the overstretched and tense state of the intestines, are in danger of bringing on inflammation. It is for this reason, also, that glysters have been frequently employed; and they are the more necessary, as the fæces collected are generally found to be in a hard and dry state. Not only on account of this state of the fæces, but, farther, when glysters produce a considerable evacuation of air,

and thus show that they have some effect in relaxing the spasms of the intestines, they ought to be repeated very frequently.

In order to take off the constrictions of the intestines, and with some view also to the carminative effects of the medicines, various antispasmodics have been proposed, and commonly employed; but their effects are seldom considerable; and it is alleged that their heating and inflammatory powers have sometimes been hurtful. It is, however, always proper to join some of the milder kinds with both the purgatives and glysters that are employed; and it has been very properly advised to give always the chief of antispasmodics, that is, an opiate, after the operation of purgatives is finished.

In consideration of the overstretched and tense state of the intestines, and especially of the spasmodic constrictions that prevail, fomentations and warm bathing have been proposed as a remedy; and are said to have been employed with advantage: but it has been remarked, that very warm baths have not been found so useful as tepid baths long continued.

Upon the supposition that this disease depends especially upon an atony of the alimentary canal, tonic remedies seem to be properly indicated. Accordingly, chalybeates and various bitters have been employed; and, if any tonic, the Peruvian bark might probably be useful. But as no tonic remedy is more powerful than cold applied to the surface of the body, and cold drink thrown into the stomach; so such a remedy has been thought of in this disease. Cold drink has been constantly prescribed, and cold bathing has been employed with advantage; and there have been several instances of the disease being suddenly and entirely cured by the repeated application of snow to the lower belly.

It is hardly necessary to remark, that, in the diet of tympanitic persons, all sorts of food disposed to become flatulent in the stomach are to be avoided; and it is probable, that the mineral acids and neutral salts, as antizymics, may be useful.

In obstinate and desperate cases of tympanites, the operation of the *paracentesis* (tapping) has been proposed; but it is a very hazardous remedy, and there is no satisfactory testimony of its having been practised with success. It must be obvious, that this operation is a remedy suited especially, and almost exclusively, to the tympanites abdominalis; the existence of which, separately from the intestinalis, is very doubtful, at least not easily ascertained, yet it is not very likely to be cured by this remedy: and how far the operation might be safe in the tympanites intestinalis, is not yet determined by any proper experience. There would be a danger, indeed, of converting the tympanites intestinalis into the tympanites abdominalis, by allowing the air to escape through the puncture of the intestine into the sac of the peritonæum, and thus of converting a less disease into a greater, and, in fact, of producing irreparable mischief.

TYMPANOTRIBA, among the *Ancients*, a designation given to an effeminate person, who could do nothing but play on the tympanum.

TYMPANUM, in *Anatomy*. See **EAR**.

TYMPANUM, *Diseases of*. The cavity of the drum of the ear is sometimes affected with a puriform ichorous discharge, attended with a loss of hearing, proportionate to the degree of disorganization which this part of the ear has sustained. In general, on blowing the nose, air is expelled from the meatus auditorius externus: and, when this is the case, it is evident that the discharge is connected with an injury, or destruction of the membrana tympani. However, when the Eustachian tube is obstructed with mucus, or

matter, or when it is rendered impervious, and permanently closed by inflammation, the membrana tympani may not be perfect, and yet, it is clear, no air can in this state be forced out of the external ear in the above manner. An examination with a blunt probe, or with the eye, while the rays of the sun fall into the passage, should therefore not be omitted. If the membrane have any aperture in it, the probe will pass into the cavity of the tympanum, and the surgeon feel that his instrument is in contact with the ossicula.

In this manner the affection may be discriminated from a herpetic ulceration of the meatus auditorius externus. The causes are various: in scarlatina maligna, the membrana tympani occasionally inflames, and sloughs; all the ossicula are discharged, and, if the patient live, he continues quite deaf. An ear-ache, in other words, acute inflammation of the tympanum, is the most common occasion of suppuration in this cavity, in which, and the cells of the mastoid process, a good deal of pus collects. At length, the membrana tympani ulcerates, and a large quantity of matter is discharged; but, as the secretion of pus still goes on, the discharge continues to ooze out of the external ear.

Instead of stimulating applications, inflammation of the tympanum demands the rigorous employment of antiphlogistic means. Unfortunately, it is a too common practice, in this case, to have recourse to acrid spirituous remedies. Above all things, the repeated application of leeches to the skin behind the external ear, and over the mastoid process, should never be neglected. As soon as the inflammation ceases, the degree of deafness, occasioned by it, will also disappear. This, however, does not always happen.

When an abscess is situated in the cavity of the tympanum, Mr. Saunders seems to think, that the membrana tympani should not be allowed to burst by ulceration, but be opened by a small puncture. Sometimes the disease, of which we are treating, is more insidious in its attack: slight paroxysms of pain occur, and are relieved by slight discharges. The case goes on in this way, until, at last, a continual discharge of matter from the ear takes place. The disorder is destructive in its tendency to the faculty of hearing, and it rarely stops until it has so much disorganized the tympanum and its contents, as to occasion total deafness. Hence Mr. Saunders very properly defends the propriety of making attempts to arrest its progress,—attempts which are free from danger; and he censures the foolish fear of interfering with the complaint, founded on the apprehension, that bad constitutional effects may originate from stopping the discharge.

If the case be neglected, the tympanum is very likely to become carious; before which change, the disease, says Mr. Saunders, is most commonly curable.

Mr. Saunders divides the complaint into three stages: 1. A simple puriform discharge. 2. A puriform discharge complicated with funguses and polypi. 3. A puriform discharge with caries of the tympanum. As the disease is a local one, direct applications to the parts affected are chiefly entitled to confidence. Blisters and setons may be advantageously employed in aid of topical applications. Mr. Saunders's practice, in these cases, consists in administering laxative medicines, and fomenting the ear while inflammatory symptoms last, and afterwards injecting a solution of zincum vitriolatum, or cerussa acetata.

In the second stage, when there are funguses, he removes or destroys them with forceps, afterwards touches their roots with the argentum nitratum, or injects a solution of alum, zincum vitriolatum, or argentum nitratum.

TYMPANUM, in *Architecture*. See **TYMPAN**.

TYMPANI, *Chorda*. See **CHORDA**.

TYMPANUM, *Tympan*, in *Mechanics*, is a kind of wheel placed

placed round an axis, or cylindrical beam, on the top of which are two levers, or fixed staves, for the more easy turning the axis about, in order to raise a weight required.

The tympanum is much the same with the peritrochium; but that the cylinder of the axis of the peritrochium is much shorter and less than the cylinder of the tympanum. See *AXIS in Peritrochio*.

TYMPANUM of a machine is also used for a hollow wheel, in which one or more people, or rather animals, walk to turn it; such as that of some cranes, calenders, &c.

TYMPANUM, Lat. a drum, in *Antiquity*; but in modern *Musick*, it is equivalent with *tymbales*, or a pair of *kettle-drums*; which see. See likewise TIMPANO, Ital. for a kettle-drum.

TYMPHÆI, in *Ancient Geography*, a people of Thesprotia, towards the sources of the Peneus. Strabo.

TYNA, a river of India, in the eastern part of the peninsula on this side of the Ganges, according to Ptolemy; marked by D'Anville to the N. of Maliarpha.

TYNAN, in *Geography*, a small post-town of the county of Armagh, Ireland; 69 miles N. by W. from Dublin.

TYNDALE, WILLIAM, (named also *Hutchins*;) in *Biography*, a learned martyr to the Reformation, was born towards the latter part of the fifteenth century, on the borders of Wales, but the precise place of his nativity is not known. He received part of his education at Magdalen-Hall, Oxford, where he imbibed the doctrines of Luther, which caused his being dismissed from Wolfey's new college of Christ-church, into which he had been admitted; so that he removed to Cambridge, where he took a degree. From hence he removed to Gloucestershire, to take the charge of sir John Welch's children; and, during his residence here, he translated Erasmus's "Enchiridion Militis Christiani" into English, for the benefit of the family with which he resided, and he often preached in and about Bristol. By the company which visited sir John, Tyndale was reproached as a heretic, and articles were preferred against him by the chancellor of the diocese, so that he was under a necessity of removing to London, where he preached at St. Dunstan's in the West. Desirous of being admitted one of bishop Tonstall's chaplains, he made application for that purpose, but was disappointed. In a retirement near London, he prepared a translation of the New Testament into English, which he accomplished, by unwearied assiduity, in about half a year; but the times would not admit of its publication. The author therefore withdrew to the continent, and at length took up his abode at Antwerp; and here he completed his work, which was printed in 1526, 8vo., without a name. The number of copies was 1500, most of which were bought in England, and industriously circulated. The zealous papists were alarmed, and foreseeing the diffusion of error and heresy, obtained orders from Warham, archbishop of Canterbury, and Tonstall, bishop of London, that those who possessed any copies should deliver them up on pain of excommunication. Tonstall procured all that were unfolded at Antwerp, and having purchased them, they were brought over and burnt at St. Paul's Cross. This circumstance favoured Tyndale's design, who took occasion to prepare a more correct edition, which was printed in 1534; and cheaper editions increased the circulation. In order to discourage and restrain these measures for disseminating the Scriptures, sir Thomas More ridiculed Tyndale's version in a dialogue in 1529, to which Tyndale replied: and the king, in a court of star-chamber in 1531, with the concurrence of the prelates, universities, and clergy, pronounced a severe condemnation of it, together with other heretical books. Tyndale, however, persevered with undaunted resolution, and engaged

in a translation of the five books of Moses from the Hebrew. But in a voyage to Hamburg he was shipwrecked, and lost his books, papers and money. At Hamburg, where he at length arrived, he met with Miles Coverdale, and co-operating in their labour, they completed the Pentateuch, and printed it in 1530. Tyndale published a translation of the prophecy of Jonah, with a prologue, in 1531, and thus ended his labour on the Old Testament. At Antwerp he took up his residence in 1534, as a place of safety; but Henry VIII. and his council employed a person to betray him under the mask of friendship, and he was conveyed as a prisoner to Vilvorden, where he remained for a year and a half. At length, in 1536, he was brought to trial upon the emperor's decree at Augsburg; and here he was condemned, and strangled at the stake; and his body was reduced to ashes. He expired with uttering this prayer, "Lord, open the king of England's eyes!" It is needless to make any reflections on the conduct of such savage persecutors, who thus treated a man of irreproachable manners, and who was pronounced, by the emperor's procurator, who assisted in his condemnation, "Homo doctus, pius, et bonus," for no other crime besides that of enabling Christians to peruse a book which is the only authoritative directory of their faith and practice. Tyndale's other works were introductions to, and comments upon, parts of Scripture. *Biog. Brit.*

TYNDARIDÆ, in *Mythology*, a name given by the poets to Castor and Pollux, the sons of Jupiter and Leda.

Though, according to the fable, Pollux and Helena proceeded from the egg which Leda had conceived by Jupiter, and were therefore immortal; whereas, out of another egg, which she conceived by Tyndarus, her husband, came Castor and Clytemnestra, who were mortal. See *CASTOR and Pollux*.

TYNDARIS, in *Ancient Geography*, *Pandari*, a town of Asia, in the Colchide, on the right bank of the Phasis, E.N.E. of Circæum, and S.W. of Cyta (Cutatis.) Pliny. —Also, a town of Sicily, towards the S.W., which was a Roman colony. It is called by Ptolemy Tyndarium.

TYNDIS, DANDA, a port of India, upon the coast of the country denominated Limyrica, according to the Periplus of the Erythræan sea.

TYNDIS, *Yanaon*, a river of India, in the peninsula on this side of the Ganges. Ptolemy.

TYNE, in *Geography*, a river of Scotland, which rises a few miles S. of Dalkeith, crosses the county of Haddington, and runs into the German sea, N. lat. 56° 2'. W. long. 2° 38'.

TYNE. See *TINE*.

TYNEMOUTH, a township in the east division of Castle-Ward, in the county of Northumberland, England; is situated on the banks of the river Tyne, 9 miles E.N.E. from Newcastle, and 286 miles N. by W. from London. It is a place of remote antiquity; and recent discoveries have proved that the Romans had buildings here. It is chiefly noted for its ancient monastery, which is reckoned to be one of those founded by Oswald, the first Christian king of Northumberland. Great local sanctity was soon attributed to it, and several kings and other illustrious persons were buried here. St. Herebald, the companion of St. John of Beverley, was abbot here at the beginning of the eighth century: but before the end of it, the monastery was plundered by the Danes, as it was again in the next century by the forces under Hungar and Hubba, and a third time in the reign of king Athelstan. The old church seems to have lain desolate for a century, till a short time before the Norman conquest, when Tofti, earl of Northumberland, rebuilt

and endowed it. On the banishment of Totti, the Conqueror gave his possessions to Robert de Mowbray, who then became earl: he refounded Tynemouth priory, and filled it with Black monks from St. Alban's, to which abbey the priory was subordinate. In his conspiracy against William Rufus, he converted the place into a fortress, which, after a siege of two months, was taken by storm. The priory progressively increased in consequence. In 1244, the prior mediated a peace between England and Scotland; and soon after obtained a charter from Henry III. to hold a market in his manor of Bewicke. He also claimed a market for Tynemouth; but in a suit on that account, judgment was given against him. Many privileges and immunities were, however, obtained for the inhabitants. At the surrender of the priory, in 1539, its possessions were very large, having twenty-seven villas with their royalties, besides the impropriations of many churches: its annual income being estimated at 706*l.* 10*s.* 8½*d.* The chief remains are those of the church, at the east end of which is a neat little chapel or oratory. Till 1659 the church was parochial, but being decayed and damaged during the civil war, another was erected, and completed in 1668; but the old cemetery is still much used in preference to the new one. The castle, erected by earl Mowbray, appears to have been a place of great strength. It was garrisoned in the reign of queen Elizabeth; and again in that of Charles I., when it was besieged and taken by the parliamentary forces. Little remains of this ancient fortress except a strong gateway, the approach to which has been recently flanked with bastions. The village of Tynemouth is much frequented in the bathing season, and commodious warm and cold baths have been erected. Here are some considerable salt-works; and it is estimated that 700,000 chaldrons of coals are annually sent hence to London. In the population return of the year 1811, the number of houses in this township is stated to be 930; and of inhabitants, 5834.—*Beauties of England*, vol. xii. Northumberland, by the Rev. —. Hodgson.

TYNIDRUM, or *Thunudronum Colonia, Hydrab*, in *Ancient Geography*, a town of Africa, mentioned by Ptolemy, and placed by him two degrees W. of Sicca Veneria.

TYNIECZ, or **TYNEZ**, in *Geography*, a town of Austrian Poland, on the Vistula; 4 miles S.W. of Cracow.

TYNNA, in *Ancient Geography*, a town of Asia, in the Lesser Armenia, and in the prefecture named Cataonia. Ptol.—Also, a river of India, on this side of the Ganges, the mouth of which was in the country of the Avari. Ptolemy.

TYNSBOROUGH, in *Geography*, a town of Massachusetts, in the county of Middlesex, containing 704 inhabitants; 31 miles N. of Boston.

TYONISTA, a river of Pennsylvania, which runs into the Allegany, N. lat. 41° 29'. W. long. 73° 30'.

TYORA, in *Ancient Geography*, surnamed "Matienna," a town of the Aborigines, on the coast of Latium; distinguished by a very ancient oracle of Mars.

TYP A, in *Geography*, a harbour on the coast of China, at the entrance of the river of Canton, formed by several islands. The anchoring place is N. lat. 22° 9'. E. long. 113° 49'.

TYPÆA Moxs, in *Ancient Geography*, a small mountain of Triphylia, near the banks of the river Alpheus. It was a law of the Eleans, that any female who was surprised in attendance at the Olympic games, should be precipitated from this mountain, the reason of which law is said to have been, that the Athletæ were naked in their exercises.

TYPE, **ΤΥΠΟΣ**, formed from τυπος *form, figure, a copy, image or resemblance, of some model.*

The term type is less in use than its compounds prototype and archetype, which are the originals that are made without models.

TYPE is also a scholastic term, much used among divines, signifying a symbol, sign, or figure, of something to come.

In this sense the word is commonly used with relation to antitype, *αντιτυπος*, which is the thing itself, of which the other is a type or figure.

Thus Abraham's sacrifice, the paschal lamb, &c. were types or figures of our redemption; and the brazen serpent was a type of the cross, &c.

Types are not mere conformities, or analogies, which the nature of things holds forth between them; nor arbitrary images arising merely from the casual resemblance of things; but there is farther required a particular institution of God to make a type, and a particular declaration of his that it is so.

Gale divides types into *historical* and *prophetical*. The first are those used by the ancient prophets in their agitations and visions: the second, those in which things done, or ceremonies instituted in the Old Testament, prefigure Christ, or things relating to him in the New Testament. Or, they are things which happened and were done in ancient time, and are recorded in the Old Testament, and which are found afterwards to describe or represent something which befell our Lord, and which relates to him and his gospel. *E. gr.* Under the law, a lamb was offered for a sin-offering, and thus an atonement was made for transgressions. John the Baptist calls Christ "the lamb of God who taketh away the sins of the world," and St. Peter tells Christians that they are redeemed "by the blood of Christ, as of a lamb." Hence we infer and conclude that the lamb was a type of Christ; and upon considering it, we find that it has all that can be required to constitute a type; for it is in many respects a very just and lively representation of Christ. The lamb died for no offence of his own, but for the sins of others; so did Christ: the lamb could not commit sin by his nature, nor Christ by his perfection: the lamb was without bodily spot or blemish; Christ was holy and undefiled: a lamb is meek and patient; such was the afflicted and much injured Son of God.

These types are useful to persons who have already received Christianity upon other and stronger evidence, as they shew the beautiful harmony and correspondence between the Old and New Testament; but they seem not proper proofs to satisfy and convince doubters, who will say perhaps, with the schoolmen, "theologia symbolica non est argumentativa."

Unless we have the authority of the Scriptures of the New Testament for it, we cannot conclude with certainty that this or that person, or this or that thing mentioned in the Old Testament is a type of Christ, on account of the resemblance which we may perceive between them: but we may admit it as probable.

The ancient fathers, as well as the modern critics, have been greatly divided about the nature and use of the types and typical representations in the Old Testament; and it is this makes one of the great difficulties in understanding the ancient prophecies, and in reconciling the New and Old Testament together.

There is no denying but that there were some types which the divine wisdom instituted to be the shadows and figures of things to come; and yet people run into an excess that way; some looking for types in every thing, like Origen, who discovered mysteries in the very cauldrons of the tabernacle. A prudent man should be contented with the more sensible and obvious ones, nor propose any without

without proving them as much as possible, and shewing that they were really intended for types, in order to justify the solidity of the reasoning of the apostles, who argued from them.

An author, in reference to this subject, maintains, that not the fathers only, but St. Paul himself, was of the opinion, "that Christianity was all contained in the Old Testament, and was implied in the Jewish history and law; both which are to be reputed types and shadows of Christianity." In order to which, he quotes Hebrews, viii. 5. x. 1. and Colos. ii. 16, 17. He adds, "that the ritual laws of Moses, being in their own nature no other than types and shadows of future good things, are to be considered as having the effect of prophecies." This is likewise the sense of Mr. Whiston, and others; but the same author even quotes our Saviour speaking in behalf of this typical reasoning in that passage, Matth. xi. 13. where he affirms that, "the law prophecies; and that he came to fulfil the law as well as the gospel." (Matth. v. 17. Disc. of the Grounds, &c.) An ingenious divine takes this occasion to observe, that had the ancients, with the modern retainers to the typical way, expressly designed to have exposed Christianity, they could not have done it more effectually than by thus making every thing types and prophecies.

Not that he denies the reality of such things as types. It is manifest there were many under the Old Testament; such were Zechariah's staves, beauty, and bands, ch. xi. 7. 10. 14; such was Hosea's adulterous wife, chap. i. 2; and such were his children, ver. 4. 6. The prophets designed by these to prefigure future events; but in these instances the reader is at once, by the declaration of the prophet, made to understand as much, and not left to his own conjectures about them after the events are over.

In effect, all that is urged from Scripture for the typical or allegorical interpretations of the Jewish law, history, ceremonies, &c. it is asserted, may be set aside, without any violence to the Sacred Text, which may be explained on more natural and intelligible principles, and more consistently with grammar.

The word *τυπος*, we have observed, literally denotes no more than a copy or impression of any thing; and accordingly, in our translation, we find it sometimes rendered by *print*, sometimes by *figure*, sometimes by *fashion*, and sometimes by *form*.

Hence also the word is figuratively applied to denote a moral pattern; in which sense it signifies no more than *example* and *similitude*.

Again, the word *αντιτυπος*, *antitype*, in Scripture, signifies any thing formed according to a model or pattern; and thus, in the Epistle to the Hebrews, the tabernacle, and holy of holies, being made according to the pattern shewn to Moses, are said to be antitypes, or figures, of the true holy places. In the like sense, St. Peter, speaking of the flood and the ark, by which eight persons were saved, calls baptism an antitype to them; by which he expresses no more than a similitude of circumstances.

The other words used in Scripture to imply a future event, prefigured by some foregoing act, are,—*υποδειγμα*, rendered by *imitation* and *example*; and *σκια*, *shadow*.

Such being the import of all the terms used in the New Testament writers, seeming to imply any prefiguration of future events under the Gospel, it is observed,

1. That to argue from types, is only to argue from examples or similitudes; and, consequently, that all inferences drawn from such reasonings are no farther conclusive than reasonings from similitudes are. The intent of similitudes is only to help to convey some ideas more clearly or strongly;

so that to deduce consequences from a simile, or infer any thing from other parts of the simile, than what are plainly similar, is absurd.

The same author also alleges, 2. That it cannot be proved, that the ceremonies of the Mosaic law were ever designed to prefigure any future events in the state of the Messiah's kingdom. No such declared prefigurations are mentioned in the writings of the Old Testament, whatever notions prevailed among the writers who immediately followed. It is granted, that the apostles argued from the rites in the Mosaic institution; but this (he says) appears to have only been by way of illustration and analogy.

There is certainly a general likeness in all the dispensations of Providence; an analogy of things in the natural as well as the moral world, from which it is easy arguing by way of parity, and it is very just and usual so to do; but that one of these dispensations was therefore given to prefigure another that was future, can never be proved, unless it be expressly declared.

It is in the same way of similitude (he maintains) we are to understand St. Paul, where he says, "that Christ our pass-over is sacrificed for us." And thus we are to understand John the Baptist, when he calls our Saviour the "Lamb of God." There was this similitude of circumstance, that Christ was slain on the same day with the paschal lamb; that he died about the same time of the day when the priests began their hillel; that not a bone of the one or the other was broken. Add, that as the paschal lamb was without blemish, so was Christ without sin. From these, and other circumstances, the apostle applied the term *passover* to Christ.

Thus, also, we are to account for what St. Paul calls the baptism of the children of Israel in the cloud, and in the sea; and for the comparison betwixt the high-priest entering the holy place every year, and Christ entering into heaven. Sykes's Essay on the Truth of the Christian religion, 1725.

TYPE, *τυπος*, is also a name given to an edict of the emperor Constant II. published in 648, to impose a general silence both on the orthodox and the Monothelites.

It had the name of type, as being a kind of formulary of faith; or rather a form on which men were to regulate their conduct.

The type owed its original to Paul, patriarch of Constantinople, who persuaded that emperor to take away the *ecthesis*, compiled and hung up in all the public places by Heraclius (as occasioning great complaints from the orthodox, by its favouring the Monothelites); and to publish an edict to impose silence on both parties.

But such kinds of pacifications are held inexcusable in matters of religion; accordingly pope Theodore soon procured the patriarch Paul to be deposed; the type was examined in the council of Rome, consisting of a hundred and five bishops, in 649, and condemned; and an anathema was pronounced against all such as admitted either the impious *ecthesis* or *typus*.

TYPE, *Typus*, is also used to denote the order observed in the intention and remission of fevers, pulses, &c.

TYPE, among *Letter-founders* and *Printers*, denotes the same with letter. See *FOUNDERY*.

TYPHA, in *Botany*, Cat's-tail, or Reed-mace, *τυφη* of the ancient Greeks, from *τυφος*, a bog or marsh, of which situations the plants of this genus are among the most conspicuous inhabitants. They are often vulgarly mistaken for the Bull-rush, a very different plant. (See *SCRIPUS*, sect. 2.)—Linn. Gen. 479. Schreb. 620. Willd. Sp. Pl. v. 4. 197. Mart. Mill. Dict. v. 4. Sm. Fl. Brit. 959. Prodr. Fl. Græc. Sibth. v. 2. 225. Ait. Hort. Kew. v. 5. 234.

Brown Prodr. Nov. Holl. v. 1. 338. Pursh 34. Juss. 25. Tourn. t. 301. Lamarck Illustr. t. 748. Gært. t. 2.—Class and order, *Monocœcia Triandria*. Nat. Ord. *Calamariæ*, Linn. *Typha*, Juss. *Aroideæ*, Brown.

Gen. Ch. Male Flowers numerous, in a catkin at the top of the stem. *Cal.* Common Catkin cylindrical, very dense. Perianths of three setaceous leaves. *Cor.* none. *Stam.* Filaments three, varying to one or four, capillary, the length of the calyx, combined at the base; anthers oblong, pendulous.

Female Flowers numerous, in a catkin surrounding the same stem, very densely crowded together. *Cal.* Perianth of many capillary bristles. *Cor.* none. *Pist.* Germen ovate, on a bristle-shaped stalk; style awl-shaped; stigma capillary, permanent. *Peric.* none, the numerous fruits form a cylinder round a common receptacle. *Seed* solitary, ovate, stalked, subtended, in the lower part of the stalk, by the permanent capillary calyx, as long as the style, forming a sort of down or wing.

Ess. Ch. Male, Catkin cylindrical, dense, chaffy. Anthers about three on each filament.

Female, Catkin cylindrical, inferior. Seed solitary, on a feathered stalk.

1. *T. latifolia*. Great Cat's-tail, or Reed-mace. Linn. Sp. Pl. 1377. Willd. n. 1. Fl. Brit. n. 1. Engl. Bot. t. 1455. Pursh n. 1. Fl. Dan. t. 645. (*T. major*; Curt. Lond. fasc. 3. t. 61. *Typha*; Ger. Em. 46. Matth. Valgr. v. 2. 216. *T. palustris major*; Bauh. Hist. v. 2. 539. Morif. sect. 8. t. 13. f. 1.)—Leaves linear, flat; very slightly convex beneath. Male and female catkins close together.—Common in pools, ditches, and slow streams throughout Europe and North America, growing in the water, and flowering in July; after which the tall pole-like stems, with the enlarged female catkins, remain long, till the seeds are blown away. The creeping, stout, perennial roots run deep into the mud. The stems are six feet, or more, in height, straight, simple, round, solid, smooth, leafy at the bottom. Leaves erect, as tall as the stem, linear, sharpish and entire at the edges; smooth on both sides; flat on the upper, slightly convex on the under side, at least in the lower part; from half an inch to an inch wide. Catkin uninterrupted; the female part four or five inches long, dark brown, feeling like plush or velvet; male shorter, yellowish, tapering, with a membranous leaf, or sheath, at the base, and another about half way up. Flowers crowded, innumerable, horizontal, forming a dense mass, with hairs between like a fine soft brush. Anthers quadrangular, two, three, or four on each compound filament, soon falling off, and leaving a naked stalk above the enlarged seed-catkin, till the seeds and their feathery stalks likewise fly away.

2. *T. angustifolia*. Lesser Cat's-tail, or Reed-mace. Linn. Sp. Pl. 1377. Willd. n. 3. Fl. Brit. n. 2. Engl. Bot. t. 1456. Pursh n. 2. Brown n. 1? Fl. Dan. t. 815. (*T. minor*; Curt. Lond. fasc. 3. t. 62. *T. palustris media*; Bauh. Hist. v. 2. 540. Morif. sect. 8. t. 13. f. 2.)—Leaves flattish upwards; channelled and semicylindrical below. Catkins a little distant, leafless.—Much less common than the last, though like it a native of all parts of Europe, as well as of Pennsylvania and Virginia, flowering at the same season. Mr. Brown doubts whether his New Holland plant be the same species or not, its size exceeding what is found in Europe. He suggests that it may possibly be what Pursh has called *T. domingensis*, in his *Synopsis*, v. 2. 532. This is a doubt we have no means of removing. Our *angustifolia*, though nearly as tall as the *latifolia*, is in every part much smaller and more slender. The leaves are more convex on their under side, and to-

wards the base at least they are concave, or channelled on the upper. There is always a naked space between the male and female catkins. The roughness between the male flowers is rather chaffy than hairy, and seems to take place of the perianths. The fruit-bearing catkin sometimes splits longitudinally, in growing, into four dismembered portions. The original Linnæan names have been retained in *Fl. Brit.* and by subsequent writers, in preference to Mr. Curtis's *major* and *minor*, which latter might have led only to confusion.

3. *T. minor*. Dwarf Cat's-tail, or Reed-mace. Fl. Brit. n. 3. Engl. Bot. t. 1457. Willd. n. 2. Ait. n. 2. Bauh. Hist. v. 2. 540. Lob. Ic. 81. (*T. angustifolia* β ; Linn. Sp. Pl. 1378. Hudf. 400. *T. minima*; Willd. n. 4. *T. palustris minima*, duplici clavâ; Morif. sect. 8. t. 13. f. 3.)—Leaves linear; convex at the back. Catkins a little distant; the male leafy; female short and turgid.—Native of marshy, rather sandy, places in England, Switzerland, and Germany, flowering in July or August.—The root is perennial and creeping, and the habit of the plant like the two foregoing species, but its size much smaller than either, the stem being only twelve or eighteen inches high, and very slender, sheathed with broad scales about half its length, which have been mistaken for leaves. The real leaves spring, as described in English Botany, from a different parcel of similar scales, and are as tall as the stem, scarcely a line in breadth, slightly channelled, convex at the back. Catkins each about an inch long, a little distant from each other; the male with a leafy scale or two at its base, middle, or summit; the female somewhat elliptical, tumid, often divided. Anthers mostly solitary. Flowers not much interspersed with hairs or chaffy scales.—There can be no doubt, from Willdenow's description, of his *T. minima* being the same plant as *minor*, of which latter he was not conscious of having seen a specimen.—*T. minor* was found on Hounslow Heath in the time of Dillenius. We have not heard of it from any recent collector.

TYPHÆ, one of Jussieu's natural orders, the eighth of his general series, the second of his second class. Its name is derived from one of the only two genera which constitute this order, (see TYPHA); the other being SPARGANIUM, which the reader will find in its proper place.

The second of Jussieu's classes is formed of monocotyledonous plants, whose stamens are inserted below the germen. Their calyx is either of one or more leaves, or wanting. Corolla (in Jussieu's opinion) none. Stamens inferior, mostly definite in number. Germen superior, simple; style either one or more, or wanting; stigma simple or divided. Seed solitary, naked or covered; or the fruit is of one cell, with one or many seeds. Leaves mostly alternate and sheathing. Flowers sometimes distinct in sex, by the failure of one or other of their organs of impregnation.—The orders are four; *Aroideæ*, *Typhæ*, *Cyperoideæ*, and *Graminææ*; for the two last, see CALAMARIÆ and GRAMINA. The *Aroideæ* consist of *Ambrosinia*, *Zostera*, *Arum*, *Calla*, *Dracontium*, *Potbos*, *Houttuynia*, *Orontium*, and *Acorus*.

The *Typhæ* are thus characterized. Flowers monoecious; the males aggregate, triandrous, with a three-leaved calyx; females likewise aggregate, with a three-leaved (rather, we would say, many-leaved) calyx; germen superior; style simple; seed solitary. Leaves all alternate and sheathing. Plants herbaceous and aquatic.

Mr. R. Brown makes the *Typhæ* of Jussieu but a section of his *Aroideæ*. He observes that their seeds are pendulous; those of *Sparganium* each in a dry drupa, those of *Typha* in that kind of membranous close capsule termed by Gærtner *utriculus*.

TYPHIUM, a name used by some authors for colt's-foot.

TYPHIUM, in *Ancient Geography*, a mountain of Greece, in Bœotia.

TYPHLE, or **TYPHLINE**, a name by which some authors have called the fish more usually known by the name of the *acus*.

TYPHLINUS, in *Zoology*, the name by which the Greeks, and from them some others, have called the *cæcilia*, or flow-worm.

TYPHLOSIS, from τυφλος, *blind*; blindness.

TYPHODES, FEBRIS, in *Medicine*. See **TYPHUS**.

TYPHOMANIA, probably from τυφος, *smoke*, and μανια, *phrensy*, but the propriety of which is not very obvious, a term used by the older writers in medicine to denote a state of disease in which lethargy was combined with delirium, or, as some have stated, an apparent sopor with actual watchfulness: whence the appellation has been deemed synonymous with *coma vigil*. A more accurate pathology has discarded these vague distinctions; for every degree of morbid somnolency, from lethargy up to complete apoplexy, appears to be the same in kind, differing only in violence. See **APOPLEXY, COMA, and LETHARGY**.

TYPHON, or **TYPHÆUS**, in *Mythology*, the name of one of the rebel giants.

The fable of Typhon is one of the most mysterious among the ancient mythologists. The Greeks and Latins, depending upon traditions received from the Egyptians, describe him as a horrid monster, produced, as they say, from the Earth by the jealous Juno, in order to avenge herself of Latona, her rival. Hesiod says, that this giant was the son of Tartarus and Terra. Manilius expresses himself to this purpose:—

“ ——— Merito Typhonis habentur
Horrendæ sedes, quem Tellus sæva profudit,
Cum bellum Cælo peperit.”

Apollodorus makes Typhon the most terrible of all monsters; describing him as having a hundred heads, and as issuing from his hundred mouths devouring flames, and howlings so dreadful, that he equally terrified gods and men. His body, whose upper part was covered with feathers, and the extremity entwined with serpents, was so vast, that he touched the skies with his head. His wife, says this author, was Echidna, and his offspring were the Gorgon, Geryon, Cerberus, the Hydra of Lerna, the Sphinx, and the Eagle which preyed upon the unfortunate Prometheus; in a word, all the monsters that were hatched in the country of fables. Hyginus adds, that Typhon no sooner sprung from the earth, than he resolved to declare war against the gods, and to revenge the overthrow of the giants. A contest took place between Typhon and Jupiter, which, after various dreadful conflicts, terminated in the defeat of Typhon, who, being pursued by Jupiter and assailed with thunderbolts, was at last driven into Sicily, and there buried under mount Ætna. The conjectures of modern authors in their attempts for explaining this fable have been very various. Some, among whom is G. Vossius, are of opinion that Typhon was the same with Og, king of Bashan. Bochart supposes that he was the same with Enceladus. Some authors think that Typhon was king of Sicily, and others that he was the same as Esau. Huet apprehends that Typhon was the legislator of the Hebrews, become extremely odious to the Egyptians by the destruction of their first-born. Banier supposes, that Typhon and his brother Osiris were much more ancient than Moses; and that the idolatrous worship of the oxen Apis and Mnevis, consecrated to Osiris, was spread through Egypt before the Israelites entered there, since it was upon

this model, according to Selden, that Aaron made the golden calf which the Jews worshipped in the wilderness. A dispute arose between Typhon and Osiris, and he was drowned, as it is said, on the authority of Herodotus, in the marshes of the lake Serbonis, or killed in a battle fought with his nephew Orus, whence the Egyptian priests made the people believe, that the gods interested themselves in avenging Osiris, by destroying his persecutor with a thunderbolt. Thus, however, perished the cruel tyrant of Egypt, and the kingdom was left to young Orus, under the reignty of his mother Isis. For further particulars we refer to Banier's *Mythology*, vol. i.

TYPHON, or **Typho**, in *Physics*. See **WHIRLWIND**.

TYPHONIS INSULA, in *Ancient Geography*, an island of the Mediterranean sea, upon the coast of the Troade.

TYPHUS, Febris Typhodes, in *Medicine*, a term used by Hippocrates to denote a fever of an inflammatory character, probably derived from τυφωω, *I inflame*. The disease, however, not having been very distinctly described by that writer, other authors have applied the term to fevers of a nervous character, and it is now received as the appellation of ordinary low fever, and stands in opposition to inflammatory fever. In short, by the word *typhus*, we now understand the common contagious fever of this and other northern climates, which has received various appellations, according to the situations in which it has prevailed, or to some of its symptoms, or to the degree of its severity; such as hospital, gaol, and ship fever; petechial, spotted, or purple fever; putrid, malignant, infectious fever; continued fever, &c. This common fever, or typhus, differs essentially from the eruptive fevers, small-pox, measles, chicken-pox, and scarlet fever, which affect any individual but once during life; it differs from the plague of the East, which is accompanied with buboes, and from the yellow fever, the bilious remittent fever of hot climates; and from the remittent and intermittent fevers, the effect of marsh effluvia, in more northern latitudes: but, under all the circumstances and denominations above alluded to, it appears to be of the same nature, and is usually understood by physicians in Europe, when they speak of *fever* simply. As we have entered at great length into the nature of this disease, and the doctrines of pathologists respecting it, under its proper head, it would be superfluous to enter more largely into the subject here. See **FEVER**.

TYPIC FEVERS, an appellation given by medical writers to those fevers which are regular in their attacks, and in their general period: they are thus called by way of distinction from the erratic, which observe no regular type, or determinate appearance.

TYPOGRAPHY, formed from τυπο; and γραφη, *writing*, the art of printing.

TYPOLITES, or **TYPOLITHUS**, formed of τυπο; *type*, and λιθος, *stone*, in *Natural History*, names given to stones or fossils, on which are impressed the figures of various animals and vegetables. See **STONES, Adventitious Fossils, &c.**

TYR, in the *Ethiopian Calendar*, the name of the fifth month of the Ethiopian year. It commences on the 25th of December of the Julian year.

TYR, in *Mythology*, a name given to a warrior deity, the protector of champions and brave men, invoked by the ancient northern nations.

The third day of the week was consecrated to Tyr, from whom, it is said, the name given to it in most of the northern languages is derived: it is called in Dan. *Tyrfdag*, or *Tisfdag*; in Sued. *Tisfdag*; in English, *Tuesday*; in Low Dutch, *Diags-tag*; and in Latin, *Dies Martis*: whence it is inferred, that Tyr answered to Mars.

The Germans, in High Dutch, call this day *Erichs-tag*, from the word *heric* or *hærec*, a warrior, which comes to the same thing.

Tyr must be distinguished from another deity called Thor. Mallet's North. Ant. vol. i. p. 99.

TYRA, in *Ancient Geography*, a town of European Sarmatia, upon the banks of the river Thyras; sometimes called Ophiufa.

TYRA, in *Geography*, a river of Germany, which runs into the Kelm, one mile W. of Kelbra, in the county of Schwartzburg.

TYRAMBE, in *Ancient Geography*, a town of Asiatic Sarmatia, 600 stadia from the river Rhombites, according to Strabo; but Ptolemy places it between Azabites Mitra and the mouth of the river Atticirus.

TYRAN, or TYRÓN, in *Geography*, a small island in the Red sea. N. lat. 27° 40'. E. long. 34° 28'.

TYRANNICIDE, formed of *tyrannus* and *cædo*, I kill, denotes the act of killing a tyrant.

TYRANNIO, in *Biography*, a Greek grammarian, was a native of Amisa, in Pontus, and a disciple of Dionysius of Thrace at Rhodes. Upon the conquest of the kingdom of Mithridates by Lucullus in the year B. C. 70, Tyrannio became a captive, but was liberated by Muræna, and taken to Rome, where he opened a school, in which he gave instruction to the son and nephew of Cicero, and also to Strabo. In this situation he acquired considerable wealth, and accumulated a library of more than 30,000 volumes. Among other valuable works which he possessed, he preserved the writings of Aristotle and Theophrastus, which he obtained from the librarian of Sylla, and which he afterwards imparted to Andronicus of Rhodes. Tyrannio lived to an advanced age; but none of his works are extant. Bayle.

TYRANNUS, in *Ornithology*, a name given by some to the lanius, or butcher-bird, a species of hawk not larger than a thrush, but a very fierce and fatal enemy to the small birds. See LANIUS.

TYRANNY, in *Political Government*, is the exercise of power beyond right, to which nobody can have a right; and thus it is distinguished from *Usurpation*, (which see,) or the exercise of power which another hath a right to: and it is the use of power which any one possesses, not for the good of those who are subject to it, but for his own private separate advantage; when the governor, however, intitled, makes not the law, but his will the rule; and his command and actions are not directed to the preservation of the property of his people, but the satisfaction of his own ambition, revenge, covetousness, or any other irregular passion.

It is a mistake to think this fault peculiar to monarchies; other forms of government are liable to it as well as that. For wherever the power that is put in any hands for the government of the people, and the preservation of their property, is applied to other ends, and made use of to impoverish, harass, or seduce them to the arbitrary irregular commands of those that have it, there it becomes tyranny, whether those who thus use it are one or many.

Accordingly we read of the thirty tyrants at Athens, as well as one at Syracuse; and the intolerable dominion of the decemviri at Rome was nothing better. Every wanton and causeless restraint of the will of the subject, whether practised by a monarch, a nobility, or popular assembly, is a degree of tyranny.

Whenever the constitution of a state vests in any man, or body of men, a power of destroying at pleasure, without the direction of laws, the lives or members of the subject, or of alienating their property, or of depriving them of their

liberty at pleasure, such constitution is tyrannical. In a word, wherever law ends, tyranny begins, if the law be transgressed to another's harm. And whosoever in authority exceeds the power given him by the law, and makes use of the force he has under his command, to compass that upon the subject which the law allows not, ceases in that to be a magistrate, and, acting without authority, may be opposed as any other man, who by force invades the right of another. The end of government, whatever be its name or nature, is the good of mankind: and upon this principle, whosoever uses force without right, as every one does in society who does it without law, puts himself into a state of war with those against whom he uses it; and in that state all former ties are cancelled, all other rights cease, and every one has a right to defend himself, and to resist the aggressor.

If it be asked who shall be judge; whether the prince or legislative act contrary to their trust? The answer is obvious, the people shall be judge; for who shall be judge whether the trustee or deputy acts well, and according to the trust reposed in him, but he who deposes him, and must, by having deputed him, have still a power to discard him when he fails in his trust? If this be reasonable in particular cases of private men, why should it be otherwise in that of the greatest moment, where the welfare of millions is concerned; and also where the evil, if not prevented, is greater, and the redress very difficult, dear, and dangerous? Locke, of Civil Government, ch. xviii. and xix. in his Works, vol. ii. p. 214, &c.

TYRANT, TYRANNUS, among the *Ancients*, denoted simply a king or monarch.

But the ill use several persons invested with that character made of it, has altered the import of the word, and tyrant now carries with it the idea of an unjust and cruel prince, who invades the people's liberty, and rules in a more despotic manner than the laws of nature, or the country, do allow.

The term *tyrant*, we are told, became odious among the Greeks, those zealous lovers of liberty, almost as soon as introduced; but Donatus assures us, it was never taken so among the Romans till the latter ages of that empire.

The motto of a tyrant is, *Oderint dum metuant*. Rowland contends, that this word, as well as the correspondent Greek and Latin, is derived from *tir*, Welsh and Erse, *land*, and *rhanner*, Welsh, *to share*; q. d. *tirhanner*, a sharer or divider of land among his vassals. Johnson.

TYRANTS, THIRTY, an appellation under which the thirty persons, established by the Lacedæmonians in Athens, in order to enslave and keep it in slavery, are denominated. Thrafsybulus formed the generous design of driving them from Athens, and succeeded; upon which event Cornelius Nepos has remarked, that many have desired, and few had the happiness to rescue their country from a single tyrant! but Thrafsybulus delivered his from thirty.

One of the means which these tyrants used for carrying on their scheme of enslaving the Athenians, was the ordering of the suffrages of the Areopagites to be public, that they might manage them as they pleased. See Montesquieu's Spirit of Laws, vol. i. p. 17.

TYRAS, in *Ancient Geography*. See DNIESTR.

TYRAWLEY'S POINT, in *Geography*, the south-west extremity of Trevanion's island, in the South Pacific ocean. S. lat. 10° 48'. E. long. 163° 41'.

TYRBE, *τυρβη*, in *Antiquity*, a festival celebrated by the ancients in honour of Bacchus.

TYRE, in *Ancient Geography*, a city of Phœnicia, distant 23 miles from Sidon, its rival, according to the Itinerary of Antoninus. (See SIDON.) This city was anciently denominated

minated *Sor*, whence it derived its name (see *SUR*), and was called the daughter of Sidon. It was situated upon the sea. Tyre has been distinguished, in the order of time, into three cities; as Tyre on the continent, or Pæle-Tyre (old Tyre), Tyre on the island, and Tyre on the peninsula, after the island was joined to the main land. There were four different places in Phœnicia which bore the name of Tyre. Tyre, of which we are now speaking, had two havens, one looking towards Sidon, the other towards Egypt. These havens were formed by the isthmus which joined the island to the main land, and were called, the one open, the other close. The former looked towards Egypt, and was the most southern of the two: it was accordingly called the Egyptian port. The sheriff Edrisi says, that one of these ports had an arch over its entrance, through which the shipping passed; and that it was fortified with a chain drawn across it. These bays or ports are still pretty large, and, in part, defended from the ocean by a long ridge, resembling a mole, stretching directly out on both sides from the head of the island; but whether these ridges are walls or rocks is uncertain; they were most probably walls. (See *SUR*.) Tyre, including Palæ-tyrus, was 19,000 paces in circumference, whence it is plain, that Tyre on the island, and old Tyre on the main, were considered as but one city, after the isthmus was thrown up between them; and possibly they might have had buildings contiguous to each other. If Pliny's numbers are right, the old city must have been by much the most extensive part of the whole, and especially as the place appears at this day. According to Pliny, the island was but 700 paces from the continent: whereas Strabo says that it was 30 stadia, or somewhat more than three of our miles from Palæ-tyrus; and according to the same geographer, Tyre was wholly an island, like Aradus, excepting the artificial isthmus, which formed it into a peninsula. The city by itself, according to the statement of Pliny, measured only twenty-two furlongs, or not quite three of our miles, and this is too great an allowance, if we may rely on our modern accounts; which represent Tyre itself as a small city in extent, though it covered the whole island; and the scantiness of the space on which it stood, induced the inhabitants to raise their buildings so high, which plan they would have otherwise avoided, from fear of earthquakes, that threatened them with destruction. At present the island appears to have been, in its natural state, of a circular form, hardly containing forty acres of ground; and the foundations of the wall which surrounded it are still to be seen at the utmost margin of the land. If it be true then, that the whole circuit of the old and new Tyre amounted to 19,000 paces, or 19 Roman miles, and that they were distant from each other but 33 stadia, or $3\frac{3}{4}$ of the same miles, it is evident that the old city stood upon a much greater space of ground than the new. A considerable part of the island was, what we call, made ground. The buildings were in general spacious and magnificent; and above the rest appeared the temples built by Hiram to Jupiter, Hercules, and Astarte. The walls of Tyre were 150 feet high, proportionably broad, and firmly built of large blocks of stone, bound together with white plaster. For its present reduced and ruinous state, see *SUR*.

Herodotus ascribes to Tyre situated on the island a very ancient epocha: and its priests, according to his account, represent that their temple, which was of greater antiquity than the city, subsisted about 450 years before the Christian era. Josephus refers the foundation of this city to 1255 years B.C., whilst the Israelites were under the government of judges. But these dates cannot be applied to insular Tyre, which was more modern than that of con-

tinental Tyre, which is said to have been built and known before the Israelites took possession of Canaan. (See Joshua, xix. 29.) The Sidonians, with a view of extending their commerce, sent out a colony to ancient Tyre, which contributed very much to its augmentation; and hence it became powerful, eclipsed the metropolis, and became itself the metropolis of several cities, which it furnished with colonies. The Tyrians were not known in the time of the Trojan war, according to Strabo (lib. xvi.) and Homer, who often speaks of the Phœnicians, mentions only the Sidonians, under which general appellation the Tyrians were probably comprehended.

Josephus and Theophilus Antiochenus begin the succession of kings of Tyre with Abibal, upon the authority of Menander the Ephesian, and Dius a Phœnician, authors of credit. Abibal was contemporary with David, and his reign is referred to 1056 B.C. He was succeeded by his son, Hiram (1046 B.C.), who maintained an intimate friendship with David and Solomon: under this prince the kingdom of Tyre was very prosperous and flourishing; the city was enlarged, and by means of a dam, joined to the temple of the Olympian Jupiter, standing in an island. He also built two temples, one to Hercules and another to Astarte, enriching them with donations. Besides erecting a statue to Hercules, he repaired the temples of other gods, and endowed them to a very great value. Tatian relates, on the authority of three Phœnician historians, that he gave his daughter in marriage to king Solomon, who, by her influence, was induced to worship Astarte, the goddess of the Sidonians. Hiram, having lived fifty-three years, and reigned thirty-four, was succeeded by his son, and a series of other princes, until Nebuchadnezzar, king of Babylon, laid siege to the city, in the reign of Ithobal II. 585 years B.C. This siege lasted thirteen years (see Ezekiel, xxvi. 8, &c.); and at last it was taken by Nebuchadnezzar and utterly destroyed. Some Phœnician historians have said, that Ithobal was succeeded by Baal; nor is it improbable, that the inhabitants of Tyre, during the siege, retreated with their effects to an island about half a mile distant from the shore, where they built for themselves a new city; which, after the destruction of the old town, submitted to Nebuchadnezzar, who appointed Baal to be his viceroy; and that, upon Baal's death, in order to render the government more dependent on the Assyrians, he changed the royal dignity into that of temporary magistrates, called *suffetes*, or judges, 562 years B.C. After Tyre had been thus governed for some years, the royal dignity was restored, and Balator created king, 556 B.C. Both he and his successors were dependent on, and tributary to the Assyrians for seventy years; at the expiration of which they recovered, according to the prophecy of Isaiah (ch. xxiii. 15. 17), their ancient liberty. In the year 480 B.C., under the reign of Marten, the Tyrians, as well as the other Phœnicians, were tributaries to the Persians, though they had a king of their own, being favoured by the Persian monarchs on account of the services which they rendered to them in their naval expeditions. About this time reigned Strato, whose accession to the throne, in consequence of an insurrection of the slaves, is particularly related by Justin, lib. xviii. cap. 3. He was succeeded by his descendants, among whom was Azelmic, in whose reign happened the memorable siege and reduction of Tyre by Alexander the Great. This siege commenced about the year 333 B.C. which was rigorously carried on and as obstinately resisted by the Tyrians. At length Alexander, having battered down the walls, took the city by storm, 332 B.C., after seven months siege, and fully executed the sentence which the Tyrians had, by their pride and other vices,

vices, drawn down upon themselves and their country. The city was burnt down to the ground, and the inhabitants, (those whom the Sidonians secretly conveyed away in their ships excepted,) either destroyed or enslaved by the conqueror, who, upon his first entering the city, put 8000 to the sword, caused 2000 of those whom he took prisoners to be crucified, and sold the rest, to the number of 30,000, says Arrian, for slaves. His cruelty towards the 2000 that were crucified was highly unbecoming the character of a generous conqueror, and reflects eternal disgrace upon his fame.

After the city was reduced, king Azelmic took sanctuary in the temple of Hercules, and was not only spared by the conqueror, but restored to the throne, after Alexander had re-peopled the place; for having cleared it of its former inhabitants, he planted it anew with colonies drawn from the neighbouring parts; and thenceforth styled himself the founder of Tyre, a city which he had most ungenerously destroyed. From hence, having unchained Apollo, whose statue the Tyrians had fastened, during the siege, with golden chains, to the altar of Hercules, returning him thanks for his intention of coming over to the Macedonians, and offered sacrifice to Hercules, Alexander continued his march into Egypt. This city afterwards regained a considerable degree of power; for in the year 313 B.C. it sustained a siege against Antigonus of fifteen months, before it was compelled to capitulate. It afterwards belonged to several masters, until Antiochus the Great, who took possession of it in the year 218 B.C. It afterwards became subject to the Seleucidæ. Cassius, a Roman governor, sold it to Marion, whose wealth enabled him to purchase the principality. Tyre, formerly called Tzor (Joh. xix. 29.), renowned for its trade and the numerous colonies which it transplanted into several parts of the world, and the wars in which its inhabitants valiantly engaged, was in all its glory when Alexander took it, about 300 years after its capture by Nebuchadnezzar. Tyre was still in great repute in the time of our Saviour. (See Matth. xi. 21. xv. 21. Mark, iii. 8. Luke, vi. 17.) It made a considerable figure in the reign of Herod Agrippa, who designed to wage war against it, if it had not secured peace by its deputies. (Acts, xii. 20.) When the apostle Paul travelled through this place, it had some Christian inhabitants. (Acts, xxi. 4.) In the second century it was a bishop's see; and St. Jerome tells us, that in his time it was the most famous and most beautiful city of Phœnicia, and a mart for all the nations of the world. This ancient father alleges this circumstance as an objection to the accomplishment of Ezekiel's prophecy (ch. xxvi. 14.), and replies to it, that the prophet's declaration is to be understood as intimating, that Tyre should no longer be the queen of nations, and enjoy the same authority and dominion as it possessed under Hiram, and its other kings, but should be subject to the Chaldæans, Macedonians, Ptolemies, and at last to the Romans. Others have supposed, that the prophet does not speak of the ruin of Tyre by Nebuchadnezzar, and Alexander the Great, but of its final destruction, of which the other events were forerunners. And indeed Tyre, as we have said, is now only a poor village, inhabited by fishermen (see SUR); so that the prophecy is fulfilled, which declared, "that it should be a place for fishermen to dry their nets on." Ezekiel may also be explained by the prophet Isaiah (xxiii. 15.), who limits the destruction of Jerusalem to 70 years. But the prophecy of Ezekiel may be more satisfactorily explained, with sir J. Marsham, Le Clerc, and other learned authors, who interpret it concerning Old Tyre, *i. e.* Palæ-tyrus, which stood a little

lower on the continent, and the best materials of which were used by Alexander the Great, in making the isthmus which now joins Tyre to the continent. (See Q. Curtius, l. iv. c. 2.) This Tyre was destroyed by Nebuchadnezzar, and never rebuilt. The inhabitants, finding themselves upon the brink of destruction, removed, as we have already said, with their wives and children, and most valuable goods, to the island of Tyre, where they built a city of the same name; so that Nebuchadnezzar, according to the prophecy (Ezek. xxix. 18.), was no gainer by his expedition. The Jews at Tyre, as Josephus informs us, suffered much from the Tyrians. This city was formerly the metropolitan see of the province of Phœnicia. Tyre was transferred to the Arabians, with the rest of Syria; and before it was reduced to its present miserable state, it was twice besieged by the Christians in the time of the Crusades, *viz.* in 1112, and again in 1124. It was unsuccessfully attacked by Saladin in 1192; but in 1291, Kabil, sultan of the Mamelukes, obtained it by capitulation, and razed its forts.

TYRESIO, in *Geography*, a sea-port town of Sweden, in Sudermannland; 9 miles S.E. of Stockholm.

TYRI, a lake of Norway, in the province of Aggerhuus; 15 miles N.W. of Christiania.

TYRIÆUM, in *Ancient Geography*, a considerable town of Asia, in Pisidia, called also *Tyros*.

TYRINGHAM, in *Geography*, a town of Massachusetts, in the county of Berkshire, containing 1689 inhabitants; 140 miles W. of Boston.

TYRIUM MARMOR, a name given by the ancients to a species of marble of a beautiful white, sometimes free from veins, and sometimes variegated with dusky blackish-grey ones. When pure, it was little inferior to the Parian, and often was used instead of it by the statuary. See MARBLE.

TYRNAU, in *Geography*. See TIRNAU.

TYRNAU, a town of Moravia, in the circle of Olmutz; 14 miles N.W. of Olmutz.

TYRNITZ. See DYRNITZ.

TYRNSTEIN. See DIERNSTEIN.

TYRO. See TYROCINIUM.

TYROCINIUM, TYROCINY, formed of *tyro*, a raw beginner, a novice or apprenticeship in any art or science.

We have several writings under the title of tyrociniums; *tyrocinium chymicum*, *tyrocinium chirurgicum*, &c. containing the rudiments of those arts, accommodated to the apprehensions of beginners.

TYROL, in *Geography*, a citadel which gives name to the Tyrolese county; 1 mile N. of Meran. N. lat. 46° 37'. E. long. 11°.

TYROLESE, or *Upper Austria*, a county, bounded on the north by Bavaria, on the east by Salzburg and Carinthia, on the south by Italy, and on the west by Bavaria and the Grisons; in this circle are included the county of Tyrol Proper, the bishopric of Trent, and the bishopric of Brixen. The bishopric of Trent is situated to the south; the bishopric of Brixen occupies the north-east part; and the county of Tyrol the centre. This county is mountainous, and capable of making a powerful stand against an invading enemy; but the Tyrolian mountains, though covered with snow to the very utmost summits of them, are also fertile; where are found not only the finest woods, abounding in a variety of game, but also large and good corn-fields; or, where these mountains are barren, there are, for the most part, mine works, or excellent marble, of all colours. Corn thrives well in many, nay in most places here; and in some places flax. On the eminences grow also all sorts of fine fruits which Italy yields, and likewise small woods of chestnut trees, together with fine vines. Among the wild beasts

here are chamois and wild goats. There are, likewise, in this county, several species of precious stones, as granites, rubies, amethysts, and emeralds, a species of diamonds, agates, cornelians, chalcedonies, &c. Hot baths and medicinal springs are found in several places; at Hall are profitable salt-pits. Not far from Schwatz is a mine of silver and copper; and some miles distant from the latter is also a mine work, which yields a very soft and malleable copper. The copper contains in it some silver and gold. Good lead, together with fine mineral colours, alum, vitriol, and fine silver ore, are also found here. The principal rivers in this county are the Inn, or Imn, the Adige, the Lech, and the Isar. In this county are twelve towns and ten villages, which have markets. The common people here, exclusive of the subsistence which the mines and salt-works yield them, have not much to earn; so that a great part of them seek for subsistence out of the country, either by trade or labour. Tyrol was formerly a part of Rhaetia, but, in the sixth century, the greatest part of it descended to the dukes of Bavaria, and this was afterwards reckoned in Noricum; but, over the southern part, the Longobards, at the same time, extended their dominion. The dukes of Bavaria appointed margraves here; but Henry the Lion, duke of Bavaria and Saxony, being, in 1180, put under the ban of the empire, by the emperor Frederic I., this last dismembered the present province of Tyrol from Bavaria, investing therewith the margrave Berchtold, under the title of duke of Meran. Otto II., grandson to this Berchtold, dying without male issue, in the year 1248, this county came to count Albrecht III., who resided at the citadel of Tyrol, gave up the title of duke of Meran, and styled the whole country the county of Tyrol. Tyrol had, afterwards, frequently princes of its own, of the house of Austria; the last of whom, named Sigismund Francis, died in 1665, upon which the emperor Leopold received homage on that account, in person, at Innsbruck; and by the peace of Presburg it was ceded to Bavaria. The high sovereign colleges over Tyrol, when subject to the house of Austria, were seated at Innsbruck; and towards the maintenance of the military state, it contributed yearly 100,000 florins.

TYRONE, a county of Ireland, in the province of Ulster, which is entirely inland, and very irregular in its shape. On the north it has the county of Derry; on the west, Donegal; on the south, Fermanagh and Monaghan; and on the east, Armagh, with Lough-Neagh. Its divisions from these counties are seldom marked by nature, but the river Blackwater bounds it for about 30 miles on the south-east and east, and the rivers Fin and Foyle for about 10 miles on the north-west. The greatest length from east to west is 43 Irish miles, or $54\frac{1}{2}$ English; and the greatest breadth 33 Irish, or 42 English. The area measures 467,700 acres, or 724 square miles Irish, which is equal to 751,387 acres, or 1163 square miles English. Dr. Beaufort states the number of houses at 28,704, which, at $5\frac{1}{2}$ per house, would give a population of near 153,000, or about 40 to each square Irish mile. As this was the statement in 1792, the increase must have been considerable. The number of parishes is only 35, and these have 38 churches. Most of these are in the diocese of Armagh, but there are some in the dioceses of Derry and Clogher. Tyrone is represented in the imperial parliament by two members for the county, and one for the borough of Dungannon. The northern part of the county is rough and mountainous. The Cairntogher and Munterlony mountains occupy a large space; and to the south of these are the high hills called "Befy Bell" and "Mary Grey." These produce very little, being in general wet and spongy. Where, however, gravel or any

porous substance forms the substratum, the surface is dry and wholesome, and well calculated for pasture. The other parts of the county contain very good land; and some districts are remarkable for their fertility, especially the neighbourhood of Dungannon, extending eastwards towards the Blackwater, and about Cookstown. The produce of this county, and the state of manufactures, agree in the leading features with those of the other northern ones. The farms, except in the mountainous districts, are usually small; and the produce in general oats, barley, potatoes, and flax. The linen manufacture is extensively carried on; and it gives a favourable idea of the industry of the inhabitants, to learn from the county survey, that much cultivated ground has been gained from the bogs and mountains. "In all parts of this country," said Dr. Beaufort in 1792, "cultivation is creeping, and that not slowly, up the sides of all the hills and mountains that are capable of improvement." In this county, the culture of the grass called *forin* was commenced by Dr. Richardson at Clonfeale, near May, the excellencies of which have been laid before the public in various publications, and have attracted the attention of many eminent agriculturists. Many parts of Tyrone contain large quarries of lime-stone, though it is not generally used for manure. There are also many quarries of free-stone; and good mill-stones are hewn out of detached rocks. It is probable that iron-ore is abundant; but without greater plenty of fuel, it can be of no use. Clay fit for bricks, and for various kinds of pottery ware, is also found in many places. But that mineral which has engaged most attention is coal. At Coal-Island, in the eastern part of the county, coal-works have been carried on with some success. Five pits were working in the year 1800, with the appearance of industry. There seemed, however, a want of encouragement; and the canal, which had been made from this place to the Blackwater, was choked up with mud and weeds. A similar account may be given of the collieries at Drumglass, near Dungannon; so that though above 140,000*l.* were expended from the national purse in making canals, independently of private exertions, the object has not been obtained; and the Newry canal, instead of conveying the Tyrone coals to that port, to be shipped for Dublin and other places, supplies the county through which it passes with English and Scotch coal. At the time of making these grants, from 1751 to about 1770, there was a surplus of the revenue, which was spent on various public works, but not always to advantage, and very seldom with economy. In the instance above mentioned, the object was to save the large sums sent annually out of Ireland for coal, or rather to procure a supply of that article on lower terms than it was usually obtained. But though some advantage has arisen from the Newry canal, so great has been the expence attending it, and so complete the failure of all the other parts of the speculation, except for the supply of the adjoining country, as seems to illustrate the opinion, that the interference of government in such plans seldom succeeds, and that the grants intended to encourage them are too commonly abused and perverted. It has been said, that there are indications of a rich coal-mine near the village of Drumquin, in the south-west of the county, and in a district abounding with iron-ore; and as this is only 12 miles distant from Lough Erne, a canal has been recommended; but since the union, and especially since the taxes have pressed so heavily on all ranks, such speculations are not so readily adopted. The report of Mr. Griffith, the mining engineer of the Dublin Society, on the Ulster coal district, will throw much light on the subject; but his opinion, as expressed in his report on the

Leinster district, is not favourable to the extent or value of that in the county of Tyrone.

The rivers of this county are very numerous, so that it is well supplied with water for bleaching, &c. The principal river is the Mourne, which passes through the centre of the county from south to north. It rises in the mountains near Clogher, and receives several streams before it comes to Omagh, where it is joined by the Cameron from the south; and a few miles lower, by the Po from the west. At Newtown-Stewart the united streams of the Moyle, and another river from the mountains between Tyrone and Derry; and at Ardtraw the Derg, which flows from Lough Derg, in the county of Donegal, add their stores. Thence it runs to the town of Strabane, below which it meets the river Fin, from the county of Donegal; and they proceed together, under the name of Foyle, to the sea, being navigable for large boats. The river Blackwater, which is also navigable for about ten miles of its course, is of great service to the eastern part of the county. The Ballinderry passes by Cookstown, and afterwards becomes the northern boundary, until it flows into Lough Neagh. The other streams are inconsiderable, and there are no lakes which deserve notice. The towns of this county are not large. Omagh is the county-town, probably on account of its central situation; for it is inferior to Dungannon or Strabane. Dungannon was the principal residence of the O'Neils, when chieftains of Ulster. These towns, and Cookstown, May, &c. are mentioned under their respective names. The country and inhabitants near Newtown-Stewart were much improved by the exertions of lord Mountjoy, who was killed at the battle of Rofs in 1798, fighting against the rebels, at the head of his regiment. His useful and benevolent plans have not, however, been neglected. About Fintona good flooring and ridge tiles are made, and a great variety of crockery ware for country use. Near Coal-Island is a pottery, supposed to be the best in Ireland for rough crockery ware, fire-bricks, and tiles for malt-kilns, which are of as good a quality as any imported. The same clay made into small oblong pieces, and dried in the sun, is used for cleaning of leather, &c. and is sent for this purpose to very distant places.

Having thus given an account of the present state of Tyrone, with respect to its productions and manufactures; it may be added, that when O'Neil, the descendant of the kings of Ulster, was compelled to submit to queen Elizabeth, he was created earl of Tyrone; and when his rebellion, in the reign of James I., occasioned the forfeiture of his possessions, this was one of the counties *planted*, that is, allotted to settlers, chiefly from Scotland, whose descendants are at present the principal landed proprietors.—M'Evoy's Survey of Tyrone. Beaufort's Memoir of Map of Ireland, &c.

TYRONE, a township of Pennsylvania, in the county of Adams, containing 648 inhabitants.—Also, a township of Pennsylvania, in the county of Cumberland, containing 2604 inhabitants.—Also, a township of Pennsylvania, in Huntingdon county, containing 753 inhabitants.—Also, a township of Pennsylvania, in Fayette county, containing 989 inhabitants.

TYROOT, a circar of Hindoostan, in the subah of Bahar, bounded on the north by Morung, on the east by Purneah, on the south by Boglipour, on the south-west by Hajypour, and on the west by Bettiah. Durbungah is the capital.

TYROSIS, τυροσις, formed of τυρος, *cheese*, in *Medicine*, a coagulating or curdling of milk in the stomach, after the manner of cheese.

TYRRELL, JAMES, in *Biography*, a political writer and historian, was the son of sir Timothy Tyrrell, knt., of Shotover,

near Oxford, by Elizabeth, the only daughter of archbishop Usher, born at London in 1642, and admitted, in 1657, a gentleman-commoner of Queen's college, Oxford. Devoting himself to the study of the law at the Inner Temple, he was called in 1665 to the bar. But declining the practice of his profession, he resided at Oakley, in Buckinghamshire, and studied the history and constitution of his country, of which he entertained more liberal sentiments than those with which he commenced his researches. In 1681 he published an answer to sir Robert Filmer's patriarchal scheme, under the title of "Patriarcha non monarcha; or, The Patriarch unmonarched." Having refused to assist in the abolition of the penal laws, and the test against popery, he was struck out of the commission of the peace by James II. As a zealous friend to the Revolution, he vindicated king William's right to the crown in "Fourteen Political Dialogues," printed from 1692 to 1695; which were afterwards collected into one volume folio, with the title of "Bibliotheca Politica, &c." in which all the chief arguments, both for and against the late revolution, are impartially represented and considered. He also composed an abridgment of bishop Cumberland's work "De Legibus Naturæ," 1692, 8vo. of which work a second edition, corrected and enlarged, was printed in 1701. But his principal performance was "The General History of England, both Ecclesiastical and Civil, from the earliest Accounts of Time," concluding with the reign of Richard II., and comprised in 5 vols. fol. 1700—1704. The political purpose of this work seems to have been to confute the leading doctrines of Dr. Brady, who maintained that all the liberties and privileges of the people of England were concessions from the kings, and derived from the crown; and that the representation of the commons, as now existing, was not introduced before the 49th of Henry III. These points are still controverted, and serve to distinguish two parties in the state. Mr. Tyrrell died in 1718, in his 76th year. Biog. Brit.

TYRREL, in *Geography*, a maritime county of North Carolina. It contains about 3364 inhabitants.

TYRREL'S Bay, a bay on the south coast of St. Vincent; 2 miles E. of Kingstown.

TYRREL'S Pass. See TERRIL'S Pass.

TYRRHENIA, in *Ancient Geography*, that part of Italy which is now called Tuscany; but more extensive towards the north and south-east. This country has changed both its name and its inhabitants.

The Umbrians were expelled by the Pelasgi, and these by the Lydians, under the conduct of Tyrrhenus, the son of the king of Lydia, whence the name Tyrrhenia. As the Tyrrhenians were a religious people, and offered many sacrifices, the Greeks called them Thufis, or Thufci, denoting sacrificers, from θυς, *to sacrifice*. See ETRURIA and TUSCANY.

TYRRHENUS SINUS, a gulf of Italy, on the coast of Etruria. According to Dionysius of Halicarnassus, this gulf was denominated "Ausonius Sinus."

TYRTÆUS, in *Biography*, a Greek poet, is supposed to have been a native of Miletus, and to have resided at Athens, as a poet, musician, and school-master. Somewhat deformed in body, he possessed a manly and elevated soul. In a contest between the Lacedæmonians and Messenians, the former, having experienced some ill success, are said to have consulted the oracle of Delphi, B.C. 623, and to have been directed to seek a general at Athens. The Athenians, as some say in derision, sent Tyrtæus, who, by the recital of poems in praise of valour and patriotism, animated the Spartans, so that they became victorious, and reduced the Messenians to subjection. He is said to have also given them useful

useful advice as a military leader, in consequence of which the Spartans conferred upon him the right of citizenship, and honoured him whilst he resided among them. His war-poems have been celebrated by the ancients, and particularly by Horace, who joins him with Homer in his eulogy :

“ ——— Post hos insignis Homerus
Tyrtaenique mares animos in martia bella
Verfibus exacuit.” — Art. Poet.

Besides these poems, he composed, also, “Moral Precepts,” and a work “On the Polity of the Lacedæmonians.” Some fragments of his “War-Poems” are extant, which are published with the other minor Greek poets, and are said to be characterized by a masculine simplicity. Moreri. *Anc. Un. Hist. Gen. Biog.*

TYRVANDO, in *Geography*, a town of Sweden, in Tavastland; 10 miles N.N.W. of Tavasthus.

TYRVIS, a town of Sweden, in the government of Abo; 35 miles E.S.E. of Biorneborg.

TYRUS, in *Ancient Geography*, a town of the Peloponnesus, in Laconia.—Also, a town of Asia Minor, in Lydia.—Also, an island situated on the coast of Syria, near the continent, according to Ptolemy.—Also, an island situated in the Persian gulf. Strabo.

TYRUS, a word used by some of the barbarous writers for a serpent or viper.

TYRWHITT, THOMAS, in *Biography*, a profound scholar and acute critic, was born in 1730, sent to Eton school in 1741, and entered at Queen’s college, Oxford, in 1747. In 1755 he was elected fellow of Merton college, and in 1756 acted as under secretary of war. In 1762 he became clerk to the house of commons, which post he retained till the year 1768. At this time he retired to pursue those studies which were adapted to his genius and taste, and to the acquirements he had already made in the knowledge of ancient and modern languages, and of the old as well as modern writers of his own country. He commenced his publications with compositions in poetry; such were “An Epistle to Florio,” and Latin versions of the “Messiah” and “Splendid Shilling,” with an English one of “Pindar’s eighth Isthmian Ode.” In 1766 appeared his “Observations and Conjectures on some Passages of Shakspeare,” which enabled him to communicate ingenious remarks to Mr. Steevens and Mr. Reed, for their editions of the works of this great dramatist. His “Proceedings and Debates in the House of Commons in 1620 and 1621, from an original MS. in Queen’s College, Oxford,” appeared in the same year; and in 1768 he published a corrected and enlarged edition of “Elfyng’s Manner of holding Parliaments in England.” His first publication in critical literature was “Fragmenta duo Plutarchi,” 1773, from one of the Harleian MSS. This was followed by a very valuable edition of Chaucer’s “Canterbury Tales,” in 4 vols. 8vo. 1773, which, besides corrections of the original text, contains an introduction and admirable essay on the author’s language and versification. In 1776, he further displayed his Latin erudition and critical acumen, by a Latin dissertation on Babrius, one of the writers of the Æsopian fables. In 1777 he gave a complete edition of the poems attributed to Rowley, with a preface and glossary. In a subsequent edition, which appeared in 1778, he expresses his full conviction, with the grounds of his opinion, that they were written solely by Chatterton, and he afterwards satisfied all unprejudiced judges with regard to this subject of literary controversy. (See CHATTERTON.) We shall merely enumerate his remaining works, which were, an edition of a Greek poem, Πέτραι Λιθων (on Stones), ascribed to Orpheus, together

with a supplement to his dissertation on Babrius, 1781; “Conjecturæ in Strabonem,” 1783; and a newly discovered “Oration of Isæus against Menocles,” 1785. Mr. Tyrwhitt was a member of the Royal and Antiquarian Societies, and a curator of the British Museum. He died, much lamented, in 1786, in his 56th year; having established a character that was truly estimable. He bequeathed to the British Museum all those of his books which were not before in that repository. Nichols’s *Lit. Anecd. Gen. Biog.*

TYSCA, in *Ancient Geography*, a country of Africa, in which there were fifty towns. Massinissa and the Carthaginians disputed the possession of this country, and the dispute was referred to the senate of Rome, according to Appian.

TYSERRA, in *Geography*, a town of Hindooftan, in Bahar; 32 miles S. of Doefa.

TYSHAS, among the *Ethiopian*s, the name of the fourth month of their year, commencing the 27th of November in the Julian year.

TYSNASOE, in *Geography*, a small island in the North sea, near the coast of Norway. N. lat. 60°.

TYSSENS, PETER, in *Biography*, was born at Antwerp in 1625, and practised painting in portraiture and history with very great success. In the latter, however, he acquired the most substantial portion of his fame; and after the death of Rubens, he was made director of the Academy at Antwerp in 1661. His compositions are rich and ingenious, and are conducted in a style more correct and grand than that of most of his countrymen, and his colour is clear and harmonious. Amongst the best of his works are his “Martyrdom of St. Benedict,” in the church of the Capuchins at Brussels; the “Crucifixion,” at the Carmelites; and the “Assumption of the Virgin,” at the church of St. James at Antwerp. He died in 1692, aged 67, leaving two sons, painters.

TYSTED, in *Geography*, a town of Denmark, in North Jutland, situated on a river which runs into the Lymford gulf; 40 miles W. of Aalborg. N. lat. 57° 3′. E. long. 8° 45′.

TYTERSAARI, a round island of the Baltic, belonging to Russia: it is pretty high, but not above ten versts in circuit. It lies 18 versts to the S.E. of Hochland. As appendages, on the western side, or in the Sound, between it and Hochland, it has four small isles, quite low, but pretty far asunder: Kleintitter, the two Viri, and Væotcalla, and on the southern side a stony ground, seven or eight versts in length, to the Narva passage; hence, it is hardly possible to land on this island. A third part of it is rock, another third is morass, and the remaining part an arid and sterile sand-hill. The island has no springs. The seal-fishery is here considerable: the inhabitants live together in one village.

TYTH, or rather *Tithe*. See TITHE.

TYTHING, and *Tything-man*. See TITHING, DECINNERS, TENMENTALE, HUNDRED, WAPENTAKE, &c.

TZAGANUSKOI, in *Geography*, a town of Russia, in the government of Irkutsk, on the borders of China; 48 miles S.S.W. of Selenginsk.

TZAGONIA, a district in the south part of the Morea, between Mistra and Cape Malio.

TZAMAMENI, a town of Asiatic Turkey, in the government of Marasch; 40 miles S.E. of Marasch.

TZAMANDUS, in *Ancient Geography*, a town of Asia, in the vicinity of the Lesser Armenia.

TZANATI, in *Ornithology*, the name of an American bird described by Nieremberg, which, he says, has all over very long and beautiful feathers, of a fine green, and of the shining gloss of the feathers of the peacock. The upper
side

side of the wings is black, but their under part is of a very fine and shaded green; it has a very beautiful crest on its head; its throat and breast are of fine scarlet; the wing-feathers are very long, and very beautifully variegated with several colours. The Indians esteem the feathers of this bird more valuable than gold; they dress up the images of their gods with them. Ray's Ornithol. p. 303.

TZANGÆ, among the *Ancients*, a kind of Parthian garments, according to some; but others will have them to have been shoes fet with precious stones, formed into the figure of eagles, and designed for the emperor's use.

TZANI, in *Ancient Geography*, a people of Asia, in the vicinity of Armenia. According to Procopius, they were formerly independent, and lived a savage life; worshipping birds and other animals, and inhabiting mountains covered with thick and dark forests. They paid no regard to agriculture, and had neither corn nor pastures, so that the culture of the soil was wholly neglected. They had no restraint on their liberty, till they lost it under Justinian, to whom they voluntarily surrendered themselves. In process of time they embraced Christianity, which produced a total change in their manners and habits. They afterwards served in the Roman armies. Justinian contributed, by the regulations which he introduced, to civilize them. But some authors say, that at this day the Tzanians have no kind of religion; that they have neither temples, nor altars, nor priests, nor any worship.

TZANPAU, in *Ornithology*, the name of an American bird described by Nieremberg, and famous for the modulations of its voice, and is by many esteemed the female of the *polyglotta avis*, or *cencontlatolli* of the Indians.

TZAREVAGOR, in *Geography*, a town of Russia, in the government of Tobolsk, on the Tobol; 28 miles S.E. of Okunevsk. N. lat. 55° 20'. E. long. 64° 34'.

TZAREVOKOKCHAISK, a town of Russia, in the government of Kazan; 68 miles N.W. of Kazan. N. lat. 54° 50'. E. long. 47° 54'.

TZAREVOŠANGURSK, a town of Russia, in the government of Viatka; 100 miles S.W. of Viatka. N. lat. 57° 8'. E. long. 47° 54'.

TZARI, a town of the principality of Georgia, in the province of Kaket; 95 miles S.E. of Teflis.

TZARITZIN, a town of Russia, in the government of Saratov, on the Volga, defended by a ditch and rampart, with artillery and a considerable garrison; 180 miles S. of Saratov. N. lat. 48° 35'. E. long. 44° 34'.

TZEKINSKOI, a fortress of Russia, in the government of Irkutsk, on the borders of China; 100 miles W.S.W. of Selenginsk.

TZEPHETH. See **SAFAD**.

TZERIMISH, a horde of tartars, pretty numerous, in the neighbourhood of Kazan.

TZERNA, a river of Romania, which runs into the Mariza, near Tzernitz.

TZERNITZ, a town of European Turkey, in Romania, near the Tzerna; 32 miles N.N.E. of Adrianople.

TZERVINKA. See **ZERVINKA**.

TZETZES, JOHN, in *Biography*, a Greek poet and grammarian, flourished in the twelfth century, and was distinguished by his talents, natural and acquired, and particularly by a retentive memory, inasmuch that he had the whole Scriptures by heart. He was the author of "Allegories on Homer," and of "Miscellaneous Histories," in thirteen chiliads, written in that lax kind of verse which is called political, or popular. The characteristics of this poet, says one of his biographers, appear to be tediousness and insi-

pidity with arrogance. As a critic, he gave scholia upon Hesiod. His Allegories were published by Morel, Paris, 8vo. Gr. and Lat., with notes, 1616; and his Histories or Chiliads at Basil, fol. 1546.

The brother of the preceding, ISAAC TZETZES, published learned commentaries on Lycophron, which have been considered as the joint productions of both brothers: they are inserted in Potter's edition of Lycophron, Oxon. 1697. Moreri. Gen. Biog.

TZICATLINA, in *Zoology*, a species of serpent, said to be found in America, and reckoned among the most beautiful of that kind of animals. It is nine inches long, about the thickness of a man's little finger, and variegated with alternate swaths of white and red crossing its body. It is likewise one of the harmless kind of serpents.

The name signifies the *serpent of ants*, because it lives always in their nests, and comes out along with them.

TZIECHANOW, in *Geography*. See **CHIEKANOW**.

TZIEL, a town of the duchy of Warsaw; 35 miles W. of Posen.

TZIGENO, a town of Croatia; 10 miles S.E. of Creutz.

TZIKIRSKOI, a fortress of Russia, in the government of Irkutsk; 120 miles W.S.W. of Selenginsk.

TZILEI, a town of Walachia, on the Danube; 20 miles W. of Nicopoli.

TZIMLIANKA, a town of Russia, in the country of the Cossacks, on the Don; 116 miles E.N.E. of Azoph.

TZINITZIAN, in *Ornithology*, the name of a very beautiful American bird, described by Nieremberg, of the size of a small pigeon, and ornamented with variously-coloured feathers. The beak is short, crooked, and of a pale colour; the head and neck are like those of the pigeon; the breast and part of the belly are red; but that part which is next the tail is of a fine elegant blue, and a bright white, beautifully intermixed with one another; the tail is green on the upper part, and black underneath; the wings are variegated with white and black; the feet and legs are grey, and the shoulders of a very beautiful green. It is most frequent near the South Sea, and feeds on vegetables. It is kept in cages for its beauty, but never sings. The Indians make several beautiful works of its feathers. Ray's Ornithol. p. 303.

TZIOURLY, in *Geography*. See **TSORLI**.

TZIVILSK, a town of Russia, in the government of Kazan; 56 miles W. of Kazan. N. lat. 55° 40'. E. long. 47° 34'.

TZNA, a river of Russia, which rises 20 miles S. of Tambov, and runs into the Moksha, 20 miles N.W. of Temnikov, in the government of Tambov.

TZTACTZON, in *Ornithology*, an American name, under which Nieremberg has described a species of duck, remarkable for the variable and beautiful colours of its head, which are purple, blue, white, and green, and shine like fawn; its body is variegated with black, grey, and white; its legs are red, and is eaten as the other water-fowl. It is common in the lakes of Mexico, and has feet much more adapted to swimming than to walking. Ray's Ornithol. p. 299.

TZURUCHATU, STAROI, in *Geography*, a town of Russia, in the government of Irkutsk, on the Argunia, on the borders of China. This is one of the towns in which a private trade is carried on between the Russians and the Chinese. It has a small garrison; 160 miles S.E. of Neretchinsk. N. lat. 49° 18'. E. long. 119° 32'.

U. and V.

V A A

U, The twentieth letter in the alphabet, and the fifth vowel.

Besides the vowel *u*, there is a consonant of the same denomination, wrote *v* or *v*.

V consonant and U vowel ought to be considered as two letters; but as they were long confounded while the two uses were annexed to one form, the old custom still continues to be followed.

U, the vowel, has two sounds; one clear, expressed at other times by *eu*, as *obtusē*; the other close, and approaching to the Italian *u*, or English *oo*, as *obtund*.

V, the consonant, has a sound nearly approaching to those of *b* and *f*. With *b* it is by the Spaniards and Gascons always confounded, and in the Runic alphabet is expressed by the same character with *f*, distinguished only by a diacritical point. The sound in English is uniform: it is never mute.

V is also a numeral letter, and signifies *five*; according to the verse,

“V vero quinque dabit tibi, si recte numerabis.”

When a dash was added at top, \bar{V} , it signified 5000.

V. R. among the Romans, stood for *uti rogas*, as you desire: which was the mark of a vote, or suffrage for the passing of a law.

The following abbreviations sometimes occur; viz. V. A. for *veterani assignati*; V. B. *vero bono*; V. B. A. *viri boni arbitrati*; V. B. F. *vir bona fidei*; V. C. *vir consularis*; V. C. C. F. *vale, conjux charissime, feliciter*; V. D. D. *voto dedicatur*; V. G. *verbi gratia*; V. L. *videlicet*; V. N. *quinto nonarum*.

V, on the French coins, denotes those that were struck at Troyes.

V, in *Music*, besides its numerical import of *five*, in ancient madrigals implies *quinta pars*, a fifth part added to the treble, counter tenor, tenor, and base. In instrumental music it stands for violin, as VV do in the plural for violins. V. S. are the initials of *verto subito*, Lat.; and *volti subito*, Ital., for turn over quick.

VAAGEN, EAST, in *Geography*, an island in the North sea, 20 miles from the coast of Norway. N. lat. 68° 26'.

VAAGEN, WEST, an island in the North sea, 30 miles from the coast of Norway. N. lat. 68° 12'.

VAAGSOE, a small island in the North sea, near the coast of Norway. N. lat. 61° 57'.

VAARSOE, a small island of Denmark, on the E. coast of Jutland, at the mouth of the gulf of Horsens. N. lat. 55° 53'. E. long. 10° 1'.

VAAS, a town of France, in the department of the Sarthe; 21 miles S. of Le Mans.

V A C

VAAST, ST. See ST. *Vaast*.

VABAR, in *Ancient Geography*, a town of Africa, on the coast of Mauritania Cæsariensis. Ptolemy.

VABAR, *Asb-oune-man-kar*, a promontory of the eastern part of Mauritania Cæsariensis. Ptolemy. The port *Salde*, mentioned by Strabo, lay S.E. of this promontory.

VABBA, a town of Africa, in Mauritania Tingitana, formerly sometimes denominated Julia Campestris.

UABE, in *Geography*. See HILAU.

VABELIRA KÉ, an island in the Red sea. N. lat. 25° 8'.

VABRES, a town of France, in the department of the Aveiron, at the union of two small rivers, which soon after run into the Tarn. Before the revolution, it was the see of a bishop, suffragan of Alby; 2 miles S.W. of St. Afrique.—Also, a town of France, in the department of the Cantal; 4 miles E. of St. Flour.

VACAN, one of the small Philippine islands, near the N. coast of Samar. N. lat. 12° 47'. E. long. 121° 15'.

VACANCY, in *Philosophy*. See VACUUM.

VACANCY, in *Law*, &c. a post or benefice wanting a regular officer, or incumbent.

The canonists hold, that the kind of vacancy is to be expressed in the impetration of a benefice.

A future vacancy, or voidance of a spiritual living, some writers call *vacatura*. *Devolution* is a species of canonical vacancy.

VACANCY of the Throne. See *Right of Crown*, and *REVOLUTION*.

VACANT EFFECTS, *Prædia Vacata*, or *Vacua*, are such as are abandoned for want of an heir, after the death or flight of the former owner.

In our law-books, *vagantes terre*, for *vacantes*, expresses forsaken or uncultivated lands.

A Romish benefice is said to be vacant *in curia Romana*, when the incumbent dies in Rome, or within twenty leagues of it; though it be only by accident that he was there. The pope nominates to all benefices vacant *in curia Romana*, excepting those of the neighbouring bishoprics.

VACANT Cylinder, in *Gunnery*. See CYLINDER.

VACARIA, *Aucaria*, or *Caucaria*, in *Ancient Geography*, a place of Africa Propria, on the route from Hippone to Carthage, between Vicus Augusti and Tuburbo Minus, according to the Itinerary of Antonine.

VACARIA, in *Geography*, a town of Egypt; 8 miles N.E. of Habasch.

VACARICA, a town of Portugal, in the province of Beira; 18 miles S.E. of Bragança.

VACAS, a river of Mexico, which rises in the province of Guatimala, and runs into the Pacific ocean, N. lat. 14° 22'. W. long. 92° 48'.

VACAS Bay, a bay on the S. coast of Africa. S. lat. 34° 15'.

VACASA, a small island near the W. coast of Lewis. N. lat. 58° 11'. W. long. 6° 57'.

VACATAMA, a river of Peru, which runs into the Pacific ocean, S. lat. 9° 25'.

VACATING RECORDS, in *Law*. See IMBEZZLE.

VACATION, *Non-term*, all the time included between the end of one term, and the beginning of the next succeeding one. See TERMS.

This intermission was called by our ancestors *pax Dei*, and *ecclesia*; and sometimes, the *time* or *days of the king's peace*. Among the Romans, it was called *justitium* or *feria*, or *dies nefasti*.

The time from the death of a bishop, or other spiritual person, till the bishopric, or other dignity, be supplied by another, is also called vacation.

During the vacation of a bishopric, the dean and chapter are guardians of the spiritualities, by the canon law; and of common right they are so at this day in England, and the archbishop hath this privilege only by prescription or composition, to whom with us, during the vacancy of any see within his province, all episcopal rights of the diocese belong; and all ecclesiastical jurisdiction is exercised by him and his commissioners. But when an archiepiscopal see is vacant, the dean and chapter of his diocese are guardians of the spiritualities, and exercise the spiritual jurisdiction of his province. And the perquisites that happen by the execution of such power belong to the guardian, but the new-elected bishop may by law, after election and confirmation, execute the same. See *CUSTOS Spiritualium*.

The custody of the temporalities of every archbishopric and bishopric within the realm, in the time of vacation, belong to the king by his prerogative; and upon the filling of a void bishopric, the king, and not the new bishop, hath the temporalities of it from the time that the same became void to the time that the new bishop shall receive them from the king: which the king *ex gratia* may grant him by his letters patent after his confirmation, and before his consecration: but after he is consecrated, invested, and installed, he may sue for his temporalities out of the king's hands by a writ directed to the estreator; the metropolitan testifying the time of consecration. See *CUSTOS Temporalium*.

During the vacation of a benefice, the profits, by the common law of the church, were to be laid out for the benefit of the church, or reserved for the successor; and by special privilege or custom the bishop or archdeacon might have the same, wholly or in part: and it is said, the king might take the profits of a free chapel, and the patron those of a donative. But by statute 28 Hen. VIII. c. 11. it is enacted, that the tithes and profits of spiritual promotions, offices, benefices, and dignities, during the time of their vacation, shall belong to the person next presented, promoted, instituted, inducted, or admitted, towards the payment of his first-fruits. Anciently, upon the death of an incumbent, the rural dean, without any formal sequestration, took the vacant benefice into his custody; but in process of time, the chancellors of bishops, or their archdeacons, laid claim to this jurisdiction, and by forms of sequestration assigned vacant churches to the *aconomi* or lay guardians of the church: and now the ordinary way of managing the profits of vacation is by sequestration granted to the church-wardens, who are to manage all the profits and expences of the benefice for the successor; whose right to the profits commences from the voidance of the benefice, and to whom the sequestrators are to account for such as they have received, deducting their reasonable expences,

and those of supplying the cure during the vacation. By 28 Hen. VIII. c. 11. an incumbent before his death may make his testament of all the profits of the corn growing upon glebe lands which he has manured and sown: but if his successor is inducted before the severance of it from the ground, the successor shall have the title of it; otherwise, if the parson dies after the severance of it, and before it is carried off, the successor shall have no tithe. Where there is no proper lease of tithes, the person who receives them shall be accountable to the executor for those received by him, and which became due before the incumbent's death, and to the successor for tithes which he received, and which became due after the incumbent's death; but glebe lands, and tithes demised or leased, are comprehended under statute 11 Geo. II. c. 19. which enacts, that the executors or administrators of a tenant for life may, in an action upon the case, recover of the under tenant, if such tenant for life die on the day on which the rent was made payable, the whole, or if before such day, a proportion of such rent, according to the time such tenant for life lived, of the last year, or quarter of year, or other time in which the said rent was growing due. As to modus in lieu of tithes, which, if taken in kind, would have been due before the death of the incumbent, whereas the modus for the same is not due till after his death, it seems that the executors are not entitled to the said modus, nor any part thereof, but that the whole shall go to the successor.

Cicero, in his Orations, mentions a law, by which the priests were exempted from service in all wars, except only in uproars, and civil tumults; which exemptions he calls *vacationes*.

VACCA, in *Ancient Geography*, a town of Spain, in the Pyrenean mountains, according to Isidore.

VACCA, *Vaga*, *Bata*, or *Vagense Oppidum*, thus differently named by Sallust, Ptolemy, Plutarch, and Pliny, *Bay-jab*, a town of Africa, in Numidia, 10 leagues from Meterense Oppidum. According to Sallust, it belonged to Jugurtha, and he says, that when it revolted, he established in it Italians. Metellus was sent to reduce it.

VACCA, or *Vacua*, a river of Spain, in Lusitania, which pursuing its course from E. to W. passed to Talabriga, and soon after ran into the sea.

VACCA, *La*, in *Geography*, a small island in the Mediterranean, near the S. coast of Sardinia; 3 miles S. of St. Antioco.

VACCA, in *Zoology*, the female of the ox-kind. See *Cow*.

VACCA *Marina*. See *SEA-Cow*.

VACCARIA, in *Botany*, so named from *vacca*, a cow, because, according to Ambrosius, cows are fond of the plant. His *Vaccaria*, like that of Dodonæus and Gerarde, is the Linnæan *Saponaria Vaccaria*, referred by the writer of this to *Gypsophila*, see that article; with which genus its bell-shaped angular calyx, roundish capsule, and whole habit, accord so exactly, that we are at a loss to account for Linnæus's having placed it elsewhere. The *Vaccaria* of Tabernæmontanus is very different, being our *Turritis glabra*; an herb agreeing with the former in the glaucous, smooth, entire leaves, of its stem at least, but otherwise having no character or property in common therewith, and certainly of too infrequent occurrence, as well as of too slender a habit, to afford much support for a dairy. The above *Gypsophila* belongs to a natural order of plants to which farmers have, as yet, scarcely recurred for any sort of fodder, the Campion tribe. Might not the name before us authorize an experiment at least, upon the qualities of this plant, as well as on those of its near relation *Silene inflata*? *Spergula arvensis*,

one of this order, is reported to enrich the milk of cows, but has not come into any general notice. See *SILENE*, sect. 2, and *SPERGULA*, n. 1.

VACCARY, *VACCARIA*, in our *Old Writers*, a house or place to keep cows in; a dairy-house, or cow-pasture.

VACCEL, *VACCEANS*, in *Ancient Geography*, a people of the interior of Hither Spain, S. of that part of the country which was inhabited by the Asturi. According to Diodorus, the Vacceans were the most gentle and polished of the Celtiberians. They were subjugated by L. Lucullus and Ch. Marcellus. It appears that they were a considerable people by the number of towns which Ptolemy assigns to them.

VACCINATION, or the *Cow-pox inoculation*, in *Surgery*, one of the greatest and most important discoveries of modern times. The discovery of the circulation of the blood, made by the celebrated Harvey, has unquestionably been the source of infinite improvement in every part of the healing art, and produced incalculable benefit; but vaccination, the discovery of another Englishman, the immortal Jenner, is a thing, which in its consequences certainly outdoes every previous innovation in practice, since it may be said to save annually the lives of millions.

Vaccination being the only known means of arresting altogether the fatal ravages of the small-pox, the most depopulating contagion upon the face of the earth, mankind will probably for ever feel a deep interest in the subject. In fact, nothing less than the well-established total extermination and permanent cessation of the small-pox, could ever justify a diminution of the laudable solicitude of the public for the continuance of vaccination. For it is not to be presumed, that a still milder and more effectual means of rendering the human body insusceptible of the effects of the small-pox contagion, will ever be discovered. A milder method, indeed, is hardly conceivable; since the symptoms produced by it amount only to a very slight indisposition, which never has any fatal or unpleasant consequences. Its efficacy also is now fully confirmed by abundance of evidence, collected from the united observations and experience of the best informed practitioners, who, it is obvious, can have no interest in the success of vaccination, but the general good of their fellow-creatures. Were medical men so base as to suffer their judgment to be influenced by mercenary considerations, they would decry with all their force the practice of vaccination, which occasions too trifling an indisposition to put many fees into their pockets; and they would necessarily praise the small-pox inoculation, by which a frequently long and lucrative attendance on their patients might be calculated upon as a matter of certainty.

A general account of the origin of vaccination has been delivered in the article *Cow-pox*, and on this interesting part of the subject we shall therefore merely recapitulate a very few particulars. As, however, it is an object of the first-rate importance to be perfectly acquainted with every criterion of the genuine disease, we mean to introduce into this article some valuable instructions, which have been published by the latest and best medical writers, or which have been circulated by the National Vaccine Establishment, respecting the appearances of the true affection, and of some others, which are either spurious, or not to be depended upon. In this account will be comprehended a brief explanation of the method of practicing vaccination. The rest of the article will be principally devoted to the consideration of the occasional failures to which the practice is liable.

It was an observation made long ago in several of the dairies in England, particularly in those in Gloucestershire,

that the milch cows were frequently affected with an eruption upon their udders and teats, which was communicated not only from one cow to another, but frequently also to the hands of the milkers; and farther, that such of the milkers as had been thus affected, were never afterwards infected with the small-pox, either by inoculation, or by exposure to the most virulent contagion of that disease, even although such persons had not previously undergone that dreadful malady.

It is curious, that the knowledge of a fact of so singular a nature, and one of so much importance to the general interests of society, should have been confined, from time immemorial, almost entirely to those occupied in the business of dairies, without being fully investigated by such persons as could duly appreciate its value.

Dr. Jenner, a physician at Berkley, in Gloucestershire, was the first person who set himself about examining this subject with that care and attention which its importance seemed to demand.

In the year 1798, after much diligent labour and investigation, Dr. Jenner published "An Inquiry into the Causes and Effects of the Variolæ Vaccinæ;" and his observations soon excited the attention of the whole medical world. For a considerable time, the accuracy of the account was received among medical men with hesitation. The character, however, of Dr. Jenner, and the singularity and important nature of the ailment, led to farther investigation; and although many arguments were urged, and circumstances stated, which seemed adverse to the plan of the general introduction of cow-pox among mankind, yet the great utility of it was at last clearly evinced. Every statement made by the accurate Jenner was confirmed, and the credit of the cow-pox, as a preventive of small-pox, was established on a basis too firm to be shaken by the shafts of envy, malice, or ignorance—the basis of immutable truth.

Dr. Jenner, not satisfied with the assertions of the dairy farmers and servants, that persons who had been affected with cow-pox were rendered thereby secure against the attacks of small-pox, determined to ascertain the truth of this fact by the test of experiment. He inoculated for small-pox many persons who had formerly undergone the cow-pox, some so long as thirty and even fifty years previously; and these he uniformly found, as had been predicted to him, completely resisted that disease.

So far the nature of cow-pox was known to others before it was known to Dr. Jenner. In the year 1796, however, this ingenious gentleman pushed his investigation farther; and on the 14th of May, he first intentionally infected the human constitution with the virus of cow-pox by inoculation, with the design, as he informs us, of observing more accurately the progress of the infection. The experiment succeeded; and the affection, though remarkably slight, was clearly marked in all its stages.

Dr. Jenner next conceived the idea of inoculating this person with the virus of small-pox, in order to ascertain whether so slight an affection as had taken place from the cow-pox, could possibly give security from that dreadful disease. Several slight punctures and incisions were accordingly made in both arms, and the virus of small-pox was carefully inserted, but no disease followed. Some months afterwards, the same person was again inoculated for small-pox, but still no sensible effect was produced upon the constitution.

This is to be reckoned the first discovery of Dr. Jenner respecting the nature of cow-pox, viz. that the matter of cow-pox, taken from the vesicles on the cow, and intentionally inserted into the human subject, produces an affection,

VACCINATION.

tion, which, at the same time that it is more mild in its symptoms than that produced by accidental infection, does nevertheless still operate such a change in the constitution, as renders the person infected unsusceptible of the small-pox.

The want of vaccine matter now prevented Dr. Jenner from prosecuting his experiments until the spring of the year 1798, when the cow-pox again became prevalent among the cows in the dairies in his neighbourhood, and afforded him an opportunity of investigating farther this interesting subject.

With matter taken from cow-pox vesicles on the teats of a cow, Dr. Jenner now inoculated several persons; and from these persons he propagated the affection to others, also by inoculation, even so far as the fifth change, without recurring to the original source, the vesicles on the teats of the cow. The experiments were completely successful. The affection, in all those inoculated, was regularly produced. All the persons who had been thus infected, were afterwards subjected to inoculation with the virus of the small-pox, but ineffectually, no disease in any instance succeeding to this operation. See Jenner's Inquiry, p. 43.

From these experiments, we derive another most important fact concerning the nature of cow-pox, *viz.* that the virus of cow-pox may be propagated from one human subject to another, through several gradations, and still retains the power, not only of producing the affection, regular in all its stages, but also of rendering those constitutions which are infected, secure against the attacks of small-pox.

By unwearied attention to all the circumstances under which he was accustomed to observe this ailment, Dr. Jenner was led to conclude, that persons who have already had the small-pox, are still susceptible of the action of cow-pox, though not to such a degree as those who have never been subjected to that of small-pox.

That in the cow-pox no eruption takes place, unless on the part where the virus is applied to the skin.

That the cow-pox, even under the most unfavourable circumstances, has never proved fatal.

That the cow-pox cannot be propagated by contagion, but only by actual contact, or inoculation with the virus.

That the virus of the cow-pox, inserted into the human body, may produce an affection which is merely local, the general constitution remaining unaltered; and that, in such cases, the person is still liable to be infected with the small-pox.

Soon after Dr. Jenner's publication appeared, *viz.* in November, 1798, Dr. George Pearson published "An inquiry into the History of Cow-pox, principally with a view to supersede and extinguish the Small-pox." In this treatise, the positions and conclusions of Dr. Jenner are examined with that candour and attention, which their importance demand. The evidences adduced are numerous and respectable, and the result is highly favourable to the general introduction of inoculation for the cow-pox among mankind, not only as a preventive of small-pox, but also as a certain mode of ultimately extinguishing that loathsome malady.

In May, 1799, were published "Reports concerning a series of Inoculations for Cow-pox, with Remarks and Observations on this Disease, considered as a Substitute for small-pox, by Dr. Woodville, Physician to the Small-pox and Inoculation Hospital in London." The account here given by Dr. Woodville is very different from that given by Dr. Jenner, and by no means favourable to the general introduction of the new inoculation as a substitute for small-

pox. Such a report, coming from a man of Dr. Woodville's known character and reputation as an accurate observer, naturally produced a strong sensation in the minds of medical men concerning the discoveries of Dr. Jenner. The circumstances, however, under which Dr. Woodville's observations were made; and upon which his reports were founded, were such as led him to be much deceived respecting the true nature of the cow-pox.

This report of Dr. Woodville, so very different from the general statement of Dr. Jenner, naturally called for a reply from the latter, who accordingly, in 1800, published "A Continuation of Facts and Observations relative to the Variolæ Vaccinæ." In this publication, Dr. Jenner is anxious to recover his favourite subject from that degree of shade, which had been thrown upon it by the hasty reports of Dr. Woodville; and this he appears to have done with great success, both by farther observations of his own, and by the concurring evidence of many respectable correspondents. See Bryce's Practical Observations on the Inoculation of Cow-pox, chap. 1. edit. 2.

With regard to Dr. Woodville's publication, we shall merely add in the present place, that the cases reported by him as examples of inoculated cow-pox, attended with many severe symptoms, and particularly with an eruption over the body, have been fully proved, and indeed have been since allowed by that respectable physician himself, to have been in fact cases of genuine small-pox, the infection having been contracted in the place where the patients were inoculated with cow-pox virus, before this latter affection had produced the effects and changes in the constitution, which render it a preventive of the other loathsome malady.

For additional particulars relative to the first progress of vaccination, we must refer to the article Cow-pox: suffice it here to say, that every objection to the practice was gradually removed; the public became convinced of its value and beneficial consequences; the great founder of it received an honourable remuneration from his country; both neighbouring and remote nations soon took a deep interest in the subject, and imitated our example; public institutions for the gratuitous inoculation of the poor were in a short time established in every civilized country; and the great benefits of the new plan were quickly extended to all the four quarters of the globe.

Description of the regular vaccine Vesicle.—When vaccination succeeds, a small red spot is observable on the third day, the day upon which the operation is performed being reckoned the first. If the spot be touched, an elevation is felt; and if examined with a magnifying glass, the little tumour appears to be surrounded by a very slight efflorescence.

The spot gradually enlarges; and between the third and sixth day, a circular vesicle appears. The edge of the vaccine vesicle is elevated; the centre depressed. The colour is at first of a light pink, sometimes of a blueish tint, and changes by degrees to a pearl colour. The centre is somewhat darker than the other parts.

The vesicle is hard to the touch.

In its internal structure it is cellular, the cells being filled with transparent lymph.

The vesicle commonly augments, till the tenth or eleventh day.

In the early stages, there is usually round the base an inflamed ring; or this takes place on the seventh or eighth day. About the ninth, it spreads rapidly; and near the tenth, it forms an areola of an inch and a half in diameter. This areola is of the usual colour of inflamed skin; it is hard, and accompanied with some degree of tumefaction.

It continues out for a day or two, and then begins to fade, sometimes forming two or three concentric circles.

After the areola is formed, the vesicle begins to decline. The centre first turns brown, and the whole gradually changes into a hard smooth scab, of a very dark mahogany colour. This dry crust usually drops off about the end of the third week, leaving a permanent circular cicatrix, about five lines in diameter, and a little depressed; the surface being marked with very minute pits, or indentations, denoting the number of cells of which the vesicle had been composed.

Varieties in the Progress and Appearance of the vaccine Vesicle, not preventing the Success of Vaccination.—The first appearance is seldom earlier, but often later, than has been described. In some rare instances, the vesicle commences even a fortnight or three weeks after vaccination; and if the progress is then regular, it is equally efficacious.

When the vesicle is ruptured at an early period, if the progress continue regular, success is not prevented; nor is it when the crust of a regular vesicle is rubbed off in the decline of the disease, though ulceration should ensue.

Of irregular and imperfect Vesicles and Pustules, which are not to be depended upon.—In these deviations, there is usually a premature itching, irritation, inflammation, vesication, or suppuration; or the progress of the vesicle is too rapid, its texture soft, its edge not well defined, its centre elevated, and the contents discoloured or purulent; or, instead of a proper areola, a premature efflorescence of a dusky purple hue takes place, and the scab is of a light brown or amber colour.

The irregular vesicle or pustule is more liable to be broken than the other, both from its more pointed form and softer texture, and also from its being usually so irritable as to provoke scratching. When broken, or even without this happening, ulceration often ensues.

A vesicle, apparently regular at first, sometimes does not augment to the proper size, but dies away without completing the regular process. This usually leaves no cicatrix, or one which is almost imperceptible.

When these, or any other considerable deviations from the regular course of the disease, take place, no dependence can be placed upon the operation, and vaccination should be repeated.

Probable Causes of irregular Vesicles and Pustules.—These accidents may be occasioned by matter or lymph being taken from an irregular vesicle or pustule at any period, or from a regular vesicle, at too late a period; or by lymph, though originally pure, which has been injured by long keeping, by heat, or otherwise. Or it may be caused by performing the operation with a rusty or unclean lancet, or in a rude manner, or by destroying the vesicle at an early stage, and thereby exciting too much inflammation, or interrupting the regular progress of the disease. Herpetic eruptions, and other cutaneous affections, have also been supposed to be the cause of these irregularities; and occasionally to prevent the vaccine lymph having any effect.

As Dr. Bateman observes, there are two causes for these imperfect inoculations: "the one is the insertion of effete or corrupted virus; and the other the presence of certain cutaneous eruptions, acute and chronic.

"The lymph of the vaccine vesicle becomes altered in its qualities, soon after the appearance of the inflamed areola; so that if it be taken for the purposes of inoculation after the twelfth day, it frequently fails to produce any effect whatever; and, in some cases, it suddenly excites a pustule, or ulceration; in others, an irregular vesicle; and, in others, erysipelas. If taken when scabs are formed over the

vesicle, (as in the case of pustules of small-pox,) the virus is occasionally so putrescent and acrid, that it excites the same violent and fatal disease which arises from slight wounds, received in dissecting putrid bodies.

"Again, the lymph, although taken from a perfect vesicle, on the sixth, seventh, or eighth day, may be so injured, before its application, by heat, exposure to the air, moisture, rust, and other causes, as to be rendered incapable of exciting the true disease.

"The most frequent cause of these imperfections, however, seems to be the presence of chronic cutaneous eruptions, or the concurrence of eruptive fevers, or even of other febrile diseases. The chronic cutaneous diseases, which sometimes impede the formation of the genuine vaccine vesicle, have been described by Dr. Jenner under the ordinary indefinite term herpes and tinea capitis. In the more accurate phraseology of Dr. Willan, they are herpes, (including the shingles and vesicular ring-worm,) psoriasis, and impetigo (the dry and humid tetter); the lichen, and most frequently the varieties of porrigo, comprising the contagious eruptions denominated by authors *crusta lactea*, *area*, *achores*, and *savi*. Dr. Willan thinks that the itch and prurigo likewise have the same influence.

"Of the interference of eruptive fevers, measles, scarlet fever, and chicken-pox, with the progress of the vaccine vesicle, when they occur soon after vaccination, numerous instances have been recorded. The suspension of its progress, indeed, would be expected, under such circumstances, from the known facts respecting the reciprocal action of these contagious fevers on each other. But the action of the vaccine virus is not only suspended by these fevers, so that the vesicle is very slow in its progress, and the areola not formed till after the fourteenth day, or later, and sometimes not at all; but it is occasionally rendered altogether inefficient. Even typhous fever, and the influenza, have been observed to produce a similar interruption in the progress of vaccination.

"Finally, the vesicle without an areola, takes place if the person inoculated have previously received the infection of small-pox, or if he be affected with some other contagious disease during the progress of vaccination.

"Other irregularities may probably have occurred. At all events, though the constitution is sometimes fully secured from the infection of small-pox, even by the irregular vesicles; yet as it is more commonly but imperfectly guarded by such vesicles, the propriety of Dr. Jenner's caution is obvious, that, when a deviation arises, of whatever kind it may be, common prudence points out the necessity of re-inoculation." See Bateman's Synopsis of Cutaneous Diseases, p. 219—221. edit. 3.

The Methods of taking Vaccine Lymph for Vaccination.—The lymph of a regular vesicle is efficacious from the time it is secreted, till the areola begins to spread. It may, therefore, commonly be taken till the ninth day; but not after the areola is fully formed.

The lymph is to be taken by small superficial punctures made in the vesicle, with the point of a lancet introduced horizontally. Time should be allowed for the liquid to exude, which will form small pellucid drops. When requisite, a very slight pressure may be cautiously applied with the flat surface of the lancet. Great delicacy is requisite in this operation; for if the vesicle is rudely treated, or too much opened, inflammation and ulceration may ensue.

Lymph intended to be used immediately, or in a few days, may be received on a lancet; but this is an improper instrument for preserving it longer; for the lymph soon rusts the lancet, and it is then liable to be inefficacious, or injurious. Quills and tooth-picks succeed; but small bits

VACCINATION.

of ivory, shaped like the tooth of a comb, and properly pointed, are the most convenient instruments; and to render them more certain, they should be charged repeatedly.

In order to preserve lymph for a long period, the best method is by two bits of square glass. The lymph is to be received on the centre of one of them, by applying it to a punctured vesicle. When fully charged and dry, it is to be covered with another bit of glass of the same size, and wrapped up in paper or in gold-beater's skin.

In whichever way the lymph is taken, it should be allowed to dry without heat, in the shade, and be kept in a dry and cool place. When inclosed in a letter, if great care is not taken, it may be injured by the heat of the melted wax in sealing the packet.

The Mode of Vaccinating.—Liquid lymph is better than dry, because it seldom fails, and the operation is more lightly and quickly performed. Therefore in every instance, where it is practicable, the patient from whom the lymph is to be taken should be present, and the lymph should be transferred immediately from him to the person who is to be inoculated.

Vaccination is generally performed in the arm, near the insertion of the deltoid muscle; but in order to hide the scar, and in adults who are likely to use the arm much, it may be advisable to vaccinate the outside of the leg, a little above or below the knee.

The lancet being charged, the skin should be stretched, and a small superficial puncture made with the point of the lancet, held nearly in a horizontal direction.

The lancet should be dipped in water and wiped after each operation, even when several successive inoculations are to be performed.

Dry lymph on glass may be moistened with a very little cold, or tepid water, on a point of a lancet, allowing it some time to dissolve, and blending it by a little friction with the lancet. It must not be much diluted, but ought to have a thick consistence; it is to be inserted in the same manner as the recent fluid.

When quills, ivory lancets, or tooth-picks charged with dry lymph are used, the lymph should not be diluted, but a puncture having been first made with a common lancet, the point of the instrument is to be inserted, and held in the puncture half a minute or more, that the lymph may gradually dissolve and remain in the wound. If the part of the instrument which is charged be afterwards wiped repeatedly upon the edges of the puncture, it will tend still farther to ensure success.

Vaccinated patients must be cautioned not to wear tight sleeves, nor to injure the vesicle by pressure, friction, or any other violence, lest inflammation or ulceration should ensue.

One perfect vaccine vesicle is sufficient; but for various reasons it may often be prudent to make two or three punctures, especially when the danger of receiving the small-pox is imminent, the lymph dry, or the patient's residence distant. Besides, greater security is obtained against a chance of failure from the derangement or destruction of one vesicle by accidental injury, or by the taking of matter for vaccination. When two punctures are to be made in one limb, they should be at least two inches asunder, on account of the irritation they may occasion. And one of them should be always permitted to go through its course undisturbed. Lancets for vaccination should be kept clean and bright.

Constitutional Symptoms.—Constitutional symptoms sometimes occur at a very early period, but more commonly from the seventh to the eleventh day. These are drowsiness, restlessness, a chilliness succeeded by heat, thirst, head-ache,

and other marks of febrile affection. Now and then sickness or vomiting takes place, especially in infants.

The constitutional symptoms are in general slight and transient, and such as require no remedy.

In a great proportion of cases, there is no perceptible indisposition; nevertheless, the person vaccinated is not the less secure from the future infection of the small-pox, provided the progress of the vesicle has been regular and complete.

Care should be taken not to confound the symptoms of other diseases with those produced by vaccine inoculation.

Medical Treatment.—In general, no medicine is required in this mild affection; but if the symptoms happen to run a little higher than usual, the same remedies are to be applied, as if they proceeded from any other cause.

No preparatory medicines are necessary before vaccinating, and commonly no cathartics need be given afterwards.

Should the local inflammation exceed the usual bounds, which rarely happens, unless from tight sleeves, pressure, or friction, it may soon be checked by the frequent application of compresses of linen dipped in water, in aqua lithargyri acetati composita, or in a solution of one drachm of cerussa acetata in a pint of water. These are to be applied cold.

If the scab be rubbed off prematurely, and ulceration take place, cooling and astringent applications may be used; such as a drop of aqua lithargyri acetati, which should be allowed to dry on the part, and then be covered with compresses dipped in water, or in either of the preparations of lead above-mentioned, and frequently renewed.

When the ulceration is deep or extensive, a poultice either of bread and milk, or of bread with any of the preparations of lead, may be applied, as the case seems to require. They must never be applied till they are nearly or quite cold.

In such foul and obstinate sores as resist the foregoing applications, the unguentum hydrargyri nitrati, mixed with an equal quantity of unguentum cereæ, or other similar applications, may sometimes be resorted to with advantage. And at other times, these sores may be healed with the unguentum cerussæ acetatæ, or the mildest applications.

The irregular vesicles and pustules are frequently followed by ulceration at an early period, and this ulceration is to be treated in the same manner, as if it proceeded from the regular vesicle.

When the patient has been previously exposed to the infection of small-pox, this disease will be either superseded or not, according to the time which may have elapsed before vaccination.

Observations on the occasional Inefficacy of Vaccination.—When the vaccine vesicle possesses the above-described characters, and passes through the regular gradations, whether accompanied with any perceptible disorder of the constitution or not, it effectually and permanently secures the individual from the danger, and almost universally from the contagion of the small-pox.

It is now nearly twenty years since the first promulgation of Dr. Jenner's discovery; and yet the truth of the preceding observation remains unimpeached. As a well-informed physician has remarked, the very exceptions to this statement may be said, without a solecism, to corroborate it. For, in the very small number of cases, (such as that of the son of earl Grosvenor), where an extensive eruption of small-pox has occurred subsequently to vaccination, the controlling influence of the cow-pox has been invariably and strikingly manifested, by the sudden interruption of the small-pox in the middle of its course, and the rapid convalescence of the patient. See Bateman's Synopsis, p. 216.

With

With very few exceptions, indeed, persons who have undergone both the local and constitutional affection of cow-pox, are thereby rendered uninfected of small-pox.

It is not meant to assert, however, as has been too generally imagined, that every person who has been inoculated for the cow-pox, is rendered secure against the contagion of small-pox. As Mr. Bryce has ably explained, there are many circumstances, besides the mere inoculation, absolutely necessary to be ascertained, before this security can be guaranteed.

Again, says Mr. Bryce, 'it is well known, that a person having undergone the small-pox is not absolutely secure from a future attack of the same malady, as well authenticated instances are recorded, where the same person has undergone this disease a second time, and these attacks were neither of them local, but very certainly general constitutional affections. See the case of Mr. R. Langford, recorded in the fourth volume of the Memoirs of the Medical Society of London. This gentleman was infected with the small-pox at a very early period of life, and was much marked from the severity of the disease. Many years afterwards, he was again infected with the small-pox, which was of the confluent kind, and proved fatal on the twenty-first day from the attack. See also Dr. Woodville's History of Inoculation, p. 217; Mr. Ring's Answer to Dr. Moseley, where many such cases are recorded; and the case of lord Westmeath's child, published in the Medical and Physical Journal, vol. xiv. p. 256.

Now, as Mr. Bryce remarks, with regard to the cow-pox, it may also happen, that a person who has undergone that affection, may yet be afterwards affected with small-pox; but, as is well known in the former case relative to small-pox, so also in the latter relative to cow-pox, the instances of the second attack from small-pox, or of the failure of the cow-pox to prevent the small-pox, are so very rare, as by no means to affect the general established rule; that persons who have once undergone the small-pox, or the cow-pox, as a constitutional affection, may thenceforth be reckoned secure against all future attacks of variolous contagion. (See Bryce's Practical Observations on the Inoculation of Cow-pox.) Besides the examples of the recurrence of small-pox a second time in the same individual, to be found in the publications already specified, additional instances are recorded by Dr. Jenner himself, Mr. Bryce, and in the Reports of the National Vaccine Establishment.

We shall here present the reader with the history of two remarkable cases published by this last institution; the one illustrating the occurrence of small-pox a second time in the same person, the other exemplifying the equally uncommon circumstance of an individual who had perfectly undergone vaccination, being afterwards affected with the small-pox.

Dr. Bree was called to visit Miss Sarah Booth, of Covent Garden theatre, on Monday, June 25th, 1811. She was said to be ill with the small-pox, and the following circumstances were reported by the mother and sisters.

Miss Booth was then eighteen years of age. She had been inoculated for the small-pox at five years of age, and had been affected with the usual degree of fever. The arm had been violently inflamed, and an eruption of small-pox pustules had appeared round the inoculated part, from which matter had been taken by Mr. Kennedy, the surgeon who attended her. Mr. Kennedy expressed himself satisfied that Miss Booth had passed regularly through the disease.

The usual fear of small-pox inoculation was perfectly evident on the arm.

On Thursday, June 20th, 1811, Miss Booth was seized

with fever, distinguished by vomiting, violent head-ache, and pains in the back and loins.

The symptoms continued till Saturday, June 22d, in the evening of which day, some pustules came out on the forehead and scalp.

Sunday, June 23d, a more complete eruption appeared on the face and neck, and she was relieved from the violence of the fever. The vomiting however continued, the throat became very sore, and a salivation began.

Monday, June 24th, the eruption extended itself on the body, the fever was still more abated, but the salivation, soreness of the throat, and vomiting, were urgent symptoms.

Tuesday, June 25th, the fourth day of the eruption, the salivation and retching continued, with soreness of the throat.

Wednesday, June 26th, fifth day of the eruption, pustules were noticed on the lower extremities, those on the face advanced, the eyes were swelled; and the number of pustules on the head and face was about two dozen.

Thursday, June 27th, sixth day of the eruption, the pustules on the face began to turn. She still suffered from fever and salivation.

Friday, June 28th, the pustules on the face turned, those on the lower extremities were few in number but well filled, and not yet changed.

Saturday, June 29th, eighth day of the eruption, she only complained of sickness. After this day, the pustules turned and dried on the lower extremities, and no complaint remained.

Dr. Bree considered this as a mild case of distinct small-pox.

On Sunday, May 26th, 1811, the Hon. Robert Grosvenor, who was recovering from the hooping-cough, became much indisposed and threw up his dinner. Fever followed, and he complained most particularly of excruciating pain in his back. He dwelt on this symptom until Thursday, when he became delirious, and there were observed on his face about twenty spots.

He had been vaccinated by Dr. Jenner, in his infancy, about ten years ago, and the mark left in his arm indicated a perfect disease.

On Friday morning, the eruption had not increased materially in point of number, but the appearance of the spots and the previous symptoms, suggested strongly a suspicion that the disorder was the small-pox.

Sir H. Halford had occasion to go to Windsor in the afternoon of Friday, and did not see Mr. Robert Grosvenor until the Monday following, (June 2d,) but he learned from Sir W. Farquhar, who attended him most carefully during Sir Henry's absence, and subsequently, that the eruption had increased prodigiously in the course of Friday; that on the evening of that day, Mr. Robert Grosvenor began to make bloody water, and that he continued to do so until Monday morning.

On the tenth day of the disease, the pustules began to dry upon the face, which was swollen to a considerable degree, but not to the extent of closing his eyes, and was attended by a salivation which lasted several days. Petechiæ had occurred in the interstices of several of the spots, particularly on the limbs, and there was that particular smell from the whole frame which is remarkable in bad cases of confluent small-pox.

It was obvious that the first symptoms of which Mr. Grosvenor complained, were such as indicated a violent disease about to follow, and Sir Henry confesses that he entertained a most unfavourable opinion of the issue of such a malady, when it was fully formed; having never seen an instance

VACCINATION.

instance of recovery under so heavy an eruption attended by such circumstances. It seemed, however, that the latter stages of the disease were passed through more rapidly in this case than usual, and it may be a question whether this extraordinary circumstance, as well as the ultimate recovery of Mr. Grosvenor, were not influenced by previous vaccination.

The Board of the National Vaccine Establishment are of opinion, that the case of the Hon. Robert Grosvenor was a case of confluent small-pox: that the attack and progress of the disorder were attended by symptoms which almost invariably announce a fatal termination. But they observe, that the swelling of the face, which is generally so excessive as to close the eyes, and is considered as a favourable symptom, was slighter than usual; that on the tenth day the pustules began to dry upon the face, and that from that time the disease passed with unusual rapidity through the period when life is generally esteemed to be in the greatest hazard.

Those who are acquainted with the nature of the confluent small-pox, are aware that this peculiarity cannot be attributed to the effect of medical treatment.

In most cases of small-pox which have succeeded to vaccination, the pustules have been observed to dry more rapidly, and the disorder has concluded at an earlier period than usual.

If allowance be made for the relative periods in which the confluent and distinct small-pox complete their course, the rapid progress towards recovery through the latter stage of confluent small-pox, as exhibited in the case of Mr. Grosvenor, may be compared with the rapid desiccation of the pustules in the distinct and peculiarly mild form of the disorder which is considered as small-pox modified by vaccination. Both forms of the disorder proceed in the usual course, the one attended with violent, the other with mild symptoms, till they arrive near to the height, when they appear to receive a check, and the recovery is unusually rapid.

From this correspondence of circumstances, the Board are induced to infer, that in the case of Mr. Grosvenor, which has been more violent than any yet submitted to them, the progress of the disease, through its latter stage, and the consequent abatement of symptoms, were influenced by an anti-variolous effect produced upon the constitution by the vaccine process.

The occurrence of small-pox after vaccination, has been foreseen and pointed out in the report on vaccination made to parliament, by the College of Physicians, in the year 1807, to which the Board are desirous of calling the attention of the public; in which it is stated, that,

“The security derived from vaccination against the small-pox, if not absolutely perfect, is as nearly so as can perhaps be expected from any human discovery; for amongst several hundred thousand cases, with the results of which the College have been made acquainted, the number of alleged failures has been surprisingly small; so much so, as to form certainly no reasonable objection to the general adoption of vaccination; for it appears that there are not nearly so many failures in a given number of vaccinated persons, as there are deaths in an equal number of persons inoculated for the small-pox. Nothing can more clearly demonstrate the superiority of vaccination over the inoculation of the small-pox than this consideration; and it is a most important fact, which has been confirmed in the course of this enquiry, that in almost every case in which the small-pox has succeeded vaccination, whether by inoculation, or by casual infection, the disease has varied much from its ordinary course; it has

neither been the same in violence, nor in the duration of its symptoms; but has, with very few exceptions, been remarkably mild, as if the small-pox had been deprived, by the previous vaccine disease, of its usual malignity.” Report of the College of Physicians, p. 4.

The peculiarities of certain constitutions with regard to eruptive fevers, form a curious subject of medical history. Some individuals have been more than once affected with scarlet fever and measles; others have been through life exposed to the contagion of these diseases without effect; many have resisted the inoculation and contagion of small-pox for several years, and have afterwards become susceptible of the disorder, and some have been twice affected with small-pox.

Among such infinite varieties of temperament, it will not appear extraordinary, that vaccination, though so generally successful, should sometimes fail of rendering the human constitution unsusceptible of small-pox; especially since it has been found that in several instances small-pox has occurred to individuals over whom the small-pox inoculation had appeared to have produced its full influence. Three instances of this kind have taken place within the last month; and, in another instance, the natural small-pox has occurred a second time. See Report of the National Vaccine Establishment, July 1811.

It has been imagined by some, that although the human constitution is apparently shielded from the action of small-pox by having undergone the cow-pox, yet that this security may not be permanent; but that, at the end of a certain period of time, the person will again become susceptible of small-pox. This objection, however, must now have little weight; for Dr. Jenner himself inoculated with the virus of small-pox, persons who had been affected with the cow-pox twenty-five, twenty-seven, thirty-one, and fifty-three years before; but who had never been infected with the small-pox, and these he found completely resisted this disease.

For further evidence and reasoning on this point, see Ferriar's Reflections on the Cow-pox; Edin. Rev. No. XVII.; and Bryce's Practical Obs. on the Cow-pox.

Experience has proved that, in certain instances, the cow-pox virus has merely a local action, and such cases have been mistaken for the regular constitutional affection; a thing very likely to happen, when it is remembered that the general ailment of the system is seldom marked by any very strong symptoms; and that, in the cases alluded to, the local appearances would pursue a regular progress. Yet, in these circumstances, the patient is left unprotected from an attack of small-pox. As Mr. Bryce has pointed out, therefore, *a certain test of the constitution being really affected* in every inoculation of cow-pox must be a most important desideratum. Indeed, until there be demonstrated and generally known some unequivocal mark of a constitutional affection, which does constantly occur during the course of cow-pox when effectual, and which may be as easily distinguished as the fever and eruption consequent to the inoculation for small-pox, this new inoculation ought never to be performed, except by persons well acquainted with every appearance of the ailment. For, as much as it is more difficult to distinguish between the cow-pox and some other affections, and also clearly to ascertain the presence of a constitutional affection, than to form a similar judgment in the inoculated small-pox, the more does the cow-pox inoculation require attention to every symptom which may occur during its progress, in order that mankind may reap every advantage which has been promised from the general adoption of cow-pox as a preventive of small-pox.

Mr. Bryce has endeavoured to discover a criterion of the patient

patient being constitutionally affected with the cow-pox, and the following observations upon this important subject merit particular attention. "I recollected (says he) some experiments which had been made with regard to the inoculation of small-pox. It was found, that if the same person was inoculated every day, until the fever induced by the first inoculation supervened, all the other punctures quickly advanced in their progress; and that, in the course of a day from the time the fever or general affection began, even that puncture which had been last made, perhaps only twenty-four hours before, equalled in maturity the one first made, perhaps eight or nine days before, and from which the fever had arisen.

"In this case it appears to me evident, and I think it must be admitted by every person, that even had no other pustules appeared on the body but those occasioned by the repeated inoculations; nay, had there even been no fever observed in consequence of the inoculation; yet as the pustule occasioned by the last puncture had been suddenly accelerated in its progress to maturation, at the time the general or constitutional affection should have appeared; this alone was a sufficient proof of the presence of the variolous action in the system.

"Judging again from analogy, I expected that the same thing, which thus happened in the small-pox inoculation, might also take place in that for the cow-pox; and the unexpected appearance of one or two vesicles upon children that I had inoculated, which vesicles were quite characteristic of the ailment, and the appearance of which I could only account for from a second and accidental inoculation during the course of the disease, strengthened my hopes. And, certainly, if we find in cow-pox, where the inflamed and hard areola does not take place, at least in the regular course of that affection, until the end of the seventh, or beginning of the eighth day from inoculation, that a second inoculation, performed, for example, at the end of the fifth, or beginning of the sixth day, is so much accelerated in its progress, about the time the general affection of the system usually takes place, as to have an areola formed within a few hours, or very shortly after the first, and that this areola increases with the first, and again fades at nearly the same time, we must be struck with the similarity, and be forcibly led to draw the same conclusions in this case as in the former, respecting the small-pox, *viz.* that although the inoculated affection had appeared very slight, and no fever had been observed, yet that a certain action had been excited in the constitution. That this was the true constitutional affection of cow-pox, may be judged by the acceleration of the second vesicle to a state of maturity five days before this could have happened, had there been no consentaneous general action, or change in the system."

Mr. Bryce next details a series of experiments, which tend to prove, that if, during the regular progress of cow-pox, a second inoculation be performed a certain number of days after the first, the affection produced by this second inoculation will be accelerated in its progress so as to arrive at maturity, and again fade at nearly the same time as the affection arising from the first inoculation; and that this will take place, although the constitutional affection be so slight as otherwise to pass unnoticed.

From several examples related by Mr. Bryce, and a great many other cases, in which the second inoculation was performed at different periods of the primary affection, it is concluded, that the most proper time for performing the second inoculation, is about the end of the fifth, or beginning of the sixth day, from the first inoculation; reckoning each day to consist of twenty-four hours. Thus, if the first inoculation be performed on Wednesday at noon, the second

inoculation should be performed on Monday, at the same hour, at which time the fifth day is considered to be finished, and the sixth day to begin. If the second inoculation be delayed beyond the sixth day, the affection produced by it will be very indistinct, and of short duration; and if performed at an earlier period than the fifth day, the contrast between the progress of the two affections, with regard to duration, will not be so great as may be thought necessary.

"These observations, however, (says Mr. Bryce,) are applicable to those cases only, in which the first inoculation advances by a perfectly regular course, and in which the areola begins to form about the end of the seventh, or beginning of the eighth day; for in those cases, in which the first inoculation is from certain causes accelerated or retarded one or two days, as frequently happens, then the second inoculation should be performed at a more early or late period accordingly.

"In short, my observations on this point lead me to conclude, that in order to obtain the proposed criterion in the greatest perfection, the second inoculation should be performed between thirty-six and forty-eight hours before the areola of the first inoculation begins to appear. This is necessary in order that the secondary affection may have proceeded some length, and that a small vesicle, containing virus, may have been formed by it, before the constitutional action from the first inoculation begins, otherwise no areola, but merely a slight degree of hardness will take place from the second puncture.

"As, on the one hand, the acceleration of the second inoculation in the manner above-mentioned, is to be regarded as a certain mark of a constitutional affection in cow-pox, so, on the other, if it shall be found that no such acceleration takes place, but that the second inoculation proceeds by a slow progress through all the stages, and has the duration of a primary affection, it is to be concluded that no constitutional action has taken place from the first insertion of the virus; and when this is the case, the second inoculation must be regarded as a primary affection, and a third puncture be made according to the plan laid down for conducting the second inoculation; and thus we may go on until the proper test be obtained, or until we be satisfied that the constitution completely resists the action of cow-pox." See Bryce's Practical Observations on the Inoculation of Cow-pox, edit. 2.

Many other particulars relating to the subject of vaccination will be found in another place (see Cow-pox), and we shall therefore merely add, that the new practice is on every account deserving of the confidence and encouragement of the public. The cow-pox is greatly milder than the small-pox, even under the most approved mode of treatment; being never attended with danger, seldom with sickness, and never producing pustules generally over the body, nor indeed any disfigurement of the skin, except at the part where the virus has been directly inserted by the inoculator. The small-pox is one of the most contagious diseases to which the human race is subject; and, when propagated in this way, it is one of the most fatal. On the other hand, the cow-pox is not at all contagious, and can only be communicated by the application of the vaccine virus to the part affected, as happens in the accidental inoculation of the hands of milkers, and the ordinary practice of vaccination.

Many hundreds of thousands have now been vaccinated in these kingdoms, and yet there is not on record a single unequivocal instance of the cow-pox having proved fatal. Corresponding agreeable accounts are also received from every part of the civilized world. The weight which this consideration ought to have may be well conceived, when it

is remembered, that in Great Britain and Ireland alone, the yearly mortality arising from the small-pox used to be estimated at about 45,000 persons. In the Russian empire, and other cold countries, the ravages of the small-pox were far more dreadful, and this contagion sometimes broke out in such regions with a degree of fury far exceeding any thing ever heard of the plague itself. See INOCULATION.

VACCINIA, the new scientific name of the cow-pox, and which is now adopted by all the latest and best medical writers. See COW-POX, and VACCINATION.

VACCINIUM, in Botany, an ancient Latin name, whether of a flower or a berry has always been a point in dispute among critics, as well as the etymology of the word. Some conceive it to have been derived from the Greek *vacca*, and therefore to be either precisely synonymous with the Latin *Hyacinthus*, or at least to belong to something agreeing with that plant in colour. The line of Virgil,

“*Alba ligustra cadunt, vaccinia nigra leguntur,*”

has afforded scope for the commentators, being equally obscure, whether we suppose *ligustra* to mean the flowers of the privet, and *vaccinia* its black berries, (which, by the bye, are not gathered by any body,) or whether, as is the most general opinion, the latter word may express our Bilberry, or any other black or dark berry in general use. We have already observed, in its proper place, that our Privet is not the original LIGUSTRUM; see that article. Linnæus however declares, very reasonably, that no future contentions or discoveries of the learned shall unsettle his name of *Vaccinium*, as applied to the Bilberry or Whortleberry tribe, for which this generic appellation is now universally adopted.—Linn. Gen. 191. Schreb. 258. Willd. Sp. Pl. v. 2. 348. Mart. Mill. Dict. v. 4. Sm. Fl. Brit. 414. Prodr. Fl. Græc. Sibth. v. 1. 255. Ait. Hort. Kew. v. 2. 355. Pursh 284. Juss. 162. Lamarek Illustr. t. 286. Gærtn. t. 28. (*Vitis idæa*; Tourn. t. 377. *Oxycoccus*; Tourn. t. 431. Pursh 263.)—Class and order, *Octandria Monogynia*. (*Decandria Monogynia*, Pursh.) Nat. Ord. *Bicornes*, Linn. *Ericæ*, Juss.

Gen. Ch. Cal. Perianth superior, of one leaf, small, permanent. Cor. of one petal, bell-shaped, more or less deeply four-cleft; the segments revolute. Stam. Filaments eight, simple, inserted into the receptacle; anthers two-horned, curling at the summits, and sometimes furnished at the back with two spreading spurs, or bristles. Pist. Germen roundish, inferior; style simple, longer than the stamens; stigma obtuse. Peric. Berry globose, depressed at the top, of four cells. Seeds few, small.

Ess. Ch. Corolla of one petal. Stamens inserted into the receptacle. Anthers with two terminal pores. Berry inferior, of four cells, with several seeds.

Obs. Linnæus remarks, that “one fifth is often added to every part of the fructification;” hence Mr. Pursh has removed *Vaccinium* to the class *Decandria*. The Swedish naturalist also mentions, that “the calyx, four-cleft in many of the species, is entire in *V. Myrtillus*; and that almost the whole of the fresh corolla of *V. Oxycoccus* is rolled back to its base.” The latter character caused Tournefort, who relied so much on the corolla, to separate *Oxycoccus* as a genus, in which Pursh, with one or two other botanists, have followed him. But Tournefort erroneously supposed this flower to have four distinct petals, a mistake corrected by Linnæus; see Fl. Lapp. n. 145 γ, where sufficient reasons appear for considering the plant as a *Vaccinium*. The character of the tubular deeply divided anthers in *Oxycoccus*, superadded by Mr. Pursh, tends only to deceive, being found in several indubitable species of *Vaccinium*.

The genus before us, mostly confined to Europe and North America, is peculiarly abundant in the latter country. It is very remarkable that, as no *Erica* occurs in America, so no *Vaccinium* has been found at the Cape of Good Hope. These genera, similar in many of their flowers, differ no less widely in the situation of their germens, and texture of their fruits, than in the insertion and habit of their foliage, which in *Vaccinium* is scattered, dilated, generally membranous and deciduous; always indeed simple and undivided; but totally unlike the narrow, whorled, evergreen leaves of *Erica*. The flowers in *Vaccinium* are copious, stalked, either solitary, simply racemose, or tufted, drooping, inodorous, generally very elegant, tinted with various shades of red or pink, never blue, scarcely yellowish. Berries black, purple, blueish or red, generally eatable, though not pleasant, nor always wholesome, in a crude state. Stem shrubby, bushy, of humble stature. *Stipulas* none.

The species of *Vaccinium* were ill understood by Linnæus, but we hope to trace the origin of many of his errors, which have never been cleared up, and have led all following authors astray. Murray defines but fifteen species in the fourteenth edition of Syst. Veg.; Willdenow has twenty-seven, of which five are European, three natives of Japan, one of Otaheite, one of Jamaica, the rest North American. Pursh has twenty-five species of *Vaccinium*, besides three of *Oxycoccus*, from North America only. In reviewing the whole of the genus, we find something to add, though we have many specimens that are dubious. We are obliged to follow the distribution of Linnæus, by which the evergreen species are separated from those which are deciduous, though some uncertainty must always attend that character, respecting species known from dried specimens only.

SECT. 1. *Leaves deciduous.*

1. *V. Myrtillus*. Common Bilberry, or Bleaberry. Linn. Sp. Pl. 498. Willd. n. 1. Fl. Brit. n. 1. Engl. Bot. t. 456. Fl. Dan. t. 974. (*Vaccinia nigra*; Ger. Em. 1415. *Myrtillus*; Matth. Valgr. v. 1. 210. Camer. Epit. 135.)—Stalks solitary, single-flowered. Leaves deciduous, serrated, ovate, smooth. Stem acutely angular. Calyx scarcely divided.—Native of heaths, stony moors, and mountainous woods, throughout most parts of Europe, especially the more northern, flowering in May. Dr. Sibthorp gathered it also on the Bithynian Olympus. The root is woody. Stem from six or eight inches to two feet high, erect, bushy, smooth; the young green branches leafy, a little zigzag, furnished with very acute dilated angles. Leaves about an inch long, on short footstalks, pellucid, veiny, rather acute, copiously serrated; paler beneath. Flowers pendulous, on simple, naked, smooth, axillary stalks. Calyx dilated, angular, seldom so much lobed as in Engl. Bot. Corolla globose, generally five-cleft, of a very delicate waxy pink hue. Anthers horned. Germen glaucous. Berry the size of a currant, blueish-black, acid, eaten in tarts, or with cream, in the north and west of England. In the eastern counties this plant is not plentiful. Its fruit is sometimes sent into Norfolk from Devonshire. Mr. Menzies brought, from the west coast of North America, what we can scarcely make more than a gigantic variety of this species, seven or eight feet high, larger in every part, with less distinctly serrated leaves.

2. *V. ovalifolium*. Oval-leaved Bilberry.—Stalks solitary, single-flowered. Leaves deciduous, elliptical, obtuse, pointed, entire, smooth, strongly veined beneath. Stem angular. Calyx scarcely divided.—Brought by Mr. Menzies from the west coast of North America. A shrub ten or twelve feet high, whose smooth branches are less acutely angular than in the foregoing, and whose leaves are very essentially different,

being either perfectly elliptical, or slightly ovate, blunt, and quite entire, about an inch and a half long, copiously reticulated with fine veins, quite smooth on both sides; rather paler beneath. *Flowers* solitary at the base of each tuft of budding leaves, drooping, each accompanied, at the base of its *stalk*, by a large ovate, acute, coloured *bractea*. The *flowers* seem to agree with those of *V. Myrtillus* in size, colour, and structure, except that the *corolla* is more ovate. The *berries* are black, crowned with the cup-shaped, slightly four-lobed, *calyx*.

3. *V. parvifolium*. Small-leaved Red Bilberry.—Stalks solitary, single-flowered. Leaves deciduous, elliptical, obtuse, pointed, entire, smooth; glaucous, and slightly veiny, beneath. Stem acutely angular. *Calyx* scarcely divided. Stalk of the fruit club-shaped.—Gathered by Mr. Menzies on the west coast of North America. The shrubby *stem* is eight or ten feet high, with smooth zigzag *branches*, whose angles are as much dilated and prominent as in our first species. The *leaves* most agree with those of *ovalifolium* in shape, but are at their full growth scarcely a quarter so large, and each tipped with a small point; their under side rather glaucous, with less copious, and far less prominent, veiny reticulations. We have seen no *flowers*. The *berries* are red, and make excellent tarts. They appear to be smaller than the last, crowned with a similar *calyx*, but their *stalk* is shorter, measuring scarcely half an inch, more drooping, and very remarkably swelling upward, so as to be quite club-shaped, contracted at the summit, of which the foregoing shews but slight traces. There is no doubt of these two species being very distinct from each other, as well as from all hitherto described by authors.

4. *V. pallidum*. Pale Whortle-berry. Ait. n. 2. Willd. n. 2. Pursh n. 6.—“Clusters bracteated. Corolla cylindrical-bell-shaped. Leaves ovate, acute, finely serrated, deciduous.”—Native of North America, from whence it is said to have been sent to Kew garden in 1772, by Dr. Samuel Martin. Mr. Pursh never met with this species, nor was he able to ascertain it, even by a strict examination of the Banksian herbarium. Neither are we furnished with a specimen, nor with any information concerning this plant, which, on account of its *inflorescence*, seems here misplaced.

5. *V. birtum*. Hairy Japan Whortle-berry. Thunb. Jap. 155. Willd. n. 3.—Stalks solitary, single-flowered. Leaves deciduous, ovate, serrated, hairy all over as well as the young branches.—Gathered on hills between Miaco and Jedo in Japan, by professor Thunberg, one of whose specimens is before us. A taller *shrub* than our *Myrtillus*, flowering in April. The *branches* are round. *Leaves* like that species in size and shape, but covered with soft hairs; their under side rather pale. *Flowers* drooping, on very short stalks.

6. *V. uliginosum*. Great Bilberry. Linn. Sp. Pl. 499. Willd. n. 5. Fl. Brit. n. 2. Engl. Bot. t. 581. Fl. Dan. t. 231. Pursh n. 15. (*Vitis idæa magna quibusdam*, five *Myrtillus grandis*; Bauh. Hist. v. 1. 518. Raii Syn. 457. *V. idæa foliis subrotundis major*; Ger. Em. 1416.)—Stalks somewhat aggregate, single-flowered. Leaves deciduous, obovate, entire, smooth. Branches round.—Native of marshy mountainous heaths, and alpine bogs, in Sweden, Germany, Switzerland, Savoy, Scotland, and the north of England; as well as in the more northern parts of America, and on its west coast; flowering in April or May, and ripening the berries, which are eatable, but not either very grateful or wholesome, in August. Taller than the Common Bilberry, and of a more glaucous hue. *Leaves* smooth and even above; veiny and glaucous at the back; quite entire, by which this species is readily distin-

guished from all that in other respects bear any resemblance to it. *Flowers* drooping, flesh-coloured, mostly four-cleft, with eight long-horned *stamens*. *Calyx* short and blunt. *Berry* large, juicy, black, with a glaucous hue. *Seeds* finely striated. A variety with slightly pointed *leaves*, was published by an apothecary at Berne, in 1787, as *V. mucronatum*, an imaginary species, of which we shall speak at the end of our eighth.

7. *V. calycinum*. Large-cupped Whortle-berry.—Stalks solitary, single-flowered. Leaves deciduous, obovate, serrated, smooth, with downy ribs. Branches angular. Segments of the *calyx* deep, ovate.—Gathered by Mr. Menzies, in woods, upon lofty mountains, in the Sandwich islands. This appears to be of a much taller stature than the preceding. The *leaves* at the flowering season are an inch and a quarter long, near an inch wide, pliant, with fine, copious, pointed, incurved serratures, and a small, blunt, terminal point; their under side pale. *Flowers* about the lower part of each young leafy branch, axillary, drooping, each on a simple, naked, slightly downy *stalk*, an inch long. *Calyx* in five, rather unequal, deep, ovate, entire, bluntish, smooth, finely reticulated segments, exceeding the *germen* in length. *Corolla* oblong, with five angles, enclosing the *anthers* and *style*. Of the *fruit* we have no knowledge.

8. *V. flamineum*. Green-wooded Whortle-berry. Linn. Sp. Pl. 498. Willd. n. 4. Ait. n. 3. Pursh n. 1. Andr. Repof. t. 263. (*V. album*; Pursh n. 2, excluding the synonym of Willdenow. *Arbuscula americana baccifera*, *flosculus comosis*, &c.; Pluk. Mant. 22. Phyt. t. 339. f. 3.)—Clusters downy, with oval bractæas as long as the flowers. Anthers twice as long as the spreading bell-shaped corolla. Leaves elliptical, acute, entire; glaucous and rather downy beneath.—Common in dry woods, from New England to Florida, flowering in May and June. The *trunk* is firm, about two feet high, with numerous green *branches*, downy when young. *Leaves* an inch and a half or two inches long at the flowering season, on very short downy stalks. *Flowers* copious, white, with remarkably conspicuous, tawny, linear *anthers*, spurred near the base. *Corolla* broader than long. *Berries* greenish, or white, called Deer-berries. Analogy leads us to consider the *inflorescence* of this species as racemose. Indeed the *bractæas*, though resembling the leaves in every respect but size, are usually but one-fourth as large, and sometimes not a quarter of an inch in length. Mr. Pursh's *album* can scarcely, by his definition or Andrews's figure, be marked even as a variety, though he says the *flowers* are larger, and *berries* more globose, than in the common *flamineum*. That his plant is not the Linnæan *album*, appears from the original specimen, sent by Kalm to Linnæus, under the denomination of “a *Vaccinium* with white berries;” but which proves *Xylosteum ciliatum* β, Pursh 161. No wonder that no subsequent investigator could ever ascertain *V. album*! We must notice another error of Linnæus, to prevent mistake. He cites under *V. flamineum* the proper figure of Plukenet, but with a wrong synonym or definition. Here also it falls to our lot to correct our great master respecting another of Kalm's plants, *V. mucronatum*, which has ever remained as unintelligible as the *album*. His described specimen is certainly one of the *Mespilus* or *Pyrus* tribe, but not in a condition for us precisely to ascertain the species, nor can we refer it to anything in Mr. Pursh's work.

9. *V. arboreum*. Shining-leaved Tree Whortle-berry. Marsh. in Michaux Boreal.-Amer. v. 1. 230. Pursh n. 3. (*V. diffusum*; Ait. n. 5. Willd. n. 8.)—Stalks axillary and solitary, or terminal and racemose, naked. Leaves ovate, acute, with slight glandular serratures; polished above;

above; rather downy beneath. Corolla bell-shaped, acute. Stamens the length of its tube.—In dry woods, on the rocky banks of rivers, from North Carolina to Florida, flowering in May and June. A large *shrub*, sometimes twenty feet high, very elegant. *Flowers* white, tinged with red. *Berries* globular, black, almost dry. *Pursh*. Our numerous wild as well as cultivated specimens, compared with the Banksian herbarium, and answering to every particular of the published accounts of this plant, leave no doubt of its identity, and therefore we do not scruple to adopt Michaux's name, in preference to the older one, *diffusum*, the latter being founded in some mistake. The *branches* are round, downy when young. *Leaves* peculiarly shining, and strongly reticulated with veins. *Flower-stalks* an inch long, angular, marked with two or three glands; some of them axillary, solitary, from several of the lower leaves of each branch; others forming a nearly leafless *cluster*, at the end of the same branch. In one instance we find two such clusters, with a small leafy *bractea*, or two in the middle, terminating a short lateral branch whose leaves are fallen. This proves that Nature has drawn no precise line of demarcation between the racemose and the solitary inflorescence of this genus, which in many species, by the ambiguous nature of their floral leaves, run into each other.

10. *V. angustifolium*. Narrow-leaved Whortle-berry, or Bluets. Ait. n. 6. Willd. n. 9. (*V. myrtilloides*; Michaux Boreal.-Amer. v. 1. 234. Pursh n. 16.)—Stalks scattered, mostly solitary, single-flowered, naked. Leaves lanceolate, nearly entire; downy at the ribs and margin.—In Canada, about Hudson's Bay and Labrador, flowering in April and May. *Berries* large, blueish-black, known by the name of Bluets. *Pursh*. Michaux says this species has the habit of *V. Myrtilus*; its *leaves* being membranous, of a narrow lanceolate form. We have seen no specimen. Dr. Solander's original name, in Hort. Kew. and Willdenow, appears preferable to that of Michaux adopted by Pursh.

11. *V. dumosum*. Bushy Whortle-berry. Ait. n. 7. Pursh n. 4. Curt. Mag. t. 1106. Andr. Repof. t. 112. (*V. frondosum*; Michaux Boreal.-Amer. v. 1. 230. *V. hirtellum*; Ait. n. 12, according to Pursh, from a comparison with the Banksian herbarium.)—Clusters downy, with oval bractees; partial stalks with two lanceolate ones. Leaves obovate, pointed, entire, downy and viscid. *Germs* hairy. Corolla bell-shaped, obtuse, longer than the stamens.—In dry sandy woods, particularly pine forests, from New Jersey to Florida, flowering in June and July. A low bushy *shrub*, with round *branches*. *Leaves* an inch and a half long, varying in breadth, reticulated with veins; paler beneath, but not at all glaucous; covered all over, especially when young, with short viscid pubescence, and glandular dots, as are also the *branches*, *stalks*, and *bractees*. The latter are as long as the flowers, and leafy, like those of *V. flamineum*, n. 8; but each partial *flower-stalk* bears also, about its middle, two smaller, lanceolate, sometimes coloured, partial *bractees*. The *germs* is particularly shaggy. Segments of the *calyx* deep, ovate, fringed, coloured. *Corolla* white, tinged with pink, rather large. *Berries* black, globular. A comparison of the two figures above cited will shew the ambiguous nature of the inflorescence, and account for this species having been described twice in the accurate publication of Mr. Aiton.

12. *V. caspitosum*. Dwarf Tufted Whortle-berry. Michaux Boreal.-Amer. v. 1. 234. Pursh n. 17.—Flowers lateral, solitary, nearly sessile. Leaves somewhat wedge-shaped, rounded, obtuse, serrated, membranous, very smooth.—In the more northern regions of America, parti-

cularly about Hudson's Bay. A little *shrub*, with many crowded *stems*, from two to four inches high, very smooth in every part. *Corolla* of a short pitcher-shape. *Berry* nearly sessile, globose, glaucous-black. Michaux.

13. *V. corymbosum*. Naked-flowering Whortle-berry. Linn. Sp. Pl. 499. Willd. n. 10. Pursh n. 8. (*V. amœnum*; Ait. n. 13. Willd. n. 18. Pursh n. 9. Andr. Repof. t. 138. *V. difomorphum*; Michaux Boreal.-Amer. v. 1. 231.)

β. *V. virgatum*; Ait. n. 14. Willd. n. 19. Pursh n. 10. Andr. Repof. t. 181.

γ. *V. fuscatum*; Ait. n. 8. Willd. n. 13. Pursh n. 11. (*V. formosum*; Andr. Repof. t. 97.)

Flowering branches nearly leafless. Clusters corymbose, drooping. Bractees membranous, shorter than the downy flower-stalks. Leaves elliptical, acute, minutely serrated, smooth, with downy ribs.—Native of swamps and wet woods, from Canada to Carolina and Georgia, flowering in May and June. A tall *shrub*, sometimes seven or eight feet high, with numerous roughish round *branches*; somewhat angular and downy when young. *Leaves* for the most part following the flowers, an inch and a half or two inches long, elliptic-oblong, acute at each end, various in breadth, veiny, but not strikingly reticulated; very minutely, more or less evidently, serrated; tipped with a glandular point; smooth, except the rib and veins, which are finely hairy or downy, especially at an early period. *Footstalks* short and broad, downy. *Clusters* from branches of the preceding year, seldom accompanied with leaves, alternate, about an inch long, and rather compact, often corymbose, of six or eight drooping *flowers*, whose partial *stalks* are finely downy, with short curved hairs, and furnished at the base with membranous, reddish, smooth, fringed, deciduous *bractees*, varying in length and acuteness, but mostly much shorter than their corresponding stalks. Segments of the *calyx* broad and shallow. *Corolla* white or reddish, cylindrical, somewhat angular, contracted at the mouth, with five shallow, spreading, marginal segments. *Stamens* ten, downy. *Antbers* within the corolla, having a double pouch at the base, but no spurs. *Style* sometimes, but not always, a little prominent. *Berries* black, insipid. Some apology may seem necessary for our thus uniting four reputed species, a measure of which Michaux first, in part, suggested the propriety. With respect to the *corymbosum* and *amœnum*, original specimens of each, and the total want of any distinctive character in authors, will abundantly justify us. The *calyx* spreads equally in both. Indeed the former being always unknown, by name, in our gardens, and its specific character in Linnæus being insufficient, if not incorrect, that species could be ascertained by his herbarium only, which in this instance was neglected, and the same plant appeared in the first edition of Hort. Kew. under the name of *amœnum*, acquired in England. It had here once been called *elevatum*, as appears by a specimen given to the younger Linnæus. Some gardeners subsequently transferred to *flamineum* the name of *amœnum*, and hence perhaps when the latter appeared afresh from America, it received the new appellations of *virgatum* and *fuscatum*, perpetuated likewise in Hort. Kew., between the original specific characters of which there can be little discovered that is essential. In Mr. Andrews's plate of *virgatum* indeed the *clusters* are accompanied by *leaves*, of which we have seen no example in *corymbosum*, and the *flowers* are smaller than usual in this latter; but Mr. Pursh, under the name of *amœnum*, allows that it "has a number of varieties in size, shape, and colour." The elegant *fuscatum*, as figured by Mr. Andrews, evidently betrays a close affinity to

to *corymbosum*, colour being avowedly of no importance, and the erect *calyx* we have good reason to mistrust. Having formed our opinion from the best materials in our power, we leave its refutation or confirmation to those who may have opportunities of future inquiry, without any intentional disrespect to the great authorities from which we dissent.

14. *V. bracteatum*. Bracteated Japan Whortle-berry. Thunb. Jap. 156. Willd. n. 11. — Clusters axillary, longer than the smooth, acute, serrated leaves. Bractæas lanceolate, serrated; partial stalks with two smaller awl-shaped ones. — Gathered by Thunberg in the island of Nippon, Japan, flowering in June. The *branches* are always smooth, leafy, slightly angular when young. *Leaves* elliptic-lanceolate, acute at each end, an inch and a half long, on short stalks, sharply but not deeply serrated, very smooth on both sides; paler, and most reticulated, beneath. We should suspect them to be evergreen, as they accompany the flowers, on what seem to be last year's shoots; but having no particular information, we, like Willdenow, place this species among those to which it appears to be naturally related. *Clusters* two or three inches long, axillary, solitary, simple, slender, many-flowered, very smooth. *Partial stalks* short, drooping, turned all one way, each having at its base a lanceolate, acute, smooth bractæa, mostly twice its own length, and about the middle two others of a very small size. Segments of the *calyx* short, acute, spreading. *Corolla* cylindrical, white. Nothing is known of the fruit. The Japanese call this plant *Ki Fusi*.

15. *V. ciliatum*. Hairy-ribbed Japan Whortle-berry. Thunb. Jap. 156. Willd. n. 12. — Clusters axillary, longer than the ovate, bristly, nearly entire leaves. Bractæas lanceolate, smooth. — Native of Japan, where it is called *Sasjebu*. The stem is smooth, ash-coloured, with upright villous branches. *Leaves* ovate, acute, unequal, from one to two inches long, ribbed; the ribs hispid all over. *Flowers* red, turned one way, in terminal, solitary, bracteated clusters, as long as the finger. Bractæas about one-third of an inch in length. *Calyx* very short. Thunberg. We formerly examined this species in professor Van Royen's herbarium, but are not possessed of a specimen. It must be presumed that by "*folia integra*" is not meant *undivided leaves*, the true sense of that expression; because no *Vaccinium* has any other. The learned author evidently contrasts this phrase with the *folia serrata* of the preceding species, and means that the leaves are nearly entire; in contradistinction to *integerrima*.

16. *V. galifornis*. Larger Gale-leaved Whortle-berry. (*V. galezans*; Michaux Boreal.-Amer. v. 1. 232. Pursh n. 12.) — "Flowers on very short stalks, in sessile tufts. Leaves sessile, lanceolate-wedged-shaped, slightly serrated, downy. Calyx pointed. Corolla ovate, much contracted at the mouth. Style prominent." — Found in the shady woods and swamps of Virginia and Carolina, flowering in May and June. *Flowers* small, yellowish-white. *Berries* small, globular, black. Pursh. Michaux describes this shrub as having the aspect of *Myrica Gale*, with slightly downy branches. *Leaves* veiny. The *flower-stalks*, shorter than the *flowers*, burst from a bud, composed of numerous crowded scales, but become naked and corymbose as the fruit advances. We trust that we need not labour under the necessity of precisely retaining the original specific name. *V. tenellum* of Hort. Kew., cited doubtfully by Michaux, is not known to us; but Mr. Pursh describes it as distinct from the present species; see n. 20.

17. *V. frondosum*. Blunt-leaved Whortle-berry or Blue Tangles. Linn. Sp. Pl. 499. Willd. n. 14. Ait. n. 9.

Pursh n. 5. Andr. Repof. t. 140. (*V. glaucum*; Michaux Boreal.-Amer. v. 1. 231.)

β. *V. venustum*; Ait. n. 10. Willd. n. 15. Herb. Banks. Pursh. — Clusters lax. Bractæas obovate, not half so long as the slender partial flower-stalks, which bear two smaller linear ones. Leaves obovate-oblong, pointless, entire, smooth. — In open woods, on a sandy soil, from New Jersey to Carolina, flowering in May and June. About three feet high. *Flowers* small, almost globular, white. *Berries* large, blue, globular, eatable, called by the country people Blue Tangles. Pursh. The *branches* are round, smooth, and slender. *Leaves* from two to three inches long, thin and pliant, generally obtuse, but in the variety β acute; bright green above; glaucous beneath, sprinkled with minute resinous dots, and reticulated with copious veins. *Clusters* lateral, from the last year's wood, about the length of the leaves, loose, slender, and spreading. *Partial flower-stalks* about an inch long, with a small obovate, pointed, entire bractæa, covered with resinous dots, at the base, and two, much smaller and narrower, deciduous ones about the middle. *Flowers* drooping, greenish-white, shaped like Lily of the Valley, but smaller. Segments of the *calyx* broad, deep, nearly triangular.

18. *V. ligustrinum*. Privet-leaved Whortle-berry. Michaux Boreal.-Amer. v. 1. 233. Pursh n. 13, excluding the synonym of Willdenow. — "Flowers nearly sessile, in sessile tufts. Leaves nearly sessile, erect, lanceolate, pointed, finely serrated, veiny, downy. Corolla longish-ovate. Branches angular. — In dry woods, from Pennsylvania to Virginia; common on the mountains, flowering in May and June. An upright straight shrub. *Leaves* membranous, furnished with conspicuous, often purplish, veins. Scales of the flower-buds also purplish. Tufts of flowers sometimes springing leafless from the branches, sometimes axillary. *Corolla* purplish-red. *Berries* black. The leaves vary extremely in shape and size. Pursh, Michaux. We adopt this species, which we have never seen, from the authors quoted, under the name by which they have distinguished it. But the Linnæan *V. ligustrinum* is a nonentity, or rather no *Vaccinium*, being the very same plant with *Andromeda paniculata*; Linnæus having received it in flower, from Kalm, as a *Vaccinium*, and in fruit, as an *Andromeda*. The latter specimen, having flowers of another species annexed, could not but mislead him, though we must allow that he too implicitly trusted his pupil, in all the strange blunders, which we have had the mortification of recording and explaining, relative to this genus.

19. *V. resinosum*. Clammy Whortle-berry. Ait. n. 11. Willd. n. 17. Pursh n. 7. Curt. Mag. t. 1288. (*V. parviflorum*; Andr. Repof. t. 125. "Andromeda baccata; Wangenh. Amer. t. 30. f. 69.") — Clusters leafless, viscid, downy, with lanceolate bractæas on the partial stalks. Leaves obovato-lanceolate, bluntish, pointless, entire, covered with resinous dots. Calyx in five deep ovate segments, longer than the germen. — In woods and on mountains frequent, from Canada to Carolina, flowering in May and June. From two to four feet high. *Berries* black, eatable. Pursh. The *branches* are round; downy when young. *Leaves* usually an inch and half long, bright green on both sides, more or less obtuse, viscid; veiny beneath. *Clusters* lateral, from last year's wood, drooping, lax, shorter than the leaves. *Flowers* small, either red or tawny, or of a greenish-yellow. *Calyx* reddish or brown, remarkably large in proportion to the germen, not well expressed in either of our English figures.

20. *V. tenellum*. Gale-leaved Dwarf Whortle-berry. Ait. n. 15. Willd. n. 20. Pursh n. 14. (*V. pennsylvanicum*;

vanicum; Lamarck Dict. v. 1. 74. Michaux Boreal-Amer. v. 1. 232.)—Flowers in dense sessile tufts. Leaves nearly sessile, ovato-lanceolate, pointed, finely serrated, smooth, except the rib and margin. Branches angular, with a downy line at each side. Calyx in five deep acute segments.—On dry hills on a gravelly soil, from New England to Virginia, flowering in May. A low, very branching shrub. *Flowers* pale red. *Calyx* green. *Berries* large, blueish-black, extremely sweet and agreeable to eat. The mountains of Pennsylvania produce an immense variety of this species, in size and shape of the fruit, leaves, and flowers. *Pursh*. Specimens from the late Rev. Dr. Muhlenberg, which we cannot but refer to this, have green rather warty branches, distinguished by a fine downy line along each side. The leaves are an inch long, resembling those of some dwarf Willows, beautifully reticulated, sometimes purplish; most shining beneath; their serratures minute, glandular, downy, as well as the mid-rib. *Flowers* few, in tufts, from scaly axillary red buds, about the tops of the branches. *Calyx* very smooth.

21. *V. Arctostaphylos*. Oriental Bear-berry, or Whortle-berry. Linn. Sp. Pl. 500. Willd. n. 21. (*Vitis idæa orientalis maxima*, *cerasi folio*, *flore variegato*; Tourn. Cor. 42. Voyage v. 2. 98, with a figure.)—Clusters lateral. Bractæas all at the base of the partial stalks. Leaves elliptical, acute, minutely serrated; hairy beneath. Stamens as long as the bell-shaped corolla, with very hairy filaments. Calyx slightly five-lobed.—Gathered on the coast of the Black sea, by Tournefort, two of whose specimens are before us. He describes this shrub as the height of a man, with a trunk as thick as one's arm. The young leafy branches are downy on two opposite sides, like the foregoing, but more broadly. *Footstalks* extremely short and broad, hairy. *Leaves* pliant, broadly elliptical, tapering at each end, two inches and a half long, and nearly one and a half broad, bright green, sometimes reddish above, and quite smooth, except the midrib, on that side; paler beneath, and besprinkled with short prominent hairs, especially about the lower part of the rib; their margin furnished with copious, but blunt and shallow, serratures. *Clusters* from the wood of the preceding year, below the fresh leafy shoots, drooping, one and a half or two inches long, somewhat hairy, composed of eight or ten pendulous flowers, of a dirty white, striped or stained with purple. *Bractæas* several at the base of each partial flower-stalk, fringed; one of them large, ovate, often half an inch, or more, in length; the rest linear-lanceolate, much smaller, one or two in number, scarcely more, being analogous to those found about the middle of the partial stalks, in several species already described, though differently situated in the present species and its allies. *Calyx* with five shallow, more or less evident, marginal segments, smooth. *Corolla* bell-shaped, five lines long and four wide, with five shallow, recurved, marginal segments. *Filaments* ten, nearly half as long as the corolla, stout, gibbous, extremely hairy at the back. *Anthers* longer than the filaments; yellow, smooth, and tubular above, furnished with two granulated pouches, descending much below their insertion, at the inner side of the filament, and with two small dorsal spurs, at the base of the tubes above those pouches. *Style* shorter than the corolla. The berries were seen by Tournefort in an unripe state only. He judges this plant, with great probability, to be the *αεικόσασφύλος*, or Bear-grape of Galen.

What the variety β of Linnæus may be, we know not, as nothing answerable to his reference is to be found in Tournefort's *Corollarium*.

22. *V. padifalium*. Madeira Whortle-berry. (*V. Arctostaphylos*; Ait. n. 16. Curt. Mag. t. 974. Andr. Repof. t. 30. Pallas Ross. v. 1. p. 2. 45.)—Clusters lateral. Bractæas all at the base of the partial stalks. Leaves ovato-lanceolate, acute, finely serrated, smooth on both sides, except the mid-rib. Stamens nearly as long as the bell-shaped corolla, with smooth, slightly fringed, filaments. Calyx five-lobed.—Native of the loftiest parts of the island of Madeira, where it forms impenetrable thickets, flowering in July, according to Mr. Masson, who sent a specimen to the younger Linnæus in 1777. This so precisely agrees with Mr. Edwards's figure in Curtis's Magazine, drawn from a plant obtained from mount Caucasus, by Mr. Loddiges, that we cannot doubt its being what Pallas found in the alpine beech forests of that neighbourhood. The younger Linnæus obtained a specimen of the same, from the English gardens; and we received one in flower, from the present duke of Marlborough's garden, at White Knight's, in June 1806. So far therefore our cultivated plant is identified, nor can any thing be more clearly distinct from the true *V. Arctostaphylos*. The leaves, well compared by Pallas to those of the Bird-cherry, are of a more firm rigid texture, and not half so large as the former; they are more rounded at the base; their serratures, though small, more evident; under surface quite smooth, except at the very base about the mid-rib, which is also a little hairy on the upper side. *Footstalks* longer. *Calyx* more decidedly five-lobed, though it appears to vary in the depth of its segments. *Corolla* larger, pale green, with a purple tinge; sometimes it seems to be all over purple externally. Partial or internal bractæas rather broader. *Germs* very glaucous. The filaments differ essentially, in being flat, quite smooth at each side, and only slightly fringed in the margin, especially about the top. We can discern no spurs on the anthers, which moreover are rather shorter with respect to the corolla. The style is sometimes a little prominent, but not constantly. Pallas says the berries are black, juicy, eatable, gratefully acid. Sometimes, though very rarely, he found the flowers four-lobed.

23. *V. cylindraceum*. Azorian Whortle-berry.—Clusters lateral. Bractæas serrated, all at the base of the partial stalks. Leaves elliptic-lanceolate, acute, finely serrated, quite smooth, except the base of the mid-rib. Stamens half the length of the cylindrical corolla, with hairy filaments. Calyx slightly five-lobed.—Native of mountains in the Azores, where this species is called *Uva de serra*, or Mountain Berry. We believe our specimen to have been gathered by Mr. Masson. The stem appears to be arborescent. The branches are stout, round, those only of the present year leafy, and finely downy at the two opposite sides. Leaves like the last, but rather larger, more tapering at the base, and quite smooth, except a little short down at the bottom, about the mid-rib and footstalk. *Clusters* numerous, on the leafless branches of the preceding season, under the leafy shoots of the present year, spreading the length of the leaves, with smooth, angular, reddish stalks; and deciduous bractæas, of which the inner ones are lanceolate and sharply toothed. *Flowers* drooping, nearly an inch long, apparently red or purple. *Calyx* with a dilated border, very slightly and obtusely five-lobed. *Corolla* twice as long as the last, cylindrical, with five erect, short, marginal segments. Stamens but half the length of the corolla; their filaments loosely hairy all over; anthers shorter than the filaments, destitute of spurs. *Style* rather longer than the corolla. Of the fruit we have no account, nor do we know whether this species has ever found its way into the English gardens.

Sect. 2. *Leaves evergreen.*

24. *V. meridionale*. Jamaica Whortle-berry. Swartz Ind. Occ. 676. Willd. n. 22. Ait. n. 17.—Clusters erect, downy. Bractæas solitary, ovate. Leaves ovate, crenate, permanent, smooth. Stem arboreous.—Native of the lofty Blue mountains in the southern part of Jamaica, flowering in February, and ripening fruit in August. This is from ten to thirty feet high, with a very straight smooth trunk, and hard wood. Branches straight, spreading, leafy, round; downy when young. Leaves rigid, an inch or rather more in length, on short, broad, downy stalks, flat, and somewhat shining, veiny; paler beneath. Clusters solitary near the end of last year's branches, twice as long as the leaves; their partial stalks naked, except a large, solitary, ovate, smooth, coloured, deciduous bractæa, at the base of each, and equal to it in length. Flowers drooping, reddish-white. Calyx in four broad, acute, permanent segments. Corolla ovate, quadrangular before expansion, contracted at the mouth, with four acute, recurved, marginal segments. Stamens eight, as long as the corolla, their filaments hairy in the middle. Dr. Swartz mistakes the tubular points of the anthers for horns or spurs. Style the length of the corolla. Berry roundish, juicy, pleasantly flavoured, pale red, resembling that of *V. Vitis idæa*. The flowers are very rarely five-cleft and decandrous.

25. *V. cereum*. Otaheité Whortle-berry. Forst. Prodr. 28. Willd. n. 25. (*Andromeda cerea*; Linn. Suppl. 238.)—Stalks axillary, solitary, single-flowered, with two lanceolate bractæas about the middle. Leaves roundish-ovate, ferrated, smooth, permanent. Calyx in five broad pointed segments.—Gathered by Forster in Otaheité. The branches are round, smooth, leafy; slightly downy when young. Leaves about an inch long, pointed, coriaceous, veiny, twice the length of the smooth simple flower-stalks. Corolla ovate-oblong, with five angles, and five erect small segments. Anthers, according to Linnæus, with two dorsal horns.

26. *V. Vitis idæa*. Red Whortle-berry, or Cow-berry. Linn. Sp. Pl. 500. Willd. n. 24. Fl. Brit. n. 3. Engl. Bot. t. 598. Pursh n. 18. Fl. Dan. t. 40. (*Vaccinia rubra*; Ger. Em. 1415. *Vitis idæa rubra*; Camer. Epit. 136.)—Clusters terminal, drooping; with ovate concave bractæas, longer than the flower-stalks. Leaves obovate, revolute, minutely toothed; dotted beneath. Corolla bell-shaped.—Native of dry barren stony woods and heaths, in the north of Europe, plentiful in Scotland, Westmoreland, Derbyshire, Wales, &c. flowering in June, and ripening fruit in August. Mr. Pursh says it occurs on rocks near the sea-coast, from Canada to New England, but the American plant is more robust than the European, with considerably larger leaves. The roots are creeping, woody. Stems ascending, in England about a span high, wavy, but little branched, smooth, leafy; young branches round, downy. Leaves evergreen, somewhat like box, but darker on the upper side, smooth and shining. Flowers pale pink, four-cleft, in elegant, dense, solitary, pendulous clusters. Calyx in four deep, broad, ovate, red segments. Anthers without horns. Stigma small, slightly notched. Berries blood-red, acid, austere and bitter, less palatable in tarts than either the Cranberry or Bilberry, but excellent in a rob or jelly, for colds and fore-throats, as well as to eat with roast meat, to which latter purpose this jelly is universally applied by the Swedes.

27. *V. myrtifolium*. Myrtle-leaved Black Whortle-berry. Michaux Boreal.-Amer. v. 1. 229. Pursh n. 19.—“Creeping, quite smooth. Leaves stalked, oval, shining, revolute, sparingly and minutely toothed. Clusters axillary,

nearly sessile, of few flowers. Corolla bell-shaped, somewhat inflated, minutely five-toothed. Anthers without dorsal horns.”—Found by Michaux only, in Carolina. He describes the berries as small, globose, crowned with the calyx, black, on short stalks.

28. *V. crassifolium*. Thick-leaved Whortle-berry. Andr. Repof. t. 105. Ait. n. 19. Pursh n. 20. Curt. Mag. t. 1152.—Clusters lateral and terminal, corymbose. Bractæas shorter than the flower-stalks. Leaves elliptical, crenate, smooth; paler and veiny beneath. Corolla bell-shaped. Stem diffuse.—Brought by Mr. Frazer from Carolina, in 1787. It flowers in May and June. A trailing evergreen species, requiring some shelter from our variable winters and springs. The leaves are not an inch long; their upper surface very smooth and even, with a little minute pubescence on the mid-rib and footstalk. Flowers five-cleft, prettily variegated with pink and white, drooping, on red corymbose stalks. Stamens hairy. We have no account of the fruit.

29. *V. villosum*. Hairy Mexican Whortle-berry.—Clusters longer than the leaves. Flower-stalks, calyx, corolla and lanceolate bractæas densely hairy. Leaves elliptical, entire, revolute, coriaceous, with a blunt point; hairy on the upper side.—Sent by Mutis to Linnæus from Mexico. The branches are round, leafy, densely hairy when young. Leaves crowded, an inch long, on thick downy footstalks; their upper side convex; under paler, veiny, scarcely hairy, except the rib. Clusters towards the ends of the younger branches, axillary, dense, drooping, nearly twice as long as the leaves, very hairy all over, the germen particularly. Bractæas coloured, internally smooth; those of the partial stalks very narrow. Calyx in five deep, lanceolate, densely fringed segments. Corolla purplish, oblong, with five hairy angles, and as many small recurved teeth. Fruit unknown, but the habit, and the inferior germen, sufficiently announce the genus.

30. *V. reticulatum*. Reticulated South-sea Whortle-berry.—Stalks axillary, solitary, single-flowered, downy. Leaves obovate, more or less ferrated, coriaceous, with a blunt point; strongly reticulated on both sides and nearly smooth. Germen hairy.—Gathered by Mr. Menzies, in woods on high mountains, in the Sandwich islands.—The branches are leafy; when young angular and finely downy. Leaves an inch long, remarkable for their reticulated veins, prominent on both sides; their margin somewhat revolute, strongly ferrated, but sometimes nearly entire. Flower-stalks numerous, erect, about an inch long, swelling upwards, without bractæas; reflexed as the fruit advances. Calyx in four or five deep, oblong, ribbed, downy, coloured segments, at length involute. Corolla cylindrical, thrice as long as the calyx, purple, slightly hairy, with four or five upright blunt teeth. Style hairy, shorter than the corolla. Berry globular, depressed, nearly or quite smooth.

31. *V. dentatum*. Toothed South-sea Whortle-berry.—Stalks axillary, solitary, single-flowered, smooth. Leaves obovate, with sharp tooth-like serratures, coriaceous, veiny, very smooth. Calyx longer than the smooth germen.—Found by Mr. Menzies, in woods on the lofty mountains of the Sandwich islands. The branches of this are angular, always smooth, like every other part. Leaves rather longer than the last, more strongly and uniformly toothed, with less prominent veins. Flower-stalks naked and smooth; recurved when in fruit. Calyx in five deep, oblong, obtuse, smooth, keeled segments, longer than the germen, even after the corolla is fallen, which latter is wanting in our specimens.

32. *V. nitidum*. Glossy Whortle-berry. Andr. Repof. t. 480.

VACCINIUM.

t. 480. Pursh n. 21. Ait. Epit. 376. Curt. Mag. t. 1550.—Clusters terminal, corymbose. Bracteas shorter than the flower-stalks. Leaves elliptic-obovate, acute, crenate, smooth and shining. Corolla cylindrical.—Native of Carolina, flowering in May and June. The stem is of humble growth, either erect, as in Andrews's figure, or diffuse, as in the Botanical Magazine; the young branches downy on two opposite sides. Leaves evergreen, from half an inch to an inch long, numerous, very smooth; paler and veiny beneath; on very short red footstalks. Flower-stalks, bracteas, and calyx very smooth, of a shining red or purple. Calyx in five broad, rather shallow, segments. Corolla ovate-oblong, white or pink, with five slight spreading teeth, longer than the style. This species bears some affinity to the following, as well as to *crassifolium*, n. 28; but differs from the latter essentially, as Mr. Pursh observes, in the shape of its corolla; to which may be added the form and polish of its leaves, and the young branches being downy on two sides only.

33. *V. myrsinites*. Small-leaved Whortle-berry. Michaux Boreal.-Amer. v. 1. 233. Pursh n. 22.—“Flowers in terminal and lateral scaly tufts, nearly sessile. Leaves sessile, oval, pointed, obscurely serrated; smooth and shining above; somewhat hairy and dotted beneath. Stem erect, much branched. Corolla oblong-ovate.”—In the dry sandy woods of Carolina and Florida, flowering in May and June. A beautiful little shrub, with slightly downy branches. Leaves glandular beneath; varying either to roundish-obovate, or to lanceolate, acute at each end. Tufts axillary, with purple scales. Segments of the calyx scarlet. Corolla of a fine purple, five-toothed. Michaux, Pursh.

34. *V. buxifolium*. Box-leaved Whortle-berry. Salisb. Parad. t. 4. Ait. n. 18. Pursh n. 23. Curt. Mag. t. 928. (*V. brachycerum*; Michaux Boreal.-Amer. v. 1. 234.)—Clusters axillary, of few flowers. Leaves stalked, obovate, toothed or crenate, smooth on both sides. Stems tufted. Corolla roundish-ovate. Filaments glandular. Stigma capitate.—In dry woods, on lime-stone rocks, in the western parts of Virginia, near Winchester and the Sweet-springs, flowering in June. Pursh. A handsome little shrub, in stature and general aspect resembling *V. vitis idaea*, n. 26. The leaves however are smooth, even, and not dotted, on the under side. Clusters shorter, but more numerous. Flowers five-cleft. Corolla globular, contracted at the mouth, not bell-shaped. Anthers with shorter horns, discharging their pollen by lateral, not terminal, apertures. Stigma dilated, or capitate. Of the berries we have no account. The flowers are white, delicately striped with red. Anthers without spurs.

35. *V. ovatum*. Ovate Whortle-berry. Pursh n. 24.—“Leaves stalked, ovate, acute, revolute, serrated, smooth, coriaceous. Clusters axillary and terminal, bracteated, short. Corolla cylindrical. Calyx acute.”—Found by governor Lewis, on the Columbia river; by Mr. Menzies on the north-west coast of America, flowering in May. Pursh.

36. *V. obtusum*. Blunt Whortle-berry. Pursh n. 25.—“Stem creeping. Leaves small, oval, rounded and blunt at each end, pointed, entire, coriaceous, smooth. Stalks axillary, solitary, single-flowered.”—Gathered by Mr. Menzies, on the north-west coast of America; seen in the Bankian herbarium, without flowers. Pursh.

We can find nothing, amongst our specimens from Mr. Menzies, that answers to the characters of either of these two last species. Our *parvifolium*, n. 3, agrees in some points with the description of the last, but the stem is rather

arborescent than creeping, and the leaves are certainly neither coriaceous nor evergreen.

37. *V. Oxycoccus*. Common Cranberry. Linn. Sp. Pl. 500. Willd. n. 25. Fl. Brit. n. 4. Engl. Bot. t. 319. Fl. Dan. t. 80. Lamarck f. 3. (*Vaccinia palustris*; Ger. Em. 1419. Lob. Ic. v. 2. 109. Oxycoccum; Cord. Hist. 140. 2. f. 1. Oxycoccus vulgaris; “Perf. Syn. v. 1. 419.” Pursh 263.)—Corolla deeply four-cleft. Leaves ovate, entire, revolute, acute, smooth. Stems creeping, thread-shaped. Flowers terminal.—Native of turfy mossy bogs in the mountainous parts of Europe; common in Switzerland, Russia, Scotland, Ireland, and the north of England, as well as in Lincolnshire, and the neighbouring part of Norfolk, flowering in June. Mr. Pursh speaks of it as common on the boggy mountains of North America, from Canada to Pennsylvania, flowering from May to July. Few plants are more elegant. The wiry shrubby stems creep among bog-moss, with long, branching, fibrous roots, which often appear to imbibe nourishment from the clear water alone. Branches scattered, procumbent, smooth, reddish, leafy. Leaves evergreen, stalked, from a quarter to half an inch long, coriaceous; convex and of a dark shining green above; glaucous beneath. Flower-stalks few together about the tops of the branches, somewhat corymbose, above an inch long, simple, red, slightly hoary, bearing two minute bracteas in the lower part, and a solitary, drooping, very beautiful, four-cleft flower at the top. The germen is smooth. Calyx-lobes broad and shallow. Corolla pink, with reflexed oblong segments, a quarter of an inch in length. Filaments purple, downy. Anthers yellow, converging, without spurs. Berry pear-shaped or globular, often spotted, crimson, of a peculiar flavour, somewhat like black currants, with a strong acidity, grateful to most people, in the form of tarts, for which purpose they are largely imported from Russia. We can remember Cranberries from Lincolnshire, and the north-west corner of Norfolk, being sold in cart-loads about the freats of Norwich; but the extensive enclosures have, in many parts, destroyed and drained their native bogs. Lightfoot records that at Longtown, on the borders of Cumberland, not less than twenty or thirty pounds-worth were sold each market-day, for five or six weeks together, and dispersed over different parts of the kingdom. In Sweden these berries serve only to boil silver plate to its due degree of whiteness, their sharp acid corroding the superficial particles of the copper alloy.

38. *V. macrocarpon*. American Cranberry. Ait. Hort. Kew. ed. 1. v. 2. 13. t. 7. ed. 2. n. 22. Willd. n. 27. Lamarck f. 4. (*V. Oxycoccus* β ; Michaux Boreal.-Amer. v. 1. 228. “*V. hispidulum*; Wangenh. Amer. 108. t. 30. f. 67.” Oxycoccus macrocarpus; Pursh 263.)—Corolla deeply four-cleft. Leaves elliptic-oblong, entire, slightly revolute, obtuse, smooth. Stems ascending. Flowers lateral.—In bogs principally in a sandy soil, and on high mountains, frequent, from Canada to Virginia, flowering from May to July. A larger and more upright plant than the last, with less convex, more oblong, much larger leaves. Several flowers come forth at the ends of the last year's branches, surmounted by the shoots of the present year. Their bracteas are situated towards the top of each stalk, and, as well as the segments of the corolla, are larger than in the Common Cranberry. The filaments however are shorter in proportion to their anthers, which are unusually long. The berries are larger, and of a brighter red, than the last, collected in great abundance, for making tarts, in America, and exported from thence to Europe; but they always prove here far inferior in quality to the Russian Cranberries,

berries, however excellent in America. The best method of having American Cranberries in Europe, is by cultivation in an artificial bog with great plenty of water, as first contrived by sir Joseph Banks. A very few square yards of ground thus employed, will yield as many Cranberries as any family can use. If allowed to hang till they are full ripe, as late as October, they are even better than the *Oxycoccus*, and may be kept dry in bottles throughout the year. Our wild Cranberries have generally been gathered too early; as may also be the case with those brought from America.

39. *V. erythrocarpum*. Scarlet Carolina Cranberry. Michaux Boreal.-Amer. v. 1. 227. (*Oxycoccus erectus*; Pursh 264.)—"Corolla deeply four-cleft. Leaves oval, pointed, finely serrated, fringed. Stem erect. Flowers axillary."—On high mountains of Virginia and Carolina, flowering in June. Berries scarlet and quite transparent, of an exquisite taste. *Pursh*. The stem is shrubby, erect, generally with divaricated zigzag branches. Leaves rather large, thin and membranous, somewhat hairy at the ribs on each side. Calyx minute, sharply four-cleft. Corolla before expansion long and conical; finally revolute. Anthers prominent, without spurs. Berry globose, shining. Michaux.

We have seen no specimen of this species. Its fruit might be an acquisition to our tables, if raised in the same mode as the last.

In the above ample detail of the genus *Vaccinium*, which we trust will prove acceptable to those who have ever attended to its former confusion, we have removed eight of Willdenow's species. Four of these are *album*, *mucronatum*, *ligustrinum* and *hispidulum* of Linnæus, the latter being referred by Mr. Pursh to *GAULTHERIA* by the name of *serpyllifolia*; see that article, where this species should be introduced next to *procumbens*, with the following character. "Stem creeping, hispid. Leaves roundish-oval, acute. Flowers four-cleft, axillary, solitary, nearly sessile. Corolla bell-shaped." (*Vaccinium hispidulum*; Linn. Sp. Pl. 500. Willd. n. 26. Michaux Boreal.-Amer. v. 1. 228. t. 23.)—In mossy swamps, particularly where Cedars and other evergreens abound, from Canada to Pennsylvania, flowering in April and May. A small creeping plant. Berries white, very sweet, and agreeable to eat. *Pursh*.—The other four discarded species of Willdenow are *fuscatum*, *venustum*, *amænum* and *virgatum* of Dr. Solander, in Ait. Hort. Kew. ed. 1; the reasons of which rejection are to be found under our 13th and 17th species.—On the other hand, we have augmented this genus with seven entirely nondescript species, for most of which we are obliged to the bounty of our often-mentioned friend Mr. Archibald Menzies; as well as with twelve others from Michaux, Pursh, and our several English garden botanists and publishers. On this subject we would particularly direct our fellow-labourers to the plants hitherto confounded under *V. Arctostaphylos*, and the still-suppoted varieties of that interesting species; relating to which, discoveries are probably yet to be made, in the wilds of Tartary and the Levant, and possibly even in the greenhouses of France and England.

VACCINIUM, in *Gardening*, comprehends many sorts of hardy, dwarf, under-shrubby, ligneous, evergreen, and deciduous plants, among which the species most commonly cultivated are those of the black whortle, or bilberry (*V. myrtillus*); the white Pennsylvanian whorts, or bilberry (*V. album*, see the preceding article); the red whortleberry (*V. vitis idæa*); the cranberry, moss, or moor berry (*V. oxycoccus*); the marsh whortle, or great bilberry-

bush (*V. uliginosum*); the hispid-stalked American whortleberry (*V. hispidulum*, see the preceding article); the corymbose-flowering American whortleberry (*V. corymbosum*); the privet-leaved Pennsylvanian whortleberry (*V. ligustrinum*); and the staminate American whortleberry (*V. stamineum*).

The first has slender, branching, shrubby stalks, about two feet in height, and produces large eatable berries of a blackish-red colour. The second is a similar plant, producing small berries of a whitish colour. The third is a more dwarfish plant, producing clusters of nodding, reddish flowers, and red juicy berries of great value for tarts, and other culinary uses. The fourth has slender creeping stalks, which produce reddish eatable berries of great value and importance for different culinary well-known purposes, as in pies, tarts, &c. The fifth has a woody, shrubby, branching stalk of some height, and affords whitish purple flowers, and large berries. The sixth grows with slender, trailing, rough stalks, and yields large red berries. The rest are all American plants.

Method of Culture.—They may all be raised from seeds, or offset root-suckers, creeping roots, and trailing rooting stalks. Those also growing with several rooted stalks and branches, may be divided in the root and top, into separate plants, in which way they succeed very well.

The seeds should be sown, where that method is pursued, in the autumn as soon as they are ripe and gathered, in a shady border, or the places where the plants are to grow and remain; and when the young plants are up, they should be kept clean, and be removed with earth about their roots, as there may be occasion.

The offsets and root-plants may be set out in the same season in proper places, which for the first four sorts are those where the soil is of a cold, light, sandy, heathy, mossy, moory, or woody nature, and for the two succeeding ones in marshy and boggy situations; as these have the most resemblance to those in which they grow naturally, and are the most prosperous. It may likewise be adviseable in many cases to take the plants from their native situations with balls of earth about their roots. Some, however, succeed in the common borders and other parts. They may in some cases be removed in the spring season, but the other is the better way.

They are admitted into gardens and pleasure-grounds for the sake of variety, curiosity, and ornament, and some of them are cultivated for the use of their fruit. In its natural situation, that of the cranberry is often an object of very great importance, affording the poor gatherers of its berries considerable employment as well as much money. It delights most in rather wet, moory, mossy situations.

The *vaccinium oxycoccus* of Linnæus, or cranberry, may be preserved perfect for several years, merely by drying it a little in the sun, and then stopping it closely in dry bottles. The *vaccinium myrtillus*, or bilberry, yields a juice, which has been employed to stain paper, or linen, purple. In autumn the moor-game chiefly live upon the product of this shrub.

VACERRI. See DRUIDS.

VACH, in *Geography*, one of the smaller Lipari islands, in the Mediterranean.

VACH, or *Vakh*, in *Mythology*, a name of the Hindoo goddess Saraswati; fakti or consort of the creative power in the Trimurti, or divine Triad of the East. The name Vach, or Vachi, is derived from *speech*, Saraswati being goddess of eloquence; and hence called also Vachdevi. Vachapati, a title equivalent to lord of eloquence, is sometimes applied to

to the regent of the planet Jupiter, whom the Hindoos call *Vrihaspati*; which see.

VACHA, in *Geography*, a town of Germany, in the principality of Upper Hesse, on the Werra; 20 miles N.E. of Fulda.—Also, a town of Germany, in the margravate of Anspach, on the Rednitz; 25 miles N.E. of Anspach.—Also, a town of Peru, in the diocese of La Paz; 8 miles S.W. of La Paz.

VACHE, or *Cow's Island*, an island about twelve miles from the south coast of Hispaniola, about twenty-four miles in circumference. It was formerly a place of rendezvous for pirates and freebooters, and is provided with three ports, one of which can receive vessels of 300 tons. N. lat. 18° 5'. W. long. 74° 25'.

VACHE *et le Torreau*, or *Cow and Bull Rocks*, rocks on the south coast of Newfoundland, a little to the east of Placentia bay.

VACHELUSE, one of the Lipari islands; 3 miles S. of Stromboli.

VACHIER, a town of France, in the department of the Upper Loire; 9 miles S. of Le Puy en Velay.

VACHON, PIERRE, in *Biography*, an eminent performer on the violin, was born in Provence, 1730. After performing at the concert spirituel with great applause, he was placed at the head of the prince of Conti's select band. In 1784 he was appointed concert-master to the king of Prussia at Berlin, after residing some time in London, and leading at the Opera. He was one of the most certain and agreeable performers on the violin of his time, particularly in trios and quartets. He was likewise a composer of considerable merit, having furnished the different theatres of Paris with six or eight successful musical dramas, and the performers on his instrument with several books of solos, quartets, and concertos, which were practicable and in a pleasing style. He had an extreme melancholy expression of countenance, of which he was not insensible, and used to say, in pleasantry, "Ma triste contenance m'a fait beaucoup de mal auprès les dames."

VACIA, or **VACZ**, in *Geography*. See **WAITZEN**.

VACIAN, a town of Abascia; 15 miles S. of Alkasy.

VACKALEER, a town of Hindoostan, in Mysore; 27 miles E.N.E. of Bangalore.

VACOMAGI, in *Ancient Geography*, a people of the isle of Albion, S. of the Caledonii, whose towns were Banatia, Tamaa, the Winged Camp, or Alata Castra, and Tufis.

VACONE, in *Geography*, a town of the Papedom, in the duchy of Spoleto; 8 miles S.E. of Narni.

VACONTIUM, in *Ancient Geography*, a town of Lower Pannonia, at a distance from the Danube.

VACUA, Ital., in *Music*, a white open note; in old English, a *void*; in opposition to notes with black heads, like crotchets and quavers. In the first time-table all the notes were black, till the invention of the semibreve and minim.

VACUNA, in *Mythology*, a goddess held in high veneration among the Sabines.

VACUNALIA, a festival kept in honour of the goddess Vacuna, who presided over those that were unemployed or at rest.

It was celebrated in December by the country labourers, after the fruits were gathered in, and the land tilled.

Ovid speaks of it in his *Fasts*, lib. vi.

"Nam quoque cum fiunt antiquæ sacra vacunæ,
Aute vacuales stantque, sedentque focos."

The worship of Vacuna was very ancient in Italy, and established among the Sabines long before Rome was founded. Some take her for Diana, Venus, or Ceres, and

others for Bellona or Victory. Varro thinks she was Minerva.

VACUP, in *Geography*, a town of Bosnia; 32 miles S.W. of Serajo.

VACUUM, VACUITY, in *Physics*, a space empty or devoid of all matter, or body.

Whether there be any such thing in nature as an absolute vacuum; or whether the universe be completely full, and there be an absolute plenum, is a thing that has been controverted by the philosophers of all ages.

The ancients, in their controversies, distinguished two kinds; a *vacuum coærvatum*, and a *vacuum interpersum*, or *diffeminatum*.

VACUUM coærvatum, is conceived as a place destitute of matter: such, *e. gr.* as there would be, should God annihilate all the air, and other bodies within the walls of a chamber.

The existence of such a vacuum is maintained by the Pythagoreans, Epicureans, and the Atomists, or Corpuscularians; most of whom assert such a vacuum actually to exist without the limits of the sensible world. But the modern Corpuscularians, who hold a *vacuum coærvatum*, deny that appellation; as conceiving, that such a vacuum must be infinite, eternal, and uncreated.

According, then, to the later philosophers, there is no *vacuum coærvatum* without the bounds of the sensible world; nor would there be any other vacuum, provided God should annihilate divers contiguous bodies, than what amounts to a mere privation, or nothing; the dimensions of such a space, which the ancients held to be real, being by these held to be mere negations; that is, in such a place, there is so much length, breadth, and depth wanting, as a body must have to fill it. To suppose, that when all the matter in a chamber is annihilated, there should yet be real dimensions, is to suppose corporeal dimensions without body; which is absurd.

The Cartesians, however, deny any *vacuum coærvatum* at all; and assert, that if God should immediately annihilate all the matter, *v. gr.* in a chamber, and prevent the ingress of any other matter, the consequence would be, that the walls would become contiguous, and include no space at all. They add, that if there be no matter in a chamber, the walls can be conceived no otherwise than as contiguous; those things being said to be contiguous, between which there is not any thing intermediate: but if there be no body between, there is no extension between: extension and body being the same thing: and if there be no extension between, then the walls are contiguous, and where is the vacuum?

But this reasoning is founded on a mistake, *viz.* that body and extension are the same thing. See **MATTER**.

VACUUM diffeminatum, or *interpersum*, is that supposed to be naturally interspersed in and among bodies, in the pores of the same body, and in the interstices between different bodies.

It is this kind of vacuum which is chiefly disputed among the modern philosophers; the Corpuscularians strenuously asserting it; and the Peripatetics and Cartesians as tenaciously impugning it. See **CARTESIAN** and **LEIBNITZIAN**.

The great argument the Peripatetics urge against a *vacuum interpersum* is, that there are divers bodies frequently seen to move contrary to their own nature and inclination; and that for no other apparent reason, but to avoid a vacuum; whence they conclude, that nature abhors a vacuum, and gives us a new class of motions ascribed to the *fuga vacui*, or nature's flying a vacuum. Such, they say, is the rise of water in a syringe, upon the drawing up of the piston; such also is the ascent of water in pumps, and the swelling

swelling of the flesh in a cupping-glass, &c. But since the weight, elasticity, &c. of the air have been ascertained by sure experiments, those motions and effects are universally ascribed to the gravity and pressure of the atmosphere.

The Cartesians deny not only the actual existence, but even the possibility of a vacuum: and that on this principle, that extension being the essence of matter, or body, wherever extension is, there is matter; but mere space, or vacuity, is supposed to be extended; therefore it is material. Whoever asserts an empty space, they say, conceives dimensions in that space, *i. e.* he conceives an extended substance in it; and therefore he denies a vacuum, at the same time that he admits it.

Des Cartes, if we may believe some accounts, rejected a vacuum from a complaisance to the taste which prevailed in his time, against his own first sentiments; and among his familiar friends used to call his system his philosophical romance.

On the other hand, the corpuscular authors prove, not only the possibility, but the actual existence of a vacuum, from divers considerations; particularly from the consideration of motion in general; and that of the planets, comets, &c. in particular; from the fall of bodies; from the vibration of pendulums: from rarefaction and condensation; from the different specific gravities of bodies; and from the divisibility of matter into parts.

1. It is argued, that motion could not be effected without a vacuum. This is what Lucretius urged long ago. "*Principium quoniam cedeni nulla daret res,—undique materies quoniam stipata fuisset.*"

The force of this argument will be increased from the two following considerations; *viz.* first, that all motion is either in a straight line, or in a curve, which returns into itself, as the circle and ellipsis; or in a curve that does not return into itself, as the parabola, &c. And, secondly, that the moving force must always be greater than the resistance.

From hence it follows, that no force, even though infinite, can produce motion where the resistance is infinite; consequently, there can be no motion either in a straight line, or a non-returning curve; because, in either of those cases, the protrusion, and consequently the resistance, would be infinite. There remains, therefore, only the motion of a revolving curve practicable; this must either be a revolution upon an axis, or an annular motion round a quiescent body; both which are, again, impossible in an elliptic curve; and, consequently, all motion must be in circles geometrically true; and the revolving bodies must either be spheres, spheroids, cylinders, or portions of them, exactly geometrical; otherwise the revolutions in a plenum would be impossible: but such motions, or such figured bodies, we do not know in nature. Therefore there is a vacuum.

2. The motions of the planets and comets demonstrate a vacuum: thus Sir Isaac Newton,—“That there is no such fluid medium as æther,” (to fill up the porous parts of all sensible bodies, as the air and interstellar parts, and so make a plenum,) “seems probable; because the planets and comets proceed with so regular and lasting a motion through the celestial spaces, both from and to all parts; for hence it appears, that those celestial spaces are void of all sensible resistance, and consequently of all sensible matter. For the resisting force of fluid mediums arises partly from the attrition of the parts of the medium, and partly from the inactivity of matter. Now, that part of the resistance of any medium, which arises from the tenacity or attrition of its parts, may be lessened by dividing the matter into smaller parts, and rendering those parts more smooth and slippery:

but that part of the resistance which arises from the inactivity of matter, is always in proportion to the density of the matter; nor can it be diminished by dividing the matter, nor by any other means, except by diminishing the density thereof.

“Consequently, if the celestial regions were as dense as water, or as quicksilver, they would resist almost as much as water or quicksilver; but if they were perfectly dense without any interspersed vacuity, though the matter were ever so fluid and subtle, they would resist more than quicksilver does: a perfectly solid globe, in such a medium, would lose above half its motion, in moving three lengths of its diameter; and a globe not perfectly solid, such as the bodies of the planets and comets are, would be stopped still sooner. Therefore, that the motion of the planets and comets may be regular and lasting, it is necessary the celestial spaces be void of all matter, except perhaps some few, and much rarefied effluvia of the planets and comets, and the passing rays of light.”

3. The same great author deduces a vacuum also from the consideration of the weights of bodies; thus: “All bodies about the earth gravitate towards the earth; and the weights of all bodies, equally distant from the earth’s centre, are as the quantities of matter in those bodies. If the æther, therefore, or any other subtle matter, were altogether destitute of gravity, or did gravitate less than in proportion to the quantity of its matter; because (as Aristotle, Des Cartes, and others, argue) it differs from other bodies only in the form of matter; the same body might, by the change of its form, gradually be converted into a body of the same constitution with those which gravitate most in proportion to the quantity of matter: and, on the other hand, the most heavy bodies might gradually lose their gravity, by gradually changing their form; and therefore the weights would depend upon the forms of bodies, and might be changed with them; which is contrary to all experiment.”

4. The descent of bodies proves, that all space is not equally full; for the same author goes on, “If all spaces were equally full, the specific gravity of that fluid with which the region of the air would, in that case, be filled, would not be less than the specific gravity of quicksilver or gold, or any other the most dense body; and therefore neither gold, nor any other body, could descend therein. For bodies do not descend in a fluid, unless that fluid be specifically lighter than the body. But, by the air-pump, we can exhaust a vessel, till even a feather shall fall with a velocity equal to that of gold in the open air: the medium, therefore, through which this feather falls, must be much rarer than that through which the gold falls in the other case.

“The quantity of matter, therefore, in a given space, may be diminished by rarefaction: and why may not it be diminished *in infinitum*? Add, that we conceive the solid particles of all bodies to be of the same density; and that they are only rarefiable by means of their pores: and hence a vacuum evidently follows.”

5. “That there is a vacuum, is evident from the vibrations of pendulums; for since those bodies, in places out of which the air is exhausted, meet with no resistance to retard their motion, or shorten their vibrations; it is evident there is no sensible matter in those spaces, or in the occult pores of those bodies.”

As to what Des Cartes urges of his *materia subtilis*, that its tenuity prevents its resistance from being sensible; and that a small body, striking against a greater, cannot in the least move, or resist the motion of that other; but is reflected

lected back again with all its momentum; it is contrary to all experience. For sir Isaac proves, that the density of fluid mediums is proportionable to their resistances, very nearly; and that they are exceedingly mistaken, who suppose the resistance of projectiles to be infinitely diminished, by dividing the parts of the fluid, even *in infinitum* (Princip. lib. ii. prop. 38.): when, on the contrary, it is clear the resistance is but little diminished by the subdivision of the parts (*ibid.* prop. 40.), and that the resisting forces of all fluids are nearly as their densities.—For why should not the same quantity of matter, whether divided into a great number of subtile parts, or into a few larger ones, have the same resisting force? If then there were no vacuum, it would follow, that a projectile moving in the air, or even in a space whence the air is exhausted, should move with as much difficulty as it would in quicksilver; which is contrary to experience.

Nor will it avail to suppose the particles of the subtile fluid, constituting a plenum, to move constantly and equally in all directions; and by favour of this hypothesis, to imagine that they act, but do not resist. Because the motion of a fluid favours the motion of a body in it, only as far as it is in the same direction; and an intestine motion of the parts of the fluid, equal in all directions, cannot make the resistance less than if there was no motion of the parts. It is supposed by many that the particles of common fluids, *e. g.* water or air, are in a constant intestine motion: but this does not hinder those fluids from resisting in proportion to their density.

If it should be alleged, that by supposing this dense fluid which replenishes space to penetrate the pores of bodies with the utmost freedom, (as light passes through transparent bodies, and the magnetic and electric effluvia through most kinds of bodies,) its resistance will then be incomparably less than in proportion to its density; the resistance in this case not being measured by the density of the fluid, because the greater part passes through the pores of the body in motion freely, without resistance: yet even on this hypothesis, the resistance of a golden ball in a plenum would be still very great. For this subtile fluid, how penetrating soever it be, must resist the solid parts of the ball; which cannot move in the fluid without displacing its parts, and losing as much motion as must be communicated to those parts; and this resistance depends on the quantity of solid parts in the ball; whereas the resistance which the same ball meets with in quicksilver (which we suppose to have no passage through the ball), depends on the quantity of the solid parts in an equal bulk of the quicksilver, which must be moved to make way for the ball. And this being less than the quantity of solid parts in an equal bulk of the golden ball, in proportion as the specific gravity of quicksilver is less than that of gold, it follows that the resistance of a golden ball, moving in such a subtile penetrating plenum, would still be greater than its resistance in quicksilver. The resistance of a golden ball in a plenum (how freely soever the matter constituting it pass through the pores of the ball, and how large and numerous soever these pores may be) must correspond to the solid matter in the ball; which is greater than the solid matter in any equal bulk of any of our fluids, upon which their resistance depends.

6. That there are interspersed vacuities, appears from matter's being actually divided into parts, and from the figures of those parts; for, on supposition of an absolute plenitude, we do not conceive how any part of matter could be actually divided from that next adjoining, any more than it is possible to divide actually the parts of absolute space

from one another: for by the actual division of the parts of a continuum from one another, we conceive nothing else understood, but the placing of those parts at a distance from one another, which, in the continuum, were at no distance from one another: but such divisions between the parts of matter must imply vacuities between them.

7. As for the figures of the parts of bodies, upon the supposition of a plenum, they must either be all rectilinear, or all concavo-convex; otherwise they would not adequately fill space; which we do not find to be true in fact.

8. The denying a vacuum, supposes what it is impossible for any one to prove to be true; *viz.* that the material world has no limits.

However, we are told by some, that it is impossible to conceive a vacuum. But this surely must proceed from their having imbibed Des Cartes's doctrine, that the essence of body is constituted by extension; as it would be contradictory to suppose space without extension. To suppose that there are fluids penetrating all bodies and replenishing space, which neither resist nor act upon bodies, merely in order to avoid admitting a vacuum, is feigning two sorts of matter, without any necessity or foundation; or is tacitly giving up the question.

Since then the essence of matter does not consist in extension, but in solidity, or impenetrability, the universe may be said to consist of solid bodies moving in a vacuum: nor need we at all fear, lest the phenomena of nature, most of which are plausibly accounted for from a plenitude, should become inexplicable when the plenum is set aside. The principal ones, such as the tides; the suspension of the mercury in the barometer; the motion of the heavenly bodies, and of light, &c. are more easily and satisfactorily accounted for from other principles. See TIDES, &c.

VACUUM, or *Vacuum Boyleanum*, is also used, somewhat abusively, to express that approach to a real vacuum, which we arrive at by means of an air-pump.

Thus, any thing put in a receiver so exhausted, is said to be put *in vacuo*: and thus, most of the experiments with the air-pump are said to be performed *in vacuo*, or *in vacuo Boyleano*. Some of the principal phenomena observed of bodies *in vacuo*, are; that the heaviest and lightest bodies, as a guinea and a feather, fall here with equal velocity:—that fruits, as grapes, cherries, peaches, apples, &c. kept for any time *in vacuo*, retain their nature, freshness, colour, &c. and those withered in the open air recover their plumpness *in vacuo*:—all light and fire become immediately extinct *in vacuo*:—the collision of flint and steel *in vacuo*, produces no sparks:—no sound is heard, even from a bell rung *in vacuo*:—a square phial, full of common air, well closed, breaks *in vacuo*; a round one does not:—a bladder half full of air will heave up forty pounds weight *in vacuo*:—cats, and most other animals, soon expire *in vacuo*.

By experiments made in 1704, Dr. Derham found, that animals that have two ventricles, and no foramen ovale, as birds, dogs, cats, mice, &c. die in less than half a minute; counting from the first exsuction: a mole died in one minute, a bat lived seven or eight. Insects, as wasps, bees, grasshoppers, &c. seemed dead in two minutes; but, after being left *in vacuo* twenty-four hours, they came to life again in the open air: snails continued twenty-four hours *in vacuo*, without appearing much incommoded.

Seeds planted *in vacuo* do not grow:—small beer dies, and loses all its taste, *in vacuo*:—lukewarm water boils very vehemently *in vacuo*:—and air, rushing through mercury into a vacuum, throws the mercury in a kind of shower upon the receiver, and produces a great light in a dark room.

The air-pump can never produce a perfect vacuum; as is evident from its structure, and the manner of its working: in effect, every exsuction only takes away a part of the air: so that there will still be some left after any finite number of exsuctions. Add, that the air-pump has no longer any effect than while the spring of the air remaining in the receiver is able to lift up the valves: when the rarefaction is come to that degree, you can come nearer to a vacuum. Sir Isaac Newton, observing that a thermometer suspended *in vacuo*, and in that state removed to a warm or a cold room, receives the heat or cold, and rises, or falls, almost as soon as another in open air; takes thence occasion to suspect, that the heat of the warm room is conveyed through the vacuum, by the vibrations of a much subtler medium than air, which remained in the vacuum after the air was drawn out. Opt. p. 323.

VACUUM, *Toricellian*. See TORRICELLIAN.

VADA, in *Ancient Geography*, a place which belonged to the Batavi, W. of Batavodurum.

VADA *Sabatia*, *Vai*, a town of Italy, in Liguria.

VADA *Volaterra*, a place of Italy, in Etruria.

VADA, in *Geography*, a sea-port town of Etruria, at the mouth of the river Cecina; 18 miles S.W. of Volterra. N. lat. 43° 17'. E. long. 10° 30'.

VADACOURCHY, a town of Hindoostan, in Calicut; 10 miles S.W. of Palicauchery.

VADAGARY, a town of Hindoostan, in Madura; 25 miles W. of Coilpetta.

VADAMADERRY, a town of Hindoostan, in the province of Dindigul; 15 miles N.E. of Dindigul.

VADAMIA, a town of the Arabian Irak, on the Euphrates; 105 miles W.N.W. of Bassora.

VADARI, in the *Civil Law*, denotes a person to pledge, undertake, or give security, in behalf of another, that he shall, on a certain day, appear in court, to prosecute, or answer.

If he fails, his surety has an action *vadimonii deserti* against him; that is, an action for deserting his bail. See WAGER.

Properly speaking, *vadari reum*, among the Romans, was the act of the plaintiff himself, who here demanded surety, or bail from the defendant, that he would appear before the praetor on a certain day.

VADDAL, in *Geography*, a town of Hindoostan, in Soonda; 27 miles S.E. of Goa.

VADDER, LOUIS DE, in *Biography*, an eminent landscape painter, was born at Brussels in 1560. It is not known under whom he studied, where he resided, or how long he lived; but he has left works behind him which exhibit him as a diligent observer of nature, with taste and feeling to select her most fascinating effects, and ability to execute what he attempted, so as to afford the greatest pleasure to all admirers of the art.

It is not improbable that he resided some time in Italy, and had studied the pictures of Titian; perhaps wrought in the same scenery; for his finest works have a great degree of resemblance to those of the Venetian, in the choice of forms and colour however more than in the execution, in which he more resembles Pynacher in freshness and fulness.

Two large pictures by Vadder found their way into this country some time ago, and fully justify these remarks; but in general his works are scarce, or most probably have been introduced under fictitious names. In his native country he is better known and justly esteemed. He has left a few spirited etchings in the style of Lucas Van Uden.

VADÉ, JOHN JOSEPH, was born at Ham, in Picardy,

and is distinguished as the inventor of a kind of humorous French poetry. In his youth he resided at Paris, and led a dissipated life; but in more advanced age he perceived the defects of his early education, and endeavoured to supply them by a perusal of the best French authors. As he was original in his mode of thinking, he adopted a new kind of writing, to which he was led by his familiarity with vulgar life. This species of writing was called the "Poissarde manner," and he was hence denominated the "Teniers" of poetry. His productions, which consisted of tales and songs, were amusing and popular; and as he possessed many amiable qualities, he was generally beloved in the gay societies which he frequented. But he was thus led to pursue a course of debauchery, which terminated his life in 1757, at the early age of 37 years. His works, consisting of comic operas, parodies, songs, &c. have been collected in 4 vols. 8vo., to which has been added a volume of posthumous pieces of a similar nature, though of superior merit, and indicating talents of a higher class, which he might have cultivated to advantage. Moreri. *Nouv. Dict. Hist.*

VADLECT. See VALET.

VADÉ-MECUM, or a VENI-MECUM, a Latin phrase, used in English, to express a thing that is very familiar; and which any one usually carries about with him: it is chiefly applied to some favourite book.

Some make Virgil, others Horace, their *vade-mecum*; others an Epictetus, &c.

This is what the Greeks call *εγχεσίδιον*, or *manual*. The Arabs have a phrase of equal import; *viz. Habib al feir*, *comes iimeris*, companion of the journey. In Latin it is best expressed by *comes*; as *comes theologicus*, *comes rusticus*, &c.

VADENAGORCHY, in *Geography*, a town of Hindoostan, in Coimbatore; 15 miles W. of Damicotta.

VADIANUS, JOACHIM, in *Biography*, was born in 1484, at St. Gall in Switzerland, where his father, Leonard Von Watt, was a senator. Having studied at Vienna, he was chosen professor of the belles lettres, and rector of the university. In 1514 he was honoured at Lintz by the emperor Maximilian with the poetical laurel. In his subsequent travels, he applied to the study of geography, and in 1518, having taken the degree of M.D. at Vienna, he returned to St. Gall, and devoted himself to the practice of physic, to which he joined theology upon the principles of the reformers, whose cause he promoted as a senator, and also by his discourses and writings. Having been honoured eight times with the office of consul, he died in 1551, and bequeathed his library to his fellow-citizens. On the various subjects of mathematics, geography, antiquities, medicine, and theology, he published works, as well as several Latin poems. His "Commentary on Pomponius Melz de Situ Orbis," and his "Scholia on the second Book of Pliny's Natural History," are the most generally known of his literary performances. Scaliger regarded Vadianus as one of the most learned men in Germany; and on account of his able conduct of public affairs, Thuanus presents him to notice, as an example, that men of letters and philosophers are not, as such, disqualified for business. Moreri.

VADIATION. See VADARI.

VADICASSES, in *Ancient Geography*, a people of Gaul, who have been distinguished by different denominations: the Bodiocasses of Pliny being the same with the Vadicasses of Ptolemy, and both are supposed to comprehend the ancient inhabitants of Bayeux, anciently called Næomagus.

VADILCORA, or *Vadi al Kora*, in *Geography*, a town

town of Arabia, in the province of Hedsjas; 56 miles N. of Medina. N. lat. $25^{\circ} 30'$. E. long. $38^{\circ} 20'$.

VADIMONIS LACUS, in *Ancient Geography*, a lake of Italy, in Etruria, in the vicinity of Ameria.

VADIMONIUM, in the *Civil Law*, a promise, or bond, given for appearance before the judge upon a day appointed. See VADARI.

VADIN, in *Geography*, a town of European Turkey, in Bessarabia, on the Danube; 32 miles W. of Nicopoli.

VADIUM. See GAGE and PONE *per Vadium*.

VADNIA, in *Ancient Geography*, a town of Hither Spain, belonging to the Cantabri. Ptolemy.

VADO, or VADI, in *Geography*, a sea-port town of the Genoese, situated in a bay of the Mediterranean, with a good harbour; 3 miles S. of Savona. N. lat. $44^{\circ} 14'$. E. long. $8^{\circ} 30'$.

VADO, *Il*, a town of Naples, in Abruzzo Citra, near the Adriatic; 16 miles E.S.E. of Lanfiano.

VADO Saetta, a town of Naples, in Capitanata; 6 miles S.E. of Troia.

VADOCNDES, a town of Spain, in old Castile; 26 miles W.S.W. of Olma.

VADORANIUM, a town of Hindooistan, in the Carnatic; 12 miles S. of Negapatam.

VADUTZ, a town and castle of Germany, in the principality of Lichtenstein; 26 miles S. of Lindau. N. lat. $47^{\circ} 5'$. E. long. $9^{\circ} 31'$.

VÆIROE, a small island in the Baltic, near the north coast of Laland. N. lat. $55^{\circ} 57'$. E. long. $10^{\circ} 46'$.

VAELUE, a river of the island of Ceylon, which runs into the sea, near Mago.

VA-EMBU, in the *Materia Medica*, a name given by some authors to the *acorus Asiaticus*, or Asiatic sweet flag.

VAENA, in *Geography*, a town of Spain, in the province of Cordova; 18 miles E.S.E. of Cordova.

VÆROE, a small island in the North sea, about 20 leagues from the coast of Norway. N. lat. 67° .

VÆSAPA, in *Ancient Geography*, a town of Asia, in the Lesser Armenia, towards the mountains, and at a distance from the Euphrates.

VAG BESTER, in *Geography*, a town of Hungary, on the river Waag; 6 miles N.E. of Bolefko.

VAGA, PIERINO DEL, in *Biography*, whose real name was Pietro Buonacorsi, was one of those ingenious painters employed by Raphael to assist him in adorning the Vatican. He was born at a village near Florence in 1500, of indigent parents. His father was killed in battle, and his mother died of the plague before he was two months old. He is said to have been reared by goat's milk, and as a destitute orphan, was taken under the protection of an indifferent artist named Andrea de Ceri, whose house was frequented by several young artists of Florence.

As Pierino had discovered a decided inclination for painting, he was placed, when eleven years old, under the tuition of Ridolfo Ghirlandaio, and with his assistance soon became a very able designer, and more particularly, as Vasari observes, by studying with many other Florentine youths as well as strangers the Cartoon of M. Angelo, known by the name of the Cartoon of Pifa.

His talents acquired for him the attention and approbation of a Florentine painter of inferior quality, but who had nevertheless much employment, and was in want of a skilful designer to assist him in conducting his undertakings. With the consent of his guardian Ceri, Pierino accompanied this man, whose name was Vaga, to the neighbourhood of Rome, whence, when the work was completed which

he had undertaken, he was conveyed by his employer to Rome in 1515, and there introduced to several painters, to whose care and assistance Il Vaga recommended him during his absence; and thence he was called Pierino del Vaga. In Rome he endured great miseries, and obtained bread with difficulty; but ever intent upon improvement, he studied hard the pictures of Angelo in the Sistine, and designed from the pieces of antique sculpture which by chance came to his hand, and after a short time, his ardent exertions were repaid by a degree of success, which led to his adoption into the school of Raphael.

Julio Romano and Francesco Penni first did justice to his talents by recommending him to their master, who, upon the first sight of his productions, placed him under Giovanni da Udine, who had the management of the ornamental parts of the works then going on in the Vatican. But Pierino was soon found equal not only to assist Giovanni in the grotesque ornaments and in the stuccoes, but also Polidoro da Caravaggio in the antique subjects in chiaro-scuro, and sometimes also in executing the scripture subjects from the sketches of Raphael, as among others may be seen, according to Vasari, in the Hebrews crossing the river Jordan, the surrounding Jericho, the combat of Joshua with the Amorites, Abraham preparing to sacrifice Isaac, Jacob wrestling with the angel, Joseph and his brethren, &c. &c. The praise which he gained by these labours inspired him only with a more earnest desire to improve, and the mildness and attention of his manner procured for him the esteem and even love of his master Raphael.

After the death of Raphael, he was employed, with J. Romano and G. F. Penni, to continue and complete the adornment of the Vatican, great part of the execution of which is the work of Del Vaga.

For a short time he went to Florence, when the pope Leo X. was there, but quickly returned to Rome and pursued his labours, adding to them many original ones, the inventions of his own mind. Among them was the hall of the house of Maschione Baldassini, which he adorned with subjects from the Roman history, with arms, trophies, &c. Perhaps the most perfect of these minor works was the birth of Eve, which he painted in the church of S. Marcello, and in which he exhibited his decided predilection for the style of the Florentine school, and the success with which he had studied the works of M. Angelo.

Pierino was in full possession of public repute when he was compelled to fly for safety from Rome, by the sacking of that city in 1527. He took refuge in Genoa, where he was graciously received by prince Doria, who at that time projected the embellishment of his superb palace near the gate of St. Thomas. He had here a full opportunity of displaying his imagination, as well as his executive powers; and here he indulged in those inventions which breathe the spirit of Raphael himself, and rival the exertions of his fellow pupil J. Romano, in the palazzo del T at Mantua: both do honour to the school they had studied in, and the patron who employed them. He is said not to have been sufficiently scrupulous in the choice of his coadjutors, and the grandeur of his designs is consequently weakened by their imperfect execution. He died at Rome in 1547, aged 47.

VAGA, *Tagadempt* or *Swamma*, in *Ancient Geography*, a town of Africa, in Mauritania Casariensis, E. of Cirta. Ptolemy. This town, named Baga by Plutarch, was situated S.E. of Victoria. It was one of the episcopal sees of Numidia.

VAGA, in *Geography*, a river of Russia, which rises near Poprovskoe, in the government of Vologda, and runs into

into the Dwina, at Uft Vagkoi, in the government of Archangel.

VAGABOND, a person that wanders about, having no certain dwelling; or a sturdy beggar, &c. mentioned in divers statutes.

“De vagabundis, et aliis hominibus mendicantibus, qui se nominant.”—Travelling men, &c. Charta 22 Hen. VI. “Item utemur, quod nullus vagabundus vegetur seu deambulet de nocte in villa seu suburbio post pulsationem campanæ nostræ communis, vocatæ Coverfeu: et si aliquis ibidem capiatur post pulsationem dictæ campanæ, ducatur ad gaulam domini regis, et ibi morabitur usqua in crastinum, ut notitia personæ suæ habeatur,” &c. MS. Cod. de Leg. et Stat. Burgi villæ Mountgomer. temp. Hen. II.

All itinerant beggars, fortune-tellers, collectors for gaols, fencers, bearwards, players of interludes, minstrels, jugglers, gypsies, &c. shall be reputed vagabonds, rogues, and iturdy beggars. 39 Eliz. c. 4.

The court of Areopagus at Athens punished idleness, and exercised a right of examining every citizen in what manner he spent his time. The civil law expelled all sturdy beggars from the city; and, in our own law, all idle persons or vagabonds, (whom our ancient statutes describe to be “such as wake in the night, and sleep in the day, and haunt customable taverns, and alehouses, and routs about; and no man wot from whence they come or whither they go;” or such as are more particularly described by statute 17 Geo. II. c. 5. called the Vagrant Act, and divided into three classes, *idle and disorderly persons, rogues and vagabonds, and incorrigible rogues,*) are offenders against the good order, and blemishes in the government, of any kingdom.

Idle and disorderly persons are thus described by the said statute: *viz.* all persons who threaten to run away, and leave their wives or children to the parish: all persons who shall unlawfully return to the parish or place from whence they have been legally removed by order of two justices, without bringing a certificate from the parish or place whereunto they belong: all persons, who, not having wherewith to maintain themselves, live idle without employment, and refuse to work for the usual and common wages given to other labourers in the like work, in the parishes or places where they are: all persons going about from door to door, or placing themselves in streets, highways, or passages, to beg or gather alms in the parishes or places where they dwell. And by 32 Geo. III. c. 45. all persons who by their wilful default and neglect permit their wives and children to become chargeable to their parishes or places; and it shall be made appear to two justices that such persons do not use proper means to get employment, or being able to work do neglect to work, or spend their money in alehouses or places of bad repute, or in any other improper manner, and do not employ a proper proportion of the money earned by them towards the maintenance of their wives and families, by which they or any of them become chargeable to such parish or place; and these shall be deemed idle and disorderly persons.

Rogues and vagabonds are, by the same statute, such as follow: *viz.* all persons going about as patent-gatherers, or gatherers of alms, under pretence of loss by fire, or other casualty; persons going about as collectors for prisons, gaols, or hospitals; fencers; bearwards; common players of interludes, and all persons who shall for hire, gain, or reward, act, represent, or perform, or cause to be acted, represented, or performed, any interlude, tragedy, comedy, opera, play, farce, or other entertainment of the stage, or any part therein, not being authorised by law; minstrels;

jugglers; and all persons pretending to be gypsies, or wandering in the habit or form of Egyptians; fortune-tellers, or persons pretending to have skill in physiognomy, palmistry, or like crafty science, or to tell fortunes; or using any subtle craft, to deceive and impose on any of his majesty's subjects; or playing or betting at any unlawful games or plays; all persons who run away, and leave their wives or children, whereby they become chargeable to any parish or place; all petty chapmen, and pedlars, wandering abroad, not being duly licensed, or otherwise authorised by law; all persons wandering abroad, and lodging in alehouses, barns, out-houses, or in the open air, not giving a good account of themselves; all persons wandering abroad, and begging, pretending to be soldiers, mariners, or seafaring men (but by 43 Geo. III. c. 61. soldiers, sailors, marines, and the wives of soldiers therein mentioned, are relieved against the penalties of the vagrant acts); or pretending to go to work in harvest, without a certificate signed by the minister, and one of the churchwardens or overseers where he shall inhabit, that he hath a dwelling-house or place there; illegally dealing in lottery tickets and shares; persons to the number of two or more assembling to destroy game in the night-time (39 & 40 Geo. III. c. 50.); and all other persons wandering abroad and begging, shall be deemed rogues and vagabonds. By 23 Geo. III. c. 88. any person apprehended, having upon him any picklock key, crow, jack, bit, or other implement, with an intent feloniously to break and enter into any dwelling-house, warehouse, coach-house, stable, or out-house, or who shall have upon him any pistol, hanger, cutlafs, bludgeon, or other offensive weapon, with intent feloniously to assault any person: or shall be found in or upon any dwelling-house, warehouse, coach-house, stable, or out-house, or in any inclosed yard or garden, or area belonging to any house, with intent to steal any goods or chattels, shall be deemed a rogue and vagabond within the meaning of the statute of the 17 Geo. II. So also by 39 & 40 Geo. III. c. 87. suspected persons and reputed thieves frequenting the Thames, and the quays and warehouses, &c. adjoining, with a felonious intent.

Incorrigible rogues are by 17 Geo. II. c. 5. thus described: all end-gatherers offending against the statute of 13 Geo. I. being convicted of such offence, which offence, by 13 Geo. I. c. 23. is this, *viz.* the collecting, buying, receiving, or carrying any ends of yarn, wests, thrums, short yarn, or other refuse of cloth, druggel, or other woollen goods; and the punishment of such persons is in order to prevent their committing abuses, by such practices, in the woollen manufacture: all persons apprehended as rogues and vagabonds, and escaped from the persons apprehending them; or refusing to go before a justice; or to be examined on oath before such justice; or refusing to be conveyed by such pass as is hereinafter directed; or knowingly giving a false account of themselves on such examination, after warning given them of their punishment: all rogues or vagabonds who shall break or escape out of any house of correction, before the expiration of the term for which they were committed or ordered to be confined by this act: all persons who, after having been punished as rogues and vagabonds, and discharged, shall again commit any of the said offences: all these shall be deemed incorrigible rogues. To which may be added, any person convicted of a third offence against the 6 Geo. III. c. 48.

Idle and disorderly persons are punishable by the statute 17 Geo. II. c. 5. with one month's imprisonment in the house of correction, upon conviction before one justice, by his own view, confession, or oath of one witness. Any person

person may apprehend or carry before a justice any such person, going about from door to door, or placing themselves in streets, highways, or passages, to beg alms in the parishes or places where they dwell; and if they shall resist, or escape from the person apprehending them, they shall be punished as rogues and vagabonds. The reward for apprehension is 5s., to be paid under order of the justice, by any overseer where such offender shall be apprehended.

Rogues and vagabonds are to be apprehended by a constable, or any other person, and conveyed to a justice of the peace. The reward for apprehending is 10s., by order of the justice, payable by the high constable, or, in case of no high constable, by the petty constable; and on refusal, the justice may by his warrant levy the sum of 20s. by distress and sale of the constable's goods, &c. (17 Geo. II. c. 5.) But the justice shall not order the reward to be paid until the rogue or vagabond be publicly whipped (women excepted), or sent to the house of correction, and till the examination required by the said act shall be actually transmitted to the next sessions. (32 Geo. III. c. 45.) The penalty for not apprehending such offender shall be, on conviction before one justice, or view or oath of one witness, a forfeiture of 10s. to the poor by distress. The justices, or any two of them, shall, four times a year at least, order by warrant search for and apprehension of rogues and vagabonds. (17 Geo. II. c. 5.) And by 25 Geo. II. c. 36. two justices may examine persons apprehended on a privy search on oath as to their settlement and means of livelihood; and upon their failure of shewing that they have a lawful way of getting a livelihood, or of procuring some responsible housekeeper to testify to their character, and to give security (if required) for their future appearance, the justices may commit them to some prison or house of correction, for any time not exceeding six days, and order the overseers of the poor to advertise and describe them, &c.; and if no accusation shall be laid against them, they shall be discharged, or otherwise dealt with according to law. After examination by a justice, such justice shall order the offender apprehended to be publicly whipped by the constable, petty constable, or some other person appointed by them, or order him to be sent to the common gaol (27 Geo. III. c. 11.), or house of correction, till the next sessions, or for any less time (such time not being less than seven days, 32 Geo. III. c. 45.) as such justice shall think proper.—*N. B.* It is only here expressed generally, that he shall be publicly whipped; the form and manner thereof may perhaps be best collected from the provisions of former vagrant acts. By the 22 Hen. VIII. c. 12. the vagrant was to be carried to some market-town or other place, and there tied to the end of a cart naked, and beaten with whips throughout such market-town or other place, till his body should be bloody by reason of such whipping. By the 39 Eliz. c. 4. he was to be stripped naked from the middle upwards, and only whipped till his body should be bloody.

The justices of the next sessions, after commitment of the offender, may, after examination, order a rogue or vagabond to be detained in the house of correction to hard labour, for any further time not exceeding six months, and an incorrigible rogue for any further time not exceeding two years, nor less than six months; and during the time of confinement, to be whipped in such manner, and at such times and place, as they shall think fit. Such person may, if the sessions think convenient, afterwards be sent away by a pass; and if such person, being a male, is above the age of twelve years, the court may, before he is discharged from the house of correction, send him to be employed in his majesty's service by sea or land; and if such incorrigible rogue, so or-

dered by the sessions to be detained in the house of correction, shall break out or make his escape, or shall offend again in like manner, he shall be guilty of felony, and be transported for seven years. 17 Geo. II. c. 5.

By 13 & 14 Car. II. c. 12. the justices in sessions may transport such rogues, vagabonds, and sturdy beggars, as shall be duly convicted, and adjudged to be incorrigible.

By 17 Geo. II. c. 5. if the child of any vagrant, above the age of seven years, shall be committed to the house of correction, the justices in sessions, if they see convenient, at any time before such child be discharged, may order such child to be placed out as a servant or apprentice to any person who is willing to take such child, till such child shall be of the age of 21 years, or for a less time; and if any offender, who was found wandering with such child, shall be again found with the same child which was so placed out, he shall be deemed an incorrigible rogue. Where any vagrants have been committed to the house of correction till the next sessions, if, on examination of such persons, no place can be found to which they may be conveyed, the sessions shall order them to be detained and employed in the house of correction, until they can provide for themselves, or until the justices in sessions can place them in some lawful calling, as servants, apprentices, soldiers, mariners, or otherwise, either within this realm, or in the plantations in America.

After such whipping or confinement as aforesaid, the justice may, if he think convenient, by a pass under hand and seal, cause the offender to be conveyed to the place of his last legal settlement; but if it cannot be found, then to the place of his birth; or if he be under the age of 14 years, and have any father or mother living, then to the place of the abode of such father or mother, there to be delivered to some churchwarden or overseer. 17 Geo. II. c. 5.

And it shall be certified in the pass, that such person has been actually publicly whipped, or confined in the house of correction as aforesaid. 32 Geo. III. c. 45.

The justice shall make a duplicate of the pass and examination, and sign the same; and shall afterwards transmit the duplicate of the pass, annexed to the examination, to the next sessions, there to be filed and kept on record; and shall annex the duplicate of the examination to the pass, and send it with the same; and the said pass, examination and duplicate thereof, shall and may be read in any court of record as evidence. 17 Geo. II. c. 5.

And the justice who shall make the pass shall with the pass cause likewise to be delivered to the constable a note or certificate, ascertaining how they are to be conveyed, by horse, cart, or on foot, and what allowance such constable is to have for conveying them. The constable who shall receive such pass and certificate, shall convey the person according to the direction of the pass, the next direct way to the place whither he is ordered to be sent, if it be in the same county, riding, division, corporation, or franchise; if not, he shall deliver the said person to the constable of the first town, parish, or place, in the next county, riding, division, corporation, or franchise, in the direct way to the place whither he is to be conveyed, together with the pass and duplicate of the examination, taking his receipt for the same. And such constable shall, without delay, apply to some justice in the same county or division, who shall make the like certificate, and deliver it to such constable, who shall with all speed convey such person unto the first parish town or place in the next county or division, in the direct way to the place to which he is to be conveyed; and so from one county or division to another, till they come to the place to which such person is sent. And the constable, who shall

deliver such person to the churchwarden or other person ordered to receive him, shall at the same time deliver the said pass, with the duplicate of the examination, taking their receipt for the same. And whereas the present mode of conveying vagrants in the custody of a constable is frequently insufficient, it is enacted, that the justices in sessions may order that all rogues and vagabonds apprehended within their liberties, and ordered to be conveyed by pass, shall be conveyed by the master of the house of correction, or his servants, or by a constable, as they shall think proper; and they may make an order, that all constables, to whom rogues and vagabonds brought from another county are delivered, shall forthwith convey them to the nearest house of correction or within their liberty, to be afterwards removed by such master or his servants as aforesaid, and according to the provisions of the aforesaid act. 32 Geo. III. c. 45.

The passing of vagrants may be suspended on account of sickness by 35 Geo. III. c. 101.

By 49 Geo. III. c. 124. it is enacted, that in all cases whenever the execution of any order of removal, or of any vagrant-pass, shall be suspended by virtue of the 35 Geo. III. c. 101. any other justice of the peace of the county, or other jurisdiction within which such removal or pass shall be made, may direct and order the same to be executed, and the charges incurred to be paid, and may carry into execution any such amended orders, as fully as the same can be done by the justices who shall make the order of removal, or the justice who shall grant the pass.

Any justice before whom a vagrant shall be carried may order him to be searched, and his bundles to be inspected, by the constable or other officer in his presence; and if it shall appear that such vagrant shall be found to have sufficient wherewithal to pay for his passage, either in whole or in part, the justice shall order so much of the money to be paid, or other effects found upon such vagrant to be sold, and employed towards the expence of taking up and passing such vagrant, returning the overplus, after deducting the charges of such sale. 17 Geo. II. c. 5.

The justices in sessions shall limit what rates and allowances, by the mile or otherwise, shall be made for conveying or maintaining rogues, vagabonds, or incorrigible rogues; and make such other orders for the more regular proceeding therein, as they shall think proper. 32 Geo. III. c. 45.

If any petty constable or governor of any house of correction shall counterfeit any such certificate or receipt, or knowingly permit any alteration to be made therein, he shall forfeit 50*l.* And if he shall not convey or cause to be conveyed such vagrants, or not deliver them to the proper person; or if any constable shall refuse to receive any such person, or to give such receipt, he shall forfeit 20*l.* by distress and sale, by warrant of the justices in sessions, where the offence shall be committed; half to the informer, and half to the treasurer, to be applied by him as part of the public stock; returning the overplus upon demand, charges of distress being first satisfied. 17 Geo. II. c. 5.

The parish or place to which any rogue, vagabond, or incorrigible rogue, shall be conveyed, shall employ in work, or place in some work-house or alms-house, the person so conveyed, until he shall betake himself to some service or other employment; and if he shall refuse to work, or not betake himself to some service or other employment, the overseers may cause him to be carried to some justice, to be sent to the house of correction, there to be kept to hard labour. 17 Geo. II. c. 5.

But if the churchwarden, or other person who shall receive any person so sent, shall think the examination to be

false, he may carry the person so sent before a justice, who, if he see cause, may commit such person to the house of correction till the next sessions; and the justices there, if they see cause, may deal with such person as an incorrigible rogue: but the person so sent shall not be removed from the place to which sent, but by order of two justices, in the same manner as other poor persons are removed to the place of their settlement.

If any person shall knowingly permit any rogue, vagabond, or incorrigible rogue, to lodge or take shelter in his house, barn, or other out-house or building, and shall not apprehend and carry him before a justice, or give notice to the constable so to do; and shall be convicted thereof by confession, or oath of one witness, before one justice, he shall forfeit not exceeding 40*s.* nor less than 10*s.*, half to the informer, and half to the poor, by distress and sale; and if any charge shall be brought on any parish or place by means of such offence, the same shall be answered to the said parish or place by such offender, and be levied by distress and sale of his goods as aforesaid. And if sufficient distress cannot be found, such offender shall be committed to the house of correction by the justice, for any time not exceeding one month. 17 Geo. II. c. 5.

To defray the expences of apprehending, conveying, and maintaining rogues, vagabonds, and incorrigible rogues, and defraying all other expences necessary for the execution of this act not hereinbefore provided for, the justices in sessions may cause such sums as shall be necessary to be raised in the same manner as the general county rate.

Any person aggrieved by any act of any justice out of sessions, in or concerning the execution of this act, may appeal to the next general or quarter-sessions of the county, riding, liberty, or division, giving reasonable notice thereof; whose order thereupon shall be final.

Persons sued for any thing done in the execution of this act may plead the general issue; and if they recover, shall have treble costs.

In all cities and towns, where by virtue of special acts of parliament the charge of passing vagrants is to be defrayed in other manner than is by this act directed, or where such vagrants, by virtue of special statutes, are to be apprehended and conveyed by any person or officer, other than those named in this act, the same shall not be altered hereby. And persons conveyed in London, shall not be delivered in any other precinct within the city, but in the next county. 17 Geo. II. c. 5.

VAGAI, in *Geography*, a river of Russia, which runs into the Irtisch, 8 miles S.E. of Tobolsk.

VAGAL, in *Ancient Geography*, a town of Africa, in Mauritania Cæsariensis, on the route from Rufucurrum to Catama, between Gadaum Castra and Castellum Tingitanum, according to the Itinerary of Antonine.

VAGENI, BAGENI, or *Vagienni*, a people of Italy, in Liguria, towards the sources of the river Eridanus, according to Silius Italicus. Pliny calls them Vagienni Ligures.

VAGERA, in *Geography*, a town of Arabia, in the province of Nedsjed; 90 miles N.E. of Mecca.

VAGESA, in *Mythology*, a name of the Hindoo god Siva. He is also called Vageswara, or the lord Vagesa; sometimes pronounced Bagis, and Bagiswar. His consort Parvati, as his energy or fakti, is named Vageswari. (See PARVATI and SIVA.) In the latter article, it will be seen that some etymologists, from this similarity of name, strengthened by other characteristic coincidences, conceive Bagesa and Bacchus to be names of the same person.

VAGESWARA, a name of the Hindoo god Siva; meaning the lord Vagesa, as noticed under that article.

VAGINA,

VAGINA.

VAGINA, a Latin term, literally signifying a sheath, or scabbard; used on divers occasions. As,

VAGINA, in *Architecture*, is used for the lower part of a terminus; because resembling a sheath, out of which the statue seems to issue. See TERMS.

The vagina is that long part between the base and the capital; and is formed in divers manners, and with divers ornaments.

VAGINA, in *Anatomy*, the membranous canal leading from the external organs of generation to the neck of the uterus, and receiving the male organ in coitu. See GENERATION.

The vagina is liable to an inflammation after delivery, occasioned by the head of the child being long retained in the pelvis. If the swelling and inflammation are not very great, they are generally removed by the discharge of the lochia; but if the internal membrane of the vagina be inflamed, emollient injections must be occasionally used, and a piece of prepared sponge should be introduced, to prevent its coalescing. The sponge may be thus prepared: Take a piece of a proper size for keeping the vagina open, when it is expanded; soak it in warm water; then roll it tight from end to end with a string; cut off any hard lumps, and lay it to dry; then take off the string, anoint it with lard, and introduce it into the vagina, the moisture of which will expand it. If the pressure on this part was so long continued, as to obstruct the circulation in it, a mortification will ensue, which may be either total or partial: if it be total, the patient will die; if partial only, the mortified parts will slough off. This may be known by great pain after delivery; a fetid smell, and a discharge of sharp ichor at first from the vagina, then pus and matter. When this is the case, emollient fomentations may be thrown up from time to time; doffils of lint may be dipped in some proper balsam, and applied to the parts in order to deterge and heal them; and when the sloughs are all cast off, great care should be taken to prevent the vagina from growing together, either by introducing doffils of lint, or pieces of sponge into it.

VAGINA, *Imperforate*. The vulva is liable to two different kinds of imperforation, which ought to be discriminated. First, the labia and nymphæ may be every where united and blended together, the orifice of the meatus urinarius being totally covered by them, so that no urine can be voided. Secondly, the hymen may form a complete septum, or else some part of the vagina may be closed with a membrane of similar structure; in which circumstances, although the vagina be imperforate, there is no impediment to the free issue of the urine.

The first case constitutes a species of malformation, attended with the greatest urgency, and which indeed admits of no delay of that operation by which the conjoined parts are to be separated. The kind of raphe, situated where the natural opening ought to be, should be immediately fought for, and here the requisite division of the parts is to be made, the incisions being carried to the necessary depth, yet always with a cautious hand, lest an opening be made into the bladder, or rectum. Concretions of the labia and nymphæ together may be the consequence of ulcerations of these parts; but the closure of the vulva is then never complete. The frequent evacuation of the urine separates the parts; and, if not capable of preventing their union entirely, it is at least sufficient to maintain an aperture opposite the meatus urinarius. The narrowness of the external opening, however, may obstruct the free discharge of the urine; and urinary calculi may even form more or less deeply in the vagina. Now, without taking into the account other functions of the sexual organs, the motives already explained

are quite pressing enough to make the removal of the deformity right and adviseable.

Before the age of puberty, no inconvenience can arise from the vagina being completely shut up by the hymen, or some other analogous membrane. But, at this period, the menstrual blood collects first in the vagina, and then in the uterus. Severe periodical colic pains, a gradual distension of the uterus, the absence of the menses, impairment of the health, a variety of nervous complaints, and sometimes even inflammatory symptoms, which recur, or are exacerbated periodically, afford strong presumptive grounds for suspecting an imperforation of the vagina. More information may be acquired from a careful examination of the parts. In the greater number of instances, the membranous septum is distended with the menstrual blood, and even sometimes protrudes from the vulva, in the form of a brownish, elastic, fluctuating tumour. Almost an immediate stop has been often put to alarming symptoms of long duration, by making an incision through the membrane causing the obstruction. A crucial wound will be sufficient, without cutting any of the membrane away; but we are recommended not to neglect to keep the newly divided parts asunder for a few days, by means of a tent, or a doffel of lint.

Labours are sometimes so difficult, and attended with such injury, that inflammation, and even ulceration of the vagina, may be thus produced. These effects may be followed by considerable contractions of this canal, arising from the shrinking of the cicatrices. However, such a case is not what we have now to consider, our remarks being at present restricted to examples in which the vagina is altogether impervious.

The os tincæ may be entirely obliterated by congenital malformation, the effects of difficult labours, or any other circumstances producing inflammation in the part. In all these cases, menstruation and conception are rendered impossible, and a train of phenomena is observed, resembling those of the congenital imperforation of the vulva and vagina. But the os tincæ may become closed, from some accidental cause, subsequently to conception, and then the defect cannot be known until the period of delivery. In this last case, it is highly important to ascertain correctly whether the orifice of the womb is really obliterated; or whether an obliquity of that organ, or some other derangement of it, may not impose upon us?

The re-establishment of the natural opening is always indispensible, and it is materially facilitated by the distended state of the uterus. The operation can be most conveniently done, either with the instrument called a pharyngotomus, or a curved bistoury, which has a cutting edge that extends only a short distance from the point. See *Delpech, Précis Élémentaire des Maladies réputées Chirurgicales*, tom. i. p. 497, &c.

VAGINA, *Prolapsus of*, denotes, in *Surgery*, a species of bearing down, arising from a protrusion or descent of the vagina. The vagina is liable to two kinds of prolapsus. In one case, all its tunics are included in the protrusion, and at the same time that the part falls downwards, it becomes inverted. In the other example, it is only the relaxed lining of the vagina which descends and makes a protrusion.

The first species of prolapsus vaginæ is subject to varieties. For instance, sometimes the whole circumference of the part falls down; sometimes only a portion of one of its sides. In the first event, the prolapsus forms a cylindrical tumour, which consists of all the coats of the vagina, presenting an opening at its lower termination, and having an external covering, which is composed of the internal lining

of the vagina. But when the protrusion comprehends only a portion of one of the sides of this tube, the tumour occurs in the form of a cul-de-sac, which can be put back into the vagina with the finger or probe, and the lower end of which is without any aperture. The following differences are also remarkable in cases where the lining of the vagina constitutes the prolapsus. In some instances, the lining of the whole circumference of the part protrudes in the form of a cylindrical swelling, consisting of a duplicature of that coat. In other examples, the membrane lining the vagina is relaxed and elongated only at one or more particular points, and produces one or more external swellings of the cul-de-sac figure. This last case is liable to be mistaken for polypi of the vagina.

The possibility of a prolapsus of the whole of the vagina, together with all its coats, has been doubted by Sabatier and Levret; but, as Richter conceives, without any real foundation. If, as the latter author observes, it is possible for the inner coat of the vagina to separate from the external, with which it is intimately connected, an event which every body admits as happening in the second kind of prolapsus vaginae, why should it be impossible for the whole of this tube, together with all its coats, to be separated from the surrounding parts, to which it is not so closely adherent? Sometimes the rectum, inclusive of all its coats, forms what is termed a *prolapsus ani*, and why may not the vagina be displaced in a similar manner, since it must be much more liable than the rectum to be propelled downwards in the violent straining which takes place during parturition? Richter asks, whether every prolapsus uteri is not accompanied with such a displacement of the vagina? Cases are upon record, where the prolapsus of the vagina happened all on a sudden, in consequence of falls, the starting of a horse, &c. (Hoin, Levret, Journal de Médecine, tom. xl.) Here it cannot be supposed, that the case was merely a protrusion of the inner coat, which can only be gradually relaxed and elongated. Lastly, instances in which the prolapsus of the vagina was several inches in length, have been gradually reduced by means of external pressure. (Hoin.) How can we imagine, says Richter, that such cases could proceed from any degree of relaxation, to which the membranous lining of the vagina is liable?

It must be acknowledged, however, that this species of prolapsus is much less common than the second kind; that when it occurs, it is generally as a consequence of a prolapsus of the uterus; and that it cannot easily happen at all, except about the time of delivery. A prolapsus of the inner coat principally occurs in married women who have had many children, and been frequently troubled with fluor albus. It has, however, been occasionally met with in young unmarried females. The prolapsus of one particular portion of the inner coat of the vagina, is generally the consequence of a hernia in this part; but sometimes in cases of dropsy, a portion of the vagina, containing fluid, protrudes in the form of a cyst, or sac.

When the whole circumference of all the coats is involved in the prolapsus, if a finger, or probe, be introduced into the cylindrical tumour, which the vagina then forms, the os uteri will be found to be situated closely behind the external pudenda; for this sort of bearing down is always attended with a displacement of the womb, in the direction downwards. In many instances, particularly when the prolapsus has taken place suddenly, and is quite recent, the patient experiences a variety of complaints about the bladder and rectum, and the evacuation of the urine and feces becomes more or less interrupted. That the protrusion comprehends all the coats of the vagina, is frequently quite manifest

from the thickness of the cylinder. Also, when the accident has occurred suddenly, or it can be easily reduced, there is always reason to conclude that the prolapsus is of the preceding description.

The prolapsus of the inner membrane of the vagina generally arises gradually, and often as a consequence of a long-continued fluor albus. It either does not admit of reduction, or, if reduced, it lies in the vagina, and fills its cavity. It has very little effect upon the uterus itself, which usually remains in its natural position, and it seldom produces any difficulty in the evacuation of the urine and feces. When only a part of one side of the inner membrane of the vagina is relaxed, elongated, and protruded, the swelling can be pushed back into the vagina with the finger, and thus the nature of the complaint becomes manifest. The prolapsus, arising from a hernia in the vagina, can only be ascertained by attending to the symptoms which characterize this sort of rupture, and which are noticed in the article HERNIA.

A prolapsus of all the coats of the vagina, while it is small and recent, can be reduced by pressure without difficulty. But the thing which demands the greatest care, is to hinder a relapse. This is accomplished by the employment of a pessary, and the use of astringent applications.

When, however, the last species of prolapsus has existed a long while, its reduction is more difficult; for the vagina, after it has remained displaced a certain time, begins to be affected with swelling and induration. According to the reports of Hoin and Levret, a large protrusion of this kind, ten inches in length, was so diminished by keeping the patient invariably confined upon her back, that in the course of a month the rest of the tumour admitted of being reduced. Indeed, as Richter observes, there can be little doubt, that the treatment which has been advised by some authors for the diminution of very old enormous omental ruptures, would here be equally applicable; viz. long confinement in bed upon the back, with the buttocks somewhat elevated; continued, well-directed, external pressure; a very low diet, and repeated mercurial purges. By such means, no doubt, the swelling might be in many instances sufficiently lessened to admit of reduction.

During the state of pregnancy, a prolapsus of the foregoing kind may be attended with considerable embarrassment, and even danger. In one case, where such a prolapsus, five inches in length, took place during labour, it became necessary to turn the child, and the displaced vagina was also lacerated. The woman, however, recovered. (Pietfch, Journal de Médecine, tom. xxxiv.) In another case, where the prolapsus became as large as a man's head at every return of the labour-pains, the practitioner succeeded in holding the parts back, while the woman was delivered with the aid of the forceps. (See Loder's Journal, 1 b. p. 490.) When this is impracticable, it is necessary, according to Richter, to make an incision through both sides of the prolapsus; a proceeding, says he, to which the practitioner may the more readily make up his mind, inasmuch as the parts have even been lacerated, without any ill consequences, as we have already related.

The prolapsus of the inner membrane of the vagina, while small and recent, may perhaps be removed by astringent applications. When, however, it is of long standing, indurated, and of large size, much expectation of success from this treatment cannot be entertained. Richter sees no reason why, in such a case, the redundant relaxed part should not be cut away, especially when the disease is accompanied with ulceration, and other serious complaints. As he observes, there can be no doubt that a prolapsus of the inner membrane of the vagina, when limited to one part of
this

this canal, may always be safely extirpated either with a knife or a ligature. Richter's Anfangsgr. der Wundarzney-kunst, b. 7. Vierte Kapitel.

VAGINÆ Femoris Tensor, in *Anatomy*, a name given by Albinus to a muscle in the thigh, called by others the *membranosus*, and the *musculus fascia lata*; and by some *musculus APONEUROTICUS*; which see.

VAGINÆ Uteri Sphincter. See GENERATION.

VAGINA Foliorum, in *Botany* and *Vegetable Physiology*, the sheath of the leaves, (see LEAF and SHEATH,) most peculiarly observable in grasses, and their allies, consists of that part of the leaf which is below the *stipula*, by which it is crowned. The *Vagina* embraces the stem, or straw, more or less closely. Its inside is usually quite smooth, and polished, while the outside is generally ribbed, rough, or hairy, though commonly less so than the leaf itself. The pubescence in some instances is directed contrariwise to that of the leaf. In most grasses, particularly the corn tribe, the sheaths of one or two of the uppermost leaves are much dilated, serving the important purpose of protection to the young panicle or spike of *flowers*. A singular theory respecting the cause of smut in grain was, many years since, published by the Rev. Henry Bryant, of Heydon, Norfolk. (See SMUT.) The mischief was, by this writer, attributed to an accidental tightness in the summit of the sheath of the leaf, by which the young ear was, in a manner, strangled; an hypothesis totally insufficient to account for the phenomenon.

The term *vagina* is, in like manner, applied to the lower part of the foliage of the Crocus, the Snow-drop, and various stemless plants related to one or the other, in which the leaf tapers down into a sort of sheathing *footstalk*. But it is erroneously exemplified by professor Willdenow, in his Principles of Botany, by the genus *Polygonum*, whose cylindrical membrane, attached to the inner side of each *footstalk*, and surrounding the stem above every joint, is a real sheathing *STIPULA*, i.e. that term; the *footstalk* being interposed between it and the leaf. So in *Spermacoce*, and other plants of the extensive and various order of *Rubiaceæ*, the membranous intrafoliaceous *stipula* must not be taken for a *vagina*, though it be connected, ever so closely, with the *footstalks* at each side; because the analogy of most plants of that order shew it to be a real *stipula*, which from its situation, and the varieties in its form, structure and aspect, is of peculiar botanical importance.

VAGINALIS GULÆ, in *Anatomy*, the muscular stratum surrounding the mucous membrane of the œsophagus. See DEGLUTITION.

VAGINALIS Testis, the serous membrane surrounding the testicle, and forming the bag, in which it is included. There is also a covering, composed of condensed cellular membrane and the fibres of the cremaster, which surrounds the spermatic cord and the testis with its membranes. This is called *tunica vaginalis communis*. See GENERATION.

VAGINALIS, in *Ornithology*, a genus of the order Grallæ of birds, of which there is one species, viz. the *V. alba*, or white sheath-bill of Latham. Found in New Zealand, and other islands of the Southern ocean.

VAGINARIA, in *Botany*, named from *vagina*, a sheath; because the stem is clothed with leafless sheaths. Pursh 58. This genus is adopted by Pursh from Perfoon, and its distinctive character consists in the *seed* being surrounded at the base with three scales, and three intermediate bristles. One or the other of these parts doubtless originates in the three *stamens*. The *stigmata*, moreover, are said to be three.

The only species mentioned by Pursh is *V. Richardi*.

(*Fuirena scirpoidea*; Michaux Boreal.-Amer. v. 1. 38. t. 7.) —“Stem leafless, sheathed. Spike ovate, mostly solitary. Scales lanceolate-spatulate.”—Native of inundated fields, from Georgia to Florida. Perennial. Pursh. The aspect of the plant is like a RESTIO; see that article, *FUIRENA*, and *SCIRPUS*. When we advert to the many different appearances of these scales, or bristles, in different species of the last-named genus, and even their absence in some, we hesitate to admit the *Vaginaria*, without examining one species at least, or being informed of any others on which it is founded.

VAGIOW, in *Geography*, a town on the W. coast of the island of Celebes.

VAGLIANO, a town of Italy, in Friuli; 10 miles W. of Udina.

VAGNEY, a town of France, in the department of the Vosges; 4 miles E. of Remiremont.

VAGNIACIS, in *Ancient Geography*, a place of Great Britain, marked in the 2d Iter of Antonine, between Noviomagus, situated, according to Camden, Gale, and Horsley, at Woodcote near Croydon and Durobrivæ or Rochester; and supposed to be Northfleet.

VAGOS, in *Geography*, a town of Portugal, in the province of Beira, near the Atlantic coast; 6 miles S. of Bragança Nova.

VAGRAM, a town of the archbishopric of Salzburg; 6 miles S. of Salzburg.

VAGRANTS, in *Law*. See VAGABOND.

VAGSKOI, UST, in *Geography*, a town of Russia, in the government of Archangel, at the union of the rivers Vaga and Dwina; 20 miles N.N.W. of Schenkursk.

VAGUM, in *Anatomy*, a name given to the eighth pair of nerves of the medulla oblongata, called the *par vagum*, because dispersed to divers parts of the body. See NERVOUS System.

VAGUM, in *Ancient Geography*, a promontory situated, according to Ptolemy, on the eastern coast of the isle of Corfica.

VAGUS, in *Geography*. See WAAG.

VAHALIS, or *VACHALIS*, *Wahal*, in *Ancient Geography*, a name given to the left branch of the Rhine, after its separation at its entrance into the country of the Batavi, which afterwards joined the Meuse. The territory between these rivers was denominated “*Insula Batavorum*.”

VAHAN, in *Hindoo Mythology*, is the general name of the different vehicles by which their gods and goddesses are conveyed. The goddesses are usually seen accommodated with the vehicles of their lords; being indeed, as is declared, the same. We will here notice such vehicles as are appropriated to the different deities. *Brabma*, being a personification of the earth, or matter, and remotely participant also in representing humidity, rides the semi-aquatic bird, the sluggish swan or goose, called *Hahnsa*: his consort *Saraswati*, goddess of harmony and arrangement, is sometimes seen mounted on a species of heron. See *SARASWATI* and *SIVA*.

Vishnu, the conservator, is the air; and he, like his brother Jupiter of Greece, cleaves his own element on a towering eagle, which the Hindoos call by several names; among them *Garuda* and *Superna*.

Siva, the changing or destroying power, is a personification of fire; he also corresponds in character with some of the Jupiters of the West, and rides a white bull, called *Nandi*. His fakti or consort, *Parvati*, is often seen turret-crowned, in a car drawn by tigers or lions. Virgil's description of Cybele applies equally to the mountain-goddess *Parvati*.

“Alma parens Idæa deum, cui Dindymæ cordi,
Turrigeræque urbes, bijugique ad fræna leones.”
Æn. x. 258.

Dryden changes her lions into tigers.

“Hear thou great mother of the deities,
With turrets crowned, on Ida’s holy hill,
Fierce tigers reined and curbed obey thy will.”

Pitt, however, in his invocation, restores the lions.

“Great guardian queen of Ida’s hills and woods,
Supreme, majestic mother of the gods!
Whose strong defence proud tow’ring cities share,
While roaring lions whirl thy mighty car.”

In most languages of the East, it may be observed, the same word means both lion and tiger. The Greeks or Romans, borrowing the attribute from the East, may easily have misconceived its name. (See CYBELE and PARVATI.) It might be shewn that most of the mystical ceremonies practised by the Western heathens in honour of the goddesses Cybele, were, and are, common also in India in honour of Parvati. The peacock is likewise sacred to the latter, and is, as we shall presently notice, the vahan of one of her family, Kartikya, otherwise called Komara; and the being deemed his fakti is called *Kaumari*, and is likewise so conveyed.

Having thus seen that the vehicles of the three great powers composing the Hindoo triad are severally the swan, the eagle, and the bull, we proceed to notice how the inferior deities are accommodated.

Surya, or the sun, rides sometimes a lion, but generally in a golden car drawn by seven horses, or by one horse with seven heads. The horse is sometimes called *Oochisfrava* (which see); but we are in some doubt if correctly. *Soma*, the moon, is drawn in his silvery car (the moon is masculine in India) by an antelope. *Pavaka*, the god of fire, rides an ardent ram. *Kama*, the Indian Cupid, rides a luri, or parrot. *Varuna*, genius of the waters, bestrides a fish, as does also *Ganga*, the Ganges, primal goddess of rivers. *Ganesa*, the god of prudence and policy, has an elephant as his vahan, it being supposed the animal of greatest forecast: a rat is also deemed a very sagacious animal, and *Ganesa* is sometimes seen so mounted. He is reputed the eldest son of Parvati, and is otherwise named *Pollear*; which see. *Kartikya*, her second son, or rather her lord’s son, is borne by a peacock, as before noticed. *Indra*, regent of the firmament, has a three-trunked elephant, named *Irvat*. *Vairava*, a son of Siva, rides a buffalo, sometimes a dog. *Vyagravahi*, and *Vrishadvaja*, are names of Parvati and Siva, meaning tiger-mounted, and one who rides a bull.

Astrologers have mounted the rest of the planets, as well as the sun and moon. *Mangala*, or Mars, on a horse, sometimes on a ram: his fiery nature connects him sometimes with the igneous *Pavaka*, who rides the latter animal. *Boodh*, or Mercury, being by some accounts a manifestation of Vishnu, at any rate bearing the same name with a disputed avatara or incarnation of that god, shares his vehicle, and the planet is mounted on an eagle. *Vrihaspati*, or Jupiter, on a boar. *Sukra*, or Venus, on a rat, sometimes on a camel. The slow-moving *Sani*, or Saturn, on the heavy elephant, or ill-omened raven. *Rabu*, the dragon’s head, on a tortoise or owl: and *Kebu*, the tail or descending node, on a frog.

The word *vahan* is usually pronounced as one broad syllable; and it has been surmised that the English *van* and *vain* may bear some etymological affinity to it.

VAHARA, in *Geography*, a town of Arabia Deserta; 150 miles W. of Yamama.

VAHINGEN. See VAYHINGEN.

VAHL, MARTIN, in *Biography*, a botanical writer of good and original authority, born in Norway in 1751, received his first education at the school of Bergen, which he left in 1766, and was then entered a member of the university of Copenhagen. Residing two years with the Rev. Hans Ström, an able zoologist and botanist, (see STROEMIA,) he imbibed a taste for similar studies, especially for systematic botany, to which he, from that period, to his last hour, devoted himself. In order to obtain every possible advantage in this branch of his education, he repaired to Upsal, where he studied for five years under the celebrated Linnæus, and became one of the most distinguished pupils of that great man. Some personal estrangement unfortunately took place between the preceptor and his promising disciple, from a domestic cause, to which we have already alluded, at the conclusion of our article LINNÆUS. It was scarcely to be expected that the dignified professor, then in the zenith of his prosperity and honours, could favourably regard the inclination of one of his daughters, for a student who had his own fortune to seek; nor is any thing recorded of this daughter, which might have justified a romantic attachment, or adventurous pursuit, on the part of the young man. We know not in what year Mr. Vahl quitted Upsal, but in 1779 he was appointed lecturer, or demonstrator, of Botany, in the garden at Copenhagen, where he taught his science, with great applause, for three years. After this period had elapsed, he was chosen, by the king of Denmark, to undertake a scientific tour, at his majesty’s expence; in the course of which he visited Holland, France, Spain, and part of Barbary, as well as Italy, Switzerland, and England. He not only investigated and collected the wild and garden plants of the countries through which he passed, but, in consequence of liberal introductions, to all who were learned or occupied in the same study, he was admitted to the chief libraries and museums in Holland, France, and England; of all which advantages he made the most diligent use. He was allowed free access to the collection of Sir Joseph Banks, and the manuscripts of the deceased Solander, and the writer of the present article used habitually to devote a day in every week to study with him the herbarium of Linnæus, for their mutual benefit. If the acute and learned Dane did not, in every instance, conduct his enquiries and communications with that high sense of honour and delicacy which have been exemplified in the characters of a Banks, a Davall, Afzelus, Hofack, and many others, in the same circumstances, he by no means neglected to improve science, or to benefit its cultivators. We should not here have alluded to what is best forgotten, had not a circumstance of this kind been already before the public, in the Transactions of the Linnæan Society, v. 2. 209; and had not the remark there made been justified by a subsequent communication of the late Mr. Dryander, relative to the unauthorized and unacknowledged use of Solander’s papers, discoverable by some little mistakes copied from thence.

On returning to Copenhagen in 1785, Mr. Vahl was made professor of natural history in that university; and was appointed editor of the *Flora Danica*, begun at the royal expence by Oeder, continued with much imperfection by Muller, but restored to its original excellence by Vahl. The better to perform his duty, he visited certain tracts of country, previously little explored by botanists; especially the coasts and mountains of Norway, as far as Wardøe. Being now married, and settled in his native land, he undertook the publication of his discoveries and remarks, in a folio work, entitled *Symbolæ Botanice*, of which the first fasciculus appeared in 1790, the second in 1791, and the third in 1794. Each is accompanied by twenty-five un-

coloured

coloured plates, not highly finished, but expressive and correct. The principal object of this work was, in the first instance, to illustrate Forstall's discoveries, very incorrectly displayed in his own posthumous *Flora*; and the materials for the exemplification of which are, it seems, but partially and imperfectly preserved. Vahl's *Symbols* are moreover enriched with descriptions and figures of new or rare plants, from various other sources. The communications of the author's numerous correspondents, particularly of Von Rohr and others from the Danish West Indian colonies, are added to the acquisitions of his own journeys; and the whole forms a large body of valuable practical information. His *Eclogæ Americane*, published in 1796, are a sequel to the *Symbols*, on the same plan, but devoted to American plants.

In 1799 and 1800 professor Vahl received the pecuniary support of the Danish government in a second tour to Holland and Paris, for botanical purposes; chiefly, we presume, with a view to the composition of a great work, long in his contemplation, on the model of the Linnæan *Species Plantarum*. Of this he just lived to publish the first volume, under the title of *Enumeratio Plantarum*, in 1804, in 8vo. including the classes *Monandria* and *Diandria*. The second, containing only the *Triandria Monogynia*, was published by his widow in 1805. The copious introduction of new species, the ample original descriptions, the well-chosen synonyms, and judicious remarks, render this work far superior to any other of its kind, giving it all the merit of an original performance. Besides the addition of the essential generic characters, as in the *Systema Vegetabilium* of Linnæus, Vahl's *Enumeratio* is enriched with a compendious description of the peculiar habit of each genus, after a plan first introduced by Gouan, in his *Flora*, as well as *Hortus Monspeliensis*, and which Linnæus justly commended, as leading the way to improvement in natural classification. Nor must we pass by, without commendation, the excellent generic and specific index to each volume, an appendage of whose value we are seldom duly sensible, but from its inaccuracy or omission in other instances. The neglect, or bad construction, of indexes, and the omission of references to pages, are defects of the modern French school, which may be avoided by any botanical writer, even of the most humble scientific pretensions, and which the most learned ought not to neglect. The sequel of professor Vahl's last publication, as far as concerns grasses, was reported to have been left by its author in considerable forwardness, and was, if we mistake not, announced for publication. Something to this effect is found in the preface to the second volume; but we know not that any part of these valuable materials has appeared. The botanical professorship at Copenhagen was conferred on Mr. Vahl, after his return from his second visit to France, but he lived not long to enjoy his well-merited fame and distinction. He died on the 24th of December, 1804, in the 54th year of his age, leaving a widow and six children. His library, herbarium, and manuscripts were purchased by the king of Denmark for 3000 dollars, about 675*l.*, besides an annual pension of 400 dollars, or 90*l.*, to his widow, and of 100 dollars to each of his children. It was intended that the above-mentioned manuscripts, including a finished treatise on the class *Syngenesia*, should be edited by the successor of professor Vahl, Mr. Horneman, to whom the continuation of the *Flora Danica* was likewise confided. We are not informed of the progress of either.

Besides the botanical writings of professor Vahl, he has published some zoological papers in the Danish language, especially relating to birds; and has described a fish, constituting a new genus, by the name of *Holocentrus lentiginosus*, in the third volume of the *Transactions of the Natural His-*

tory Society of Copenhagen.—A more detailed review than we could here undertake, of the first volume of the *Enumeratio Plantarum*, may be seen in Sims and König's excellent *Annals of Botany*, v. 2. 179, where Mr. König has noticed every new article of information, and corrected every incidental mistake, with consummate accuracy and knowledge. We have already advanced an opinion similar to that of this able critic, respecting Vahl's removal of the Linnæan *SCITAMINEÆ*, see that article, from the class *Monandria* to *Gynandria*; a measure barely to be excused by our supposition, and not at all to be justified by any alleged reason.—Vahl's Works. Sims and König's *Ann. of Bot.* v. 1 and 2.

VAHLIA, in *Botany*, received that name from Thunberg, in honour of his contemporary professor Vahl. (See the last article.) The same genus was originally destined by the great Linnæus to commemorate Jean Jacques Rousseau, as appears by specimens in the Linnæan herbarium, marked *Roussæa capensis*; but he did not live to publish this genus, which his son, through inadvertence probably, introduced into the *Supplementum Plantarum*, by the name of *RUSSELLIA*, see that article and *ROUSSEA*. Those names being otherwise appropriated, the *Vahlia* is finally established.—Thunb. *Nov. Gen.* 36. Schreb. 176. Willd. *Sp. Pl.* v. 1. 1354. Mart. *Mill. Dict.* v. 4. Juss. 318. Lamarec *Illustr. t.* 183. (*Russelia*; Linn. *Suppl.* 24. Murr. in Linn. *Syst. Veg.* ed. 14. 270.)—Class and order, *Pentandria Digynia*. *Nat. Ord.* *Calycanthemæ*, Linn. *Onagræ*, Juss.

Gen. Ch. *Cal.* Perianth superior, of five lanceolate, acute, concave, spreading, permanent leaves. *Cor.* Petals five, ovate, concave, spreading, undivided, not half so long as the calyx. *Stam.* Filaments five, inserted into the calyx, between the petals, and full as long as its leaves, thread-shaped, erect; anthers incumbent, oblong, with four furrows. *Pist.* Germen inferior, roundish; styles two, thread-shaped, slightly spreading, longer than the stamens; stigmas simple, obtuse. *Peric.* Capsule ovate, abrupt, marked with five elevated lines, and crowned with the calyx, of one cell and two valves. *Seeds* numerous, minute.

Eff. Ch. Calyx of five leaves. Petals five, alternate with the stamens. Capsule inferior, of one cell and two valves, crowned with the permanent calyx. Seeds numerous.

1. *V. capensis*. Cape Vahlia. Thunb. *Nov. Gen.* 36, with a plate. *Prodr.* 48. Willd. n. 1. (*Russelia capensis*; Linn. *Suppl.* 175.)—Gathered by Thunberg, in sandy ground, near the valley of Verkeerde, at the Cape of Good Hope, flowering in December. It has not yet been brought to England. The root is woody and perennial. *Stems* several, herbaceous, erect, a span or more in height, simple or branched, leafy, clothed with short, soft, prominent, viscid pubescence, like all the rest of the herbage. *Leaves* opposite, sessile, linear-lanceolate, entire, pale green, an inch or inch and half long. *Flowers* yellow, in small, axillary, nearly sessile, tufts, about the upper part of the branches, accompanied by a small lanceolate bractea. The petals and filaments assume a violet hue when dried.

VAHNI, in *Mythology*, a name of the Hindoo regent of fire, who is more commonly called *Pavaka*; which see. A similar name, usually indeed written *Vani*, is given to Saraswati, consort of Brahma. See *SARASWATI* and *MARUT*.

VAIDYA, the name of a respectable class of Hindoos, who follow the profession of physic. Individuals of different religious sects are comprised in this denomination. (See *SECTS of Hindoos*.) Sir W. Jones, speaking of the Vaidyas, says, "they have more learning, with far less pride, than any of the Brahmans: they are usually poets, grammarians, rhetoricians, and moralists; and may be esteemed, in general, as the most virtuous and amiable of the Hindoos."

(Alicic

(Asiatic Researches, vol. i.) When not Brahmans, they are not permitted, legally, to read the holiest of the Hindoo books. See RETI and VEDA.

VAIGAL, in *Geography*, a town of Hindoostan, in Golconda; 20 miles S. E. of Combamet.

VAIGAR, an island of Russia, in the Frozen ocean, on the N. side of the straits of Vaigatkoï, about 24 miles in length, and about 8 broad. N. lat. $75^{\circ} 30'$. E. long. $52^{\circ} 24'$.

VAIGATSKOI, PROLIV, or *Straits of Vaigatz*, between Nova Zembla, and the continent of Russia.

VAIGE', a town of France, in the department of the Mayenne; 12 miles E. of Laval.

VAIHEND, or SCANDERIE, a town of Persia, in the province of Segestan, anciently Alexandria; 50 miles E. of Arokbage. N. lat. $31^{\circ} 10'$. E. long. $66^{\circ} 40'$.

VAIHIO, in the *Materia Medica*, a name used by some authors for a kind of lignum aloes, which is brought from China, and is very black, and scented.

VAIJAYANTA, the name of a palace of the Hindoo god Indra, situated in a celestial city named Amrovati. (See INDRA.) Another of his abodes is called *Sitanta*; which see. See also VAIKONTHA.

VAIKONTHA, the paradise of the Hindoo god Vishnu. It doth not precisely appear whether this abode is celestial, terrene, or subterrene. Sometimes it is described rather of the latter sort in a sea of milk, called Krirsamudra, where Vishnu is pictured reposing on a mighty serpent named Seshha, accompanied by his delightful consort Lakshmi. (See LAKSHMI and SESHHA.) A commentator on a Sanscrit work entitled *Khetra Nirmana*, the most ancient perhaps of Hindoo geographical books, places Vaikontha in the Frozen ocean: a circumstance that would have afforded curious confirmation to an idea of Buffon and Baillie as to the site of Eden, had these eminent men been aware of it: an idea more ancient, indeed, than the day of these philosophers, as Postellus had a similar notion. See PARADISE.

Several of the Hindoo deities have residences especially assigned them, by European writers usually called the paradise of those deities respectively; thus Indra's abode is called *Sitanta*, *Swerga*, and *Vaijayanta*; that of Siva, *Kailasa*; that of Varuna is *Sublavati*. Generally, these palaces or places of the Hindoo gods are described as situated on a mythical trifurcated hill named *Meru*, to which word we refer the reader for some of the extravaganzas connected with the Olympia of the Hindoos.

VAILATA, in *Geography*, a town of Italy, in the department of the Adda; 18 miles E. of Milan.

VAILLAC, a town of France, in the department of the Lot; 15 miles N. of Cahors.

VAILLANT, JEAN FOI, in *Biography*, an eminent antiquary and medallist, was born at Beauvais, in Picardy, in the year 1632. His maternal uncle, to whose care his education was entrusted, designed him for the profession of the law; but inheriting the fortune of this relation, he devoted himself to the study of physic, in which faculty he took a degree. Having accidentally gained possession of a box of medals, he relinquished his medical pursuits, applied to antiquarian and medallist researches, and soon formed a valuable cabinet, to the increase of which his various travels very much contributed. In one of his excursions for this purpose, he was attacked by an Algerine corsair and carried into slavery; and after his release, he was on another occasion attacked by a Tunisian; and in order to secure fifteen or twenty gold medals which he had in his possession, he swallowed them, and in process of time nature relieved him of his burden, which he disposed of to an amateur with advantage. On his return to Paris, he distinguished himself by

various dissertations on medals. He was thus recommended to the court, and employed on a commission for the prosecution of the same object. His ardour urged him to visit Egypt and Persia, and he was recompensed by obtaining a rich cargo of medals. To the *Memoirs of the Academy of Inscriptions and Belles Lettres*, of which he was a member, he communicated several valuable papers on his favourite subject: his reputation gained him the post of keeper of the duke of Maine's cabinet of medals; and even at Rome he was so highly esteemed, that he obtained a dispensation from the pope to marry successively two sisters. His private character was highly estimable. His labours were terminated by death in 1706, at the age of seventy-four years. The titles of some of his principal works, independently of several separate dissertations, tending to illustrate medallist science in its connection with history, are as follow: "Numismata Imperatorum Romanorum," 1674, 4to. of which an enlarged edition was published by Baldini at Rome in 3 vols. 4to. 1743: "Seleucidarum Imperium, five Historia Regum Syriæ ad fidem Numismatum accommodata," 1681, 4to.: "Selecta Numismata Antiqua ex Museo Petri Segurini," 1684, 4to.: "Numismata Ærea Imperatorum, Augustarum, et Cæsarum in Coloniais, Municipiis, et Urbibus, &c." 2 vols. fol. 1688: "Numismata Imperatorum, &c. Græca," 1698, 4to.: "Historia Ptolemæorum Ægypti Regum ad fidem Numism. &c." 1725, 4to.: "Achæmenidarum Imperium, &c." 1725.

The son of the preceding, viz. JOHN-FRANCIS FOI-VAILLANT, born at Rome in 1665, was instructed by his father in medallist science, and was graduated for the profession of physic. He published several dissertations on medals in the *Memoirs of the Academy of Inscriptions*, of which he was a member, and also a dissertation on the "Du Cabiri." His life terminated in 1708, in the 44th year of his age. Moreri.

VAILLANT, SEBASTIAN, a distinguished French botanist in the early part of the 18th century, was born May 26th, 1669, at Vigny, near Pontoise, being the eldest son of a shopkeeper in that town. He is described as having, like many other botanists of eminence, imbibed a taste for plants at a very early age, and even before his sixth year to have cultivated, in a little garden of his own, with which his father indulged him, all the plants he could collect from the country around, or from the gardens of his neighbours. We can hardly wonder that his illustrious biographer Boerhaave, should, as a physician, delight also to record an instance of Vaillant's early medical talents, in curing himself clandestinely of an intermittent fever, with lettuces and vinegar. He is reported to have made a rapid proficiency at the grammar-school of Pontoise, where he gave extraordinary proofs of attention to study, as well as of attachment to practical botany. His father was anxious to have him instructed in music, in which he made such progress, that he was found competent, at the age of eleven years, to succeed his master, as organist in the Benedictine convent of St. Macloud, in the town above-mentioned. Soon afterwards, he obtained a similar appointment, in a neighbouring nunnery, where he was accommodated with board and lodging as a remuneration. The decided bent of young Vaillant's mind appears to have been towards medicine and surgery, in consequence, probably, of his primary disposition to an observance of natural objects, and a consideration of the qualities of plants. Hence he was led to frequent the public hospital, and even to become an assistant to the surgeon of the house, and in his leisure hours he read medical books, and pursued anatomical enquiries. In this manner he passed his time till he reached his nineteenth year, when

when he removed to Evreux in Normandy, to place himself under another surgical teacher. Here he gained the good opinion of the marquis De Goville, captain of the royal fusiliers; who engaged M. Vaillant as surgeon to his company, with the rank of lieutenant. Thus the peaceable botanist, the organist of a nunnery, became a soldier; encountered the dangers of a campaign; came off with honour and safety; performed the last duties to his patron, who fell in the battle of Fleurus, July 1, 1690; and after visiting several towns in Flanders, returned to Evreux, which he quitted next year to pursue his studies, with more advantage, at Paris.

On the theatre of the metropolis, the talents of our young candidate for scientific distinction and improvement found every possible encouragement and advantage. Here, although the practice of surgery seems to have been his first object, probably with more direct views to a maintenance; he soon resigned every other pursuit for the first passion of his youth, and botany henceforth engaged all the faculties of his mind. He soon discovered the science to be just then in a state to make the scientific fortune of a man of enterprise and genius. Botany had, for some time, become a leading taste among persons of rank and opulence, by which the materials for its improvement had accumulated, but the advancement of the science itself had not, by any means, kept pace with its riches. Men of the first rank in human intellect, who had fixed everlasting landmarks in other departments of knowledge or literature, though they had done much in botany and other branches of natural history, had but imperfectly accomplished any great systematic plans of technical distribution or discrimination, without which mere practical knowledge is but an indigested chaos. The lucid order, and rapid perceptions, of Tournefort's mind, with whom Vaillant was now soon familiarized, as one of the most diligent of pupils, could not but strike him with peculiar force, while supplying light of which he so sensibly felt the necessity. But as a lamp, however brilliant, serves to betray the surrounding darkness, in an unlimited unexplored cavern; so the achievements of Tournefort, like those of his predecessors and contemporaries, tended as yet to display more of the arduous nature of their undertaking, than of its perfect accomplishment. The common herd of their pupils and admirers, are like the animalcules on a blue-bottle fly; who, as a witty writer observes, "doubtless think their fly the greatest and the bluest object in the universe," and they can only go where it pleases to lead. But Vaillant, though adoring the genius of Tournefort, and loving his truly amiable social qualities, could not but perceive the imperfect execution of much of his plan, and detected at once perhaps many of those faulty principles, which have gradually displayed themselves to subsequent observers. That he had performed an Herculean task, could not be denied, but that much remained to be done, was but too evident to an acute observer. The great preceptor soon became aware of the talents of his pupil; he held him up as an example to his colleagues, and adopted him as a coadjutor in the elucidation of the plants about Paris.

After residing some time at Neuilly, Vaillant was chosen secretary to Father de Valois, a Jesuit, confessor to the younger branches of the royal family. Here he became known to M. Fagon, first physician to the king (see FAGONIA); who finding him investigating and arranging mosses, was much struck with the specific definitions, written in Vaillant's beautiful hand under each, as they still remain. Fagon soon afterwards took him under his immediate protection, promised to further his wishes of travelling, and invited him to reside at Paris, till he could procure

him an appointment of that kind from the king. This object however was soon given up. Vaillant became secretary to his patron, and was taken into his house. Having free access to every part of the royal gardens, he enriched his own herbarium, and those of Fagon and Tournefort, with exotic, as well as native, specimens, which he prepared with skill and dexterity. He likewise added daily to the collection of living plants, and became, under M. Fagon, the director of the *Jardin du Roi*. At length, in 1708, this faithful and disinterested friend resigned, in favour of Vaillant, his own appointment, of professor and subdemonstrator of plants in that garden, which Tournefort had repeatedly solicited from him in vain. To this great benefit, which Vaillant was anxious, by all possible exertions, to deserve, was added the construction of new and ample hot-houses, at the wish of the new professor, and the formation of a splendid cabinet of *Materia Medica*. His lectures on botany, and especially a "discourse on the structure of flowers," since published, were received with great applause. He was admitted, without solicitation, into the *Academie des Sciences*; it is even said that he was desirous of declining this honour, which his friends had great difficulty in persuading him to accept. A piece of self-denial, or excessive modesty, the reasons for which are not very apparent.

In the intervals of his other occupations, Vaillant visited, at different times, various parts of France, for the sake of botanical enquiries; but it does not appear that, except his martial expedition into Flanders, he ever extended his travels beyond the limits of his native country. His foreign correspondence, nevertheless, was very extensive, and by this means he greatly augmented the riches of the royal garden.

Notwithstanding Vaillant's original admiration of Tournefort, and his personal intimacy with that great and amiable man, of whom we have given an account in its proper place; he very soon, as we have already hinted, became dissatisfied with some of the fundamental principles of his preceptor. He adopted and clearly explained the sexes of plants, and consequently asserted the importance of the stamens and pistils, in a physiological as well as systematic point of view. This was the subject of his discourse above-mentioned, delivered June 10th, 1717, before his pupils at the *Jardin du Roi*. On the 17th of December, 1721, he read a professed criticism on the method of Tournefort, before the Academy of Sciences, printed in the Memoirs of that learned society for 1723. We regret to find, in both these performances, much disrespectful mention of his illustrious predecessor; which has been but too severely retaliated upon himself, by the neglect which his own just pretensions have received from his countrymen. To have been more in the right than Tournefort, was of itself a sufficient offence; and to have asserted his opinion with asperity and indecorum, served only to authorize part of the hostility which he incurred. Whatever progress Vaillant had made towards the foundation of a new system of classification, he did not live to lay it, in any regular form, before the public. His active life was devoted to the acquisition of materials, which he had no opportunity of employing. His difficulties, doubtless, increased with his progress. What parts he did perfect are admirably done; particularly his elaborate exposition of the genera and species of the syngenesious, or compound flowers, published in the Memoirs of the Academy, between the years 1718 and 1722. But the observations and enquiries of this great botanist had been extended to various other classes and families of plants, though they never ripened into any complete systematic work. The writer of the present article has long ago recorded, *Tr. of Linn. Soc.*

v. 1. 24, that the herbarium of Vaillant, preserved at Paris, displays astonishing instances of his profound knowledge and acute judgment, with respect to the genera, species, and synonyms of plants. The specimens are copious and fine, especially of Tournefort's oriental plants, which are far more perfect and abundant than in that author's own collection. These were obtained by Vaillant, either from Gundelsheimer, the travelling companion of Tournefort, or from others who subsequently pursued the same track. We know not that any competition, or open controversy, arose between these distinguished men, during Tournefort's life, who dedicated a genus to his pupil. (See VALANTIA.) Vaillant is reported to have critically examined the whole of the *Institutiones Rei Herbarie*, as soon as that great work appeared, in 1700, and to have communicated his remarks to M. Fagon. This intelligent friend declared, that though in the morning he had admired the performance of Tournefort, he could not withhold his approbation of Vaillant's remarks by the light of mid-day. Tournefort died in 1708, and Vaillant's first public attack, except what might incidentally fall from him in lecturing, was made, as we have said, in 1721. We are informed thus much of the principles and aims of Vaillant, that, having established the doctrine of the sexes of plants, he proposed to distinguish his classes by the parts of the flower, and his genera by characters taken indifferently from the whole plant, according as might best suit his purpose. In this latter respect, he was but returning towards the darkness of former ages, and we can have nothing to regret. His boldest and most meritorious attempt respected nomenclature. He wished to distinguish every genus by an expressive name, by which its essential characters might at once declare themselves. He flattered himself with extending the same principle to every species of plant, so that a word or two might give its name and character together. The learned reader will be aware of the similarity of this scheme to that of Rivinus, and of its failure, even on the very limited theatre of that writer's scientific operations. (See RIVINUS.) He will also recollect that it succeeded with Linæus, only because the latter had the good fortune, or good sense, after discovering that these two objects, of nomenclature and clear discrimination, were in themselves incompatible, to reconcile both by division.

While these pursuits engaged the mind of Vaillant, his bodily constitution was yielding to the fatigues he had too long imposed upon it. Exposure to cold and wet, and to the night air, in many of his botanical rambles, did but ill suit a delicate frame, prone to pulmonary diseases. In proportion as he perceived a decay of strength, he only exerted himself the more, to complete the undertakings which had been the object of his life, and which might have demanded something like a patriarchal term of existence. He suffered for about four years under a consumptive attack, in the course of which he expectorated little hard concretions, amounting, says Boerhaave, to above 400, and at length expired, in a tranquil manner, on his birthday, May 26th, 1722, aged fifty-three. He was tall, well-proportioned, and active; of an open generous disposition, hating flattery, and mistrustful even of his due praise. The character of his criticisms upon Tournefort is rather, as we should hope, to be attributed to blunt sincerity, than to any portion of jealousy or envy, of which his conduct, in other instances, betrays no traces. He had the satisfaction of soothing, by the most assiduous care, the sufferings of his friend Fagon, who underwent an operation for the stone at a very advanced age; and who would gratefully have ceded to Vaillant, as a recompense, the profits of an impost which he enjoyed upon

mineral waters. This Vaillant had the still higher gratification and honour of declining.

His rich and splendid herbarium, comprehending that of M. Fagon, which had been given him by the son of his old friend, as well as his own cabinet of various natural curiosities besides, were purchased by the king, Louis XV., and deposited in the museum at the Jardin du Roi, where they have fortunately remained in safety amid the wreck and the restoration of a kingdom. His library was left in the hands of his widow, whose name was Françoise Nicole Bosfontet. Vaillant married this lady on the 14th of October, 1701, and enjoyed with her twenty-one years of great conjugal happiness, but had no offspring.

The greatest object of temporal concern, on his death-bed, was a work on the plants around Paris, which he had long been preparing, and for which Claude Aubriet, the inimitable botanical draughtsman of that day, had made, under the inspection of the author, above 300 drawings. Anxious that his labours should not prove altogether fruitless, Vaillant wrote, a year before his decease, to the famous Boerhaave, requesting him to take this orphan work under his protection. To this request, backed by their mutual friend William Sherard, Boerhaave readily acceded. Vaillant declared that he had particular and very strong reasons, which he could not explain, for making this request. He probably feared that his countrymen, venerationers of Tournefort, who no longer stood in their way, might not be over-anxious to preserve the relics of his rival, whose fame and activity had so lately clashed with their own. Whatever were his feelings on this subject, Vaillant was satisfied with Boerhaave's acceptance of this trust, and awaited his long-expected change with the piety and composure becoming a Christian and a true philosopher.

Boerhaave published the work of his departed friend in 1727, under the title of *Botanicon Parisiense*, making a very handsome folio volume, with thirty-three admirable plates, comprehending above 300 figures, of rare or obscure species, in which the cryptogamic plants are very abundant. The flowers alone of all the Orchis tribe are exhibited; their herbage being so nearly uniform as to be deemed less necessary. These figures, though uncoloured, leave scarcely any thing to be desired. The arrangement of the work is alphabetical, and its language, except the specific definitions, French, like all the author's compositions. The elegancies of style, or refinements of language, do not seem to have made a part of his studies, and he was rather a scientific than a learned botanist, except what was necessary for the accurate appropriation of synonyms, in which no one, so far as we have traced his progress, was superior to Vaillant. Dillenius, a professed and elaborate botanical critic, was undoubtedly, by many degrees, below him. Certain imperfections of this popular work, justly indicated by Haller, arose, as he observes, from Boerhaave's inability to bestow sufficient time on the correction of the unfinished manuscripts. Hence many repetitions occur, and some of the figures want references. Following authors have generally cited the beautiful figures, without adverting to the text; in which, notwithstanding, much may be found worthy of notice, especially all the practical observations, and original descriptions, of Vaillant himself. We cannot too strongly commend him as a botanist of originality, acuteness and accuracy, who has contributed to the general stock of botanical knowledge, and whose genius, had he lived longer, might have greatly extended the limits of philosophical speculation, on the subject of arrangement.—Vaillant's Works, and his life by Boerhaave. Haller Bibl. Bot.

VAILLY, in *Geography*, a town of France, in the department

partment of the Aifne; 8 miles E. of Soiffons.—Also, a town of France, in the department of the Cher; 9 miles E. of Aubigny.

VAIR, in *Heraldry*, a kind of fur, or doubling, consisting of divers little pieces, argent and azure, resembling a Dutch U, or a bell-glass.

Vairs have their point azure opposite to their point argent, and the base argent to the azure.

When there are only two or three vairs, the ancient heralds call it *great vair*; and when there are more, *small vair*.

Vair is intended to represent a kind of skin, used anciently by the kings of France, in lieu of a fur, and with which the gowns of the presidents à mortier, the counsellors of the court, the heralds' coats, &c. were lined till the fifteenth century.

It was properly the skin of a kind of squirrel, called also in French *vair*, and in Latin *sciurus*; which was white underneath, and of dove-colour at top. It is described by Aldrovandus under the name of *sciurus vario*, and is the same, according to Gesner, with the *mus Ponticus* of Aristotle and Pliny; which the Latins call *varus* or *varius*, from the variety of its colour. Its two skins, joined together, make the figure of the vairs in armories; being naturally white and azure.

Vair, Colombiere observes, is the second sort of fur anciently used as a lining of the garments of great men, consisting of little pieces, sewed by the furriers on white skins: and because these pieces were usually blue, those who first settled the rules of heraldry, decreed, that this fur, in its natural blazon, should always be argent and azure. So, if it be absolutely said, such a family bears vair; it is supposed to be argent and azure.

Regularly there must be but four rows or ranks of vair in the shield; if there be either more or less, the number must be specified. The smallest number, being three rows, is called *beffroy de vair*; the most, being five or six, is called *menu*, or *small vair*.

The *beffroy* is also known by the first figure on the dexter side of the escutcheon being always of metal, and in form of a belt; whereas that of *menu vair* is in shape of a glass.

VAIR, *Counter*. See COUNTER-VAIR.

VAJRA, the name of the weapon placed in the hand of the Hindoo god Indra, regent of the firmament, and of atmospheric phenomena. It is in fact lightning, or the thunder-bolt or fulmen of the western Jove. Indra is hence named Vajrapani, or "grasper of the thunder." (See INDRA.) It is usually described as a discus or quoit, with a central hole, on which it is whirled round on the forefinger of the right hand, and sent missilely with a terrible effect. This is similar to the chakra, or circle, the common attribute of the god Vishnu. (See VISHNU.) Such things are now seen in the hands of holy mendicants variously called Saniaffy and Yogi. (See SECTS of *Hindoos*, and YOGI.) They are usually a foot or less in diameter, of metal or hard wood, sharp at the edge. In pictures, fire is sometimes flaming from its periphery, as if from the vehemence of its centrifugal energy. The only representation we ever saw differing from this description, is in the frontispiece to Kirkpatrick's account of Nepaul. The god Siva, sometimes appearing in the character of the thunderer, is named *Vajreswara*, which see: it means riding on the thunder.

VAIRAC, in *Geography*, a town of France, in the department of the Lot; 4 miles N.E. of Martel.

VAIRAVA, in *Mythology*, a name of the Hindoo god Siva. It is sometimes written and pronounced Bhairava; and, derived from Bheru, means the *tremendous*. The Mahrattas ex-

tensively worship Siva under this name, which in their mouths is corrupted into *Bheroba*. They have legends relating to an avatara or incarnation of Siva under this name and form; and images are very common of him in the Mahratta country. Other accounts make Vairava and Virabadra the offspring of Siva, and give the former name likewise to Parvati, when speaking of her in her terrific characters, such as *Kali*; which see. Sometimes all the offspring of Siva are denominated the Bhairavas. See VIRABADRA.

The Mahrattas assign to Bheroba a consort or fakti, whom they name Jogafery: it would perhaps be more correctly written *Yugafiri*. In the Hindoo Pantheon several representations are given of this couple, and the author of that work says that he has in his collection nearly a hundred metallic casts of them, mostly rude and old, with an appearance of having been buried. The figures are usually accompanied by Siveau attributes, such as the trifura or trident, the patra or cup, the linga, &c. (See TRISULA, &c.) Sometimes he rides a buffalo. See VAHAN.

There are fables in Hindoo legends of Brahma having had one of his heads cut off. This decapitation is by some accounts attributed to Vishnu, or Narayana, by others to Siva and to Vairava, and the latter is in pictures sometimes represented holding the ghastly head, and a cup or patra to receive the blood; with a collar of blanchéd skulls, and attended by a dog. Sometimes he, usually four-handed, and his wife, are represented as skeletons.

The sect who exclusively or especially adore Siva, are called Saiva. It appears that this sect has spread to Java; for an image of him has been recognized in the interior of the island, and a well-executed drawing of it is in the possession of Mr. Marsden, author of the Malayan Grammar and Dictionary. Batu-Bharavé is the name under which this tremendous pair are known in Java; where, as Mr. Marsden is informed, our officers, during the late service, frequently recognized Hindoo figures, especially of Pollear, to which they had been familiarly accustomed on the continent of India. See POLLEAR.

Sonnerat notices this deity as honoured in the Carnatic: he calls him Vairevert, third son of Siva, produced from his breath to humble the arrogance of Brahma, one of whose heads he wrenched off, and used the skull to receive the blood of his other antagonists. He is described as mounted on a dog.

VAIRE, in *Geography*, a river of France, which runs into the Var, about 3 miles N.W. of Glandeves.

VAJRESWARA, in *Mythology*, a name of the Hindoo god Siva, derived, it is said, from the weapon more usually given to Indra, called Vajra, meaning lightning or thunder. Siva under this name will therefore correspond with the Jupiter fulminator or tonans of the West. Siva's consort, Parvati, is surnamed Vajreswari, pronounced sometimes Bajreswari; the initials being so extensively interchangeable.

VAIROE, in *Geography*. See VÆIROE.

VAIRY, VAIRE, *Verry*, or *Varry*, is applied to a coat, or the bearings of a coat, when charged, or chequered, with *vair*.

When the colours are argent and azure, or white and blue, it is *vairy proper*: if it be otherwise, the colours are to be expressly named; *vairy* of such a colour or metal. He bears *vairy*, or, and vert; this is particularly called *vair composé*. The bearings are likewise said to be *vairy*, when they are charged with vairs. When chiefs, crosses, pales, fesses, &c. happen to be *vairy*, the number of ranks are to be specified.

Vairy gowns are observed, by Julius Pollux, to have been

the habit of the ancient Gauls, as ermines were of the Armenians.

VAIRY-cuppy, or *Vairy-tassy*, or *Potent-counter*, *Counter-potent*, is a bearing in heraldry, composed of pieces representing the tops of crutches, or potents counter-placed.

In blazon, the colours must be expressed; as azure, argent, &c.

VAISETTE, JOSEPH, in *Biography*, a native of Guillac, in the diocese of Alby, was born in 1685, and entered among the Benedictines of St. Maur, at Touloufe. In 1713 he settled at Paris, and engaged, in concurrence with Claude de Vie, of the same fraternity, in the history of Languedoc, of which the first volume appeared in 1730, in folio: and upon the death of his coadjutor in 1734, it was continued by himself, four more volumes having been published, and a sixth being in preparation at the time of his own death. This history is highly commended, on account of both the learning and moderation displayed by the author. An abridgment of this history, in 6 vols. 12mo., was published by Vaisette in 1740; and he was also the author of an "Universal Geography," in 4 vols. 4to., and 12 vols. 12mo., 1755, which at the time of its publication was generally approved. The author's erudition was extensive, and his disposition was amiable, so that he died, much regretted, in 1756. Moreri.

VAISHNAVA, the general name of all the different sects of Hindoos who worship Vishnu, either directly or indirectly, through his consort Lakshmi, or in one of his incarnations called avatars. In the article *SECTS of Hindoos*, we have concentrated the chief of what we have to offer on the subject of the numerous individuals comprehended under the denomination of Vaishnava; which, in its most extended sense, includes considerably more than half of the whole race of Hindoos. The distinction of Saiva, or Siva-Bakht, comprehends the other portion. See SAIVA.

The second plate of the Hindoo Pantheon contains many sectarial marks, or symbols, by which the different sects distinguish themselves: generally speaking, horizontal lines on the forehead mark the Saiva, while perpendicular forehead-lines indicate some sect of Vaishnava. These lines are red, white, or yellow, with different coloured spots over, under, or between them; all of which are said to have some mystical allusion.

VAISHNAVI, in *Hindoo Mythology*, is a name of the goddess Lakshmi, the consort or energy of Vishnu: as such, she is called his fakti. In the different incarnations of Vishnu, Lakshmi accompanied him, either under her own name, or under some other denomination.

VAISHIKA, in *Philosophy*, is the name of one of the six Hindoo schools, or systems. Under the article *PHILOSOPHY of the Hindoos*, we have enumerated the principal schools of that thinking race. The Vaishika is a division of the Nyaya, and we refer to the latter word for some notice of the doctrines of its followers.

VAISON, in *Geography*, a town of France, in the department of the Vaucluse, on the Oueze: before the French revolution the see of a bishop, suffragan of Avignon: the old town has been long in ruins; 22 miles N.N.E. of Avignon.

VAISRAVA, in *Mythology, a name of the Hindoo Plutus, who is more commonly called *Kuvera*; which see. *Vaivra*, or *Vivra*, is a name given also to Ravena, half-brother to Kuvera. (See *RAVENA*.) *Vivra* is sometimes called their father, and they are then named *Vaivravana*.*

VAISSEAUX ENFILEZ, a term used by the French writers in *Chemistry*, for the vessels used in distilling in an

open fire, or in sand, which do not consist in the common way of a retort, joined immediately to a receiver, but have a receiver with a double opening, and a neck at each end, placed between the retort and the ordinary receiver. The neck of the retort is let into one of the necks of this middle vessel, and its other neck is thrust into that of the receiver; by this means the receiver, into which the liquor is to fall, stands at a greater distance than it otherwise would from the fire, and the vapours are more easily condensed in it by its coldness, while they have also a double or treble space to expand in, and by that means are not so likely to burst the vessel.

VAIVASWAT, in *Mythology*, a name of Surya, the Hindoo regent of the sun, as noticed in the article *SURYA*, where he is under this name styled, on the authority of sir William Jones, "lancer of the golden ray." The very important deity Surya is frequently called in Hindoo books by the title of Vaivswat; and those personages who, like the ancient Incas of Peru, are pretended to be of solar origin, are called Vaivswata. In the Gita, Krishna says, "this immutable system of devotion I revealed to Vaivswat, ('or,' says the commentator, 'the sun,') Vaivswat declared it to his son Menu; Menu explained it, &c." This Menu is the author of the celebrated Institutes that bear his name: he is also named Satyavrata, and is reasonably believed to be the same with the Noah of Scripture. (See *MENU* and *SATYAVRATA*.) These offspring of the sun are likewise called *Suryavansa*; which see: and some farther notice of their curious coincidence with the solar race of Peruvians will be found in our articles *RAMA* and *SITA*. The Hindoo Pluto is sometimes called Vaivswata Yama; denoting, we conclude, his solar origin.

VAKEF, in *Geography*, a town of Arabia, in the province of Nedsjed; 100 miles N. of Jamama.

VAKIA, in *Commerce*, a weight in Persia and Arabia. At Bassorah, the weights for merchandize are, the maund attary, the maund sefy, and the oka of Bagdat. The maund attary contains 25 vakias tary (sometimes reckoned at 24 or 26 vakias), and weighs 28½lbs. avoirdupois, or the vakia 19 ounces. The maund sefy, or maund Bassorah, contains 24 vakias sefy (called okas of Bassorah), equal to 76 vakias tary, or 90lbs. 4 oz. avoirdupois. The oka of Bagdat is 2½ vakias tary, or 47½ oz. avoirdupois. In sales of ginger, pepper, and coffee, 26 vakias are allowed to the maund; in sales of cardamoms, sugar-candy, and benzoin, 25 vakias per maund; and in sales of sugar and metals, 24 vakias per maund. The vakia tary, which should be about 115 miscals (the miscal weighing about 72 English grains), varies from 110 to 118, and the others in proportion.

At Betelsagui, or Betelackee, in Arabia, a rattle of coffee contains 14½ vakias, and a parcel, or farzil, of the same, 290 vakias; of dates, candles, and iron, 16 vakias are reckoned to a rattle; of all other sorts of goods, 15 vakias make a rattle. At Mocha, gold and silver are weighed by the vakia of 10 cofallas, or 160 carats: 24 carats = a miscal, and 1½ vakia = a beak: 100 Spanish dollars weigh 87 vakias, so that a vakia weighs little more than 1 oz. English troy weight; the bahar contains 15 farzils, or 150 maunds; the maund = 40 vakias. A rattle is = 15 vakias, but in coffee, 14½ vakias are reckoned for a rattle, 2 rattles for a maund, and 10 maunds, or 290 vakias, for a farzil. Kelly's Univ. Cambit.

VAKUNAIIKA, in *Geography*, a river of Russia, which runs into the Kifenga, N. lat. 56° 16'. E. long. 88° 14'.

VAL, LA. See *LAVELD*.

VAL, La, a town of France, in the department of Mont Blanc; 20 miles E. of Montier.

VAL,

VAL, *Le*, a town of France, in the department of the Var; 3 miles N. of Brignolles.

VAL *di Compare*. See TEAKI.

VAL *de Morza*, a town of Spain, in the province of Leon; 12 miles E. of Ponferrada.

VAL *de Prades*, a town of Portugal, in the province of Tras os Montes; 16 miles E.N.E. of Mirandela.

VAL *Richer*, or *Val de Richer*, a town of France, in the department of the Calvados; 12 miles N.W. of Caen.

VAL *Rotondo*, a town of Naples, in Lavora; 15 miles S.E. of Sora.

VAL *de Salas*, a town of Spain, in Galicia; 22 miles S. of Orense.

VAL *de Santiago*, a town of Portugal, in the province of Alentejo; 27 miles S.W. of Beja.

VAL *de Travers*, a district of the principality of Neuchâtel, about 18 miles in circumference, and containing about 3500 inhabitants. It is situated between Neuchâtel and Pontarlier.

VAL *di Trompia*, a valley of Italy, in the Bressian, containing 19 parishes, and about 13,000 inhabitants, chiefly employed in the manufacture of iron.

VAL *de Vacas*, a town of Spain, in the kingdom of Seville; 10 miles from Lucena.

VAL *de Uxo*, a town of Spain, in the province of Valencia; 17 miles S.E. of Segorbe.

VALA, in *Ancient Geography*, a town of the interior of Thrace. Ptolemy.—ALFO, a town of Africa, in Mauritania Tingitana. Ptol.

VALADARES, in *Geography*, a town of Portugal, in the province of Entre Duero e Minho; 5 miles S.W. of Melgaffo.

VALAGODE, a town of the island of Ceylon; 60 miles S. of Candy.

VALLAIS, or VALLAIS, an independent republic in alliance with the thirteen cantons of Switzerland, and which has formed a particular league with the seven Catholic cantons, for the defence of their religion. This tract of country stretches from E. to W. about 100 miles, and contains 100,000 inhabitants, professing the Roman Catholic religion. It is divided into Upper and Lower Vallais; the former reaching from the Furca to the Morge, below Sion, which is its capital; and the latter, from that river to St. Gingou, situated upon the lake of Geneva. From the mountain of Furca, its eastern boundary, two vast ranges of alps inclose the Vallais: the southern chain separates it from the Milanese, Piedmont, and part of Savoy; the northern from the canton of Bern. These two chains, in their various windings, form several small valleys, watered by numerous torrents that rush into the Rhone, as it traverses the whole district, from the Furca to St. Maurice. A country thus entirely inclosed with high alps, and consisting of plains, elevated valleys, and lofty mountains, may be naturally supposed to exhibit a great variety of situations, climates, and productions. Accordingly, the Vallais presents to the curious traveller a quick succession of prospects, as beautiful as diversified. Vineyards, rich pastures covered with cattle, corn, flax, fruit-trees, and forests, occasionally bordered by naked rocks, crowned with everlasting snow.

The productions of the Vallais vary according to the great diversity of climates by which this country is distinguished. It supplies more than sufficient wine and corn for interior consumption, and exports a considerable quantity of both; the soil in the midland and lower districts being exceedingly rich and fertile. In the plain, where the heat is collected and confined between the mountains, the harvest is usually finished in July; whereas, in the more elevated

parts, barley is the only grain that can be cultivated with any success, and the crop is seldom cut before November. About Sion, the fig, the melon, and all the other fruits of Italy, come to perfection. In consequence of this singular variety of climate, the traveller in the same day may indulge himself with strawberries, cherries, plums, pears, and grapes, each of which is the natural growth of the country.

Both the hills and valleys of the Vallais breed cattle in abundance, and yield plenty of game. The mountains are supposed to contain lead, copper, and silver mines; but the produce, it is supposed, would not defray the expence of working them. Here is likewise pit-coal. The Vallais is noted for two hot-baths of celebrated virtue, as those of Brug, or Gleufe, and Leuck, the latter of which is commonly known by the appellation of the Vallais bath. In the upper tythings the prevailing language is the German, but the inhabitants of Sion, in the Upper Vallais, with all in the Lower, speak a corrupt French; though in both parts, especially in the chief burg, they apply themselves to the German, French, Italian, and Latin; being all indispensably necessary to them in their intercourse with the cantons of Bern and Uri, Savoy, Piedmont, and the Milanese; therefore a stranger cannot but be surpris'd at the fluency with which the meanest people here speak those four tongues.

The ancient inhabitants of this country were the Lepantii, Viberi, with the Seduni and Veragri, who sold their liberty dear to Sergius Galba, general of Julius Cæsar. In the middle ages it came to be called Valesia, and in 1032, under the emperor Conrad II., devolved to the German empire, as a part of the second Burgundian kingdom. In the year 1035, that prince made over the Lower Vallais to the counts of Savoy. The inhabitants of the Upper Vallais resolutely maintained their liberties, as well against the dukes of Zaringen, who, in the year 1157, were by Frederic I. appointed guardians of the bishopric of Sion; as against the bishops of that see, who assumed the title of counts of the Vallais, and after that drove out the families of the barons Tour and Raren, who had usurped a dangerous authority among them. In 1475, the bishop of Geneva fell on the Upper Vallais with a body of 18,000 men, consisting of Lower Vallaisans and Savoyards; but the Upper Vallaisans, being assisted with 3000 troops by Bern, Friburg, and Solothern, their allies, defeated the bishop, and even made a conquest of the Lower Vallais, which ever since that time has been subject to them. In the same year, also, they formed a perpetual alliance with Bern, which was renewed in 1643; and in 1529, with the whole Helvetic body. In 1533 they entered into a more particular union with the seven popish cantons.

At an early period of the French revolution, the disaffected party of the Lower Vallais appealed to France to emancipate their country from their subjection to the Upper Vallais, but the French not having matured their scheme of fraternization, their petition was rejected.

In February 1798, however, the people of the Lower Vallais were enfranchised, and admitted to an equality of rights by the Upper Vallais; but after the conquest of Bern, and the revolution of the greater part of Switzerland, the inhabitants of the Upper Vallais rejected the new constitution, took up arms, and defended themselves with great spirit. After several bloody defeats, and the capture of the castle of Sion, which was stormed by the French, the natives submitted, and both districts were moulded into one department, called the Vallais.

There are no manufactures of any consequence; and indeed the general ignorance of the people is no less remarkable

able than their indolence; so that they may be considered, in regard to knowledge and improvements, as some centuries behind the Swifs, who are an enlightened nation. The peasants seldom endeavour to meliorate those lands where the soil is originally bad, or to draw the most advantage from those which are uncommonly fertile: having few wants, and being satisfied with the spontaneous gifts of nature, they enjoy her blessings without much considering in what manner to improve them.

The Upper Vallais is sovereign of the Lower Vallais, and comprises seven independent *dixains*, or commonwealths; namely Sion, Goms, Brieg, Visp, Leuck, Raren, and Siders; of these, Sion is aristocratical, and the others democratical. They are called *dixains*, because the Upper Vallais being divided into seven, and the Lower into three districts, each division is a *dixain*, or tenth of the whole.

The bishop of Sion was formerly absolute sovereign over the greater part of the Vallais; but his authority is at present limited to a few particulars. He has the sole power of pardoning criminals, and signs the warrants for execution; the money is coined in his name, and with the arms of the republic. In his acts he styles himself bishop of Sion, prince of the German empire, and count and præfect of the Vallais: in days of high ceremony he dines in public, and is waited upon by the first noble of the Vallais, who is hereditary treasurer. He nominates also the bailiffs or governors of the two bailliages of Martigny and Arden, and possesses considerable influence from his patronage of church preferment. Upon a vacancy in the see, the canons of the chapter of Sion present from their own body four candidates, one of whom is appointed bishop by the landfrath, or general diet.

The seven *dixains* form, conjointly with the bishop, the republic of the Vallais, and all affairs are transacted in the diet, called landfrath, which meets twice every year at Sion. This assembly consists of nine voices; the bishop; the lands-hauptmann, who is chosen or confirmed by the diet every two years; and the seven communities. The bishop presides; the lands-hauptmann collects the votes; and all resolutions are decided by the majority. Each *dixain*, although it has but one vote, sends as many deputies as it pleases; they generally consist of four; a judge, a banneret, a captain, and a lieutenant. The judge and the lieutenant are appointed every two years: the two others hold their offices for life.

In all civil causes of a certain importance, an appeal lies from the inferior courts of justice to the diet in the last resort. Thus, by the institution of this supreme council, the communities in this country are firmly united, and form in conjunction one body politic, or republic, for the general affairs of the nation. In other cases, each of the commonwealths is governed by its own particular laws and customs.

Both the Upper and Lower Vallais were formerly dependent upon the bishop of Sion; but the inhabitants of the two districts united in order to limit his power; and, having succeeded, quarrelled for superiority. A bloody war ensued; which terminated in 1475, by the total defeat of the Lower Vallaisans. Since that period, they have continued subject to the Upper Vallais, with the enjoyment, however, of some considerable privileges.

The inhabitants are generally of low stature, and those of that part of the Vallais in which the capital (see SION) is situated, are very subject to goiters, or large excrescences in the neck, which frequently increase to an enormous size, and what is more extraordinary, idiocy is no less prevalent. The weather in this inclosed vale is exceedingly sultry and oppressive. This languid heat is probably

one of the causes which occasion the inconceivable indolence of the inhabitants: much, however, must at the same time be attributed to the richness of the soil, which precludes the necessity of labour by almost spontaneously producing the fruits of the earth. In fact, the people assist nature very little: they suffer the vines in the vineyards to trail upon the ground; whereas, if the branches were properly supported, the owner would be well rewarded by the superior quantity and quality of the produce.

The uncleanness of the common people is disgusting beyond expression. Although the Lower Vallais exhibits as much uncleanness, its natives are not altogether so indolent as those of Sion and its environs. This imputation of indolence will not hold good with respect to all the inhabitants of the Upper Vallais: for in the eastern part of that district, the soil, though far inferior, was much better cultivated, and the people seemed industrious. Some physical reasons may be assigned for this difference; for *there* the weather is not so sultry, the water is not unwholesome, the air remarkably salutary, and none of those goitrous persons or idiots were observed common in the midland parts. See MARTIGNY and St. MAURICE.

VALANTIA, in *Botany*, was originally so named by Tournefort, in honour of his pupil SEBASTIAN VAILLANT, see that article. The latter, as Linnæus remarks, was dissatisfied with this appropriation, and wished, on that account, to set aside all names of botanists, as applied to genera, because he perceived the *Valantia* of Tournefort not to be distinct from *Cruciata* of the same author. He was so far correct; but there have been several species referred since to *Valantia*, which appear to constitute a good genus, whose limits the writer of this has attempted to define, in the *Flora Græca* and its *Prodrômus*, and which will here be exemplified.—“Tourn. in Mem. de l’Acad. des Sc. for 1706. t. 3.” Sm. Fl. Græc. Sibth. v. 2. 28. Prodr. v. 1. 95. Linn. Gen. 543. Schreb. 723. Willd. Sp. Pl. v. 4. 947. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 5. 434. Dill. Gen. 147. t. 8. Mich. Gen. t. 7. Juss. 197. Lamarck Illustr. t. 843. (*Galium hispidum*; Gært. t. 24.)—Class and order, *Tetrandria Monogynia*. (Polygamia Monoecia; Linn.) Nat. Ord. *Stellata*, Linn. *Rubiaceæ*, Juss.

Gen. Ch. Cal. Perianth none. *Common Receptacle* three-flowered, variously shaped, enlarged after flowering, containing the solitary fruit. *Cor.* superior, of one petal, flat; that of the central flower with four, of the lateral, or male, ones with three, deep ovate segments. *Stam.* Filaments in the central flower four, in the lateral ones three, thread-shaped, curved, alternate with the segments, and half as long; anthers roundish, of two cells. *Pist.* Germen solitary, inferior, concealed in the receptacle, belonging to the central flower, with the rudiments of two seeds; style in the central flower only, deeply divided, scarcely so long as the filaments; stigmas obtuse. *Peric.* formed of the enlarged permanent receptacle, gibbous, inflated, of one cell. *Seed* generally solitary, sometimes two, ovate, concealed in the receptacle, smooth.

Eff. Ch. Corolla of one petal, flat, superior. *Common* receptacle three-flowered, single-fruited. Lateral flowers male, three-cleft. Seeds concealed in the receptacle.

Obs. The above limitation of the genus before us excludes *V. pedemontana*, Willd. n. 4; *humifusa*, Willd. n. 6; *taurica* and *cherfonensis*, Willd. n. 9. and 10.; with *V. Aparine*, *articulata*, *Cruciata* and *glabra*, of Linnæus, all which eight species belong, if we mistake not, to *Galium*. Willdenow has already properly removed from this genus *V. hypocarpa*, which is, as Browne and Pursh make it, a species of *Rubia*, very remarkable, however, for its apparently super-

rior *germen*. But we apprehend that what looks like an inferior *calyx*, may be four *bractæas*, and that this species, like *Rubia tinctorum*, may have no real *perianth*.

1. *V. muralis*. Wall Cross-wort. Linn. Sp. Pl. 1490. Willd. n. 1. Ait. n. 1. Sm. Fl. Græc. Sibth. v. 2. 28. t. 137. (*V. annua quadrifida verticillata, floribus ex viridi pallefcentibus, fructu echinato*; Mich. Gen. 13. t. 7. *Cruciata nova romana minima muralis*; Column. Ecphr. 298. t. 297. f. 2. *Rubia quadrifolia, verticillato femine*; Bauh. Hist. v. 3. 718.)—Fruit lobed; its angles fringed with teeth. Whorls crowded.—Native of walls and dry banks in Italy and the south of France, as well as in Greece. Dr. Sibthorp gathered it on mount Hymættus, near Athens, and on the hills of the country of Argos. The root is small and annual. *Stems* several, about a finger's length, ascending, clothed with numerous whorls of small, obovate, entire leaves, four in a whorl, a little hairy on each side. *Flowers* axillary, one to each leaf, small, sessile, pale yellow. *Fruit* of a singular appearance, much larger than the flowers, deflexed; gibbous and smooth at the base, lodging a solitary, ovate, smooth seed; its lobes divaricated and toothed.

2. *V. hispidula*. Brittle Cross-wort. Linn. Sp. Pl. 1490. Willd. n. 2. Ait. n. 2. Sm. Fl. Græc. Sibth. v. 2. 29. t. 138.—Fruit brittle. Whorls rather remote.—Native of the south of Europe. Dr. Sibthorp gathered it on the mountains of Crete, and has supplied the only figure that exists of this species. An annual herb, twice the size of the foregoing, and distinguished by its longer, narrower, more distant leaves; but more essentially by the oblong form of its common receptacle, or fruit, beset with pale rigid bristles, and not fringed, in whose gibbous smooth base is lodged a solitary seed, whose insertion is erroneously represented by Gærtner. Miller cultivated both these species, but nothing can be less likely to interest a mere flower-garden botanist. To those who study natural genera, and their affinities, these plants are highly curious, and sufficiently demonstrate *Valantia* to be distinct from *Galium*.

3. *V. filiformis*. Least Cross-wort. Ait. n. 3. Willd. n. 3.—Fruit cylindrical, scaly, without prickles, longer than its stalk. Leaves lanceolate, somewhat fringed. Gathered by Mr. Masson, in Teneriffe. Root annual. *Stems* simple, a span long, hispid. *Leaves* four in each whorl, somewhat stalked, reticulated with veins; the lower ones roundish. Common receptacle beset with minute, lanceolate, chaffy scales.

4. *V. cucullaria*. Hooded Cross-wort. Linn. Sp. Pl. 1491. Moen. Acad. v. 4. 296. Willd. n. 5. Ait. n. 5. (*Cucullaria*; Buxb. Cent. 1. 13. t. 19. f. 2.)—Bractæas ovate, stalked, deflexed, concealing the oblong furrowed hairy fruit.—Gathered by Buxbaum, in Cappadocia, and by Hasselquist in Arabia, on hills, flowering in May. A small, branching, annual herb, with square rough-edged stems. *Leaves* ovate, stalked, revolute, rough with minute prickles. *Flowers* very small, yellowish, on branched axillary stalks, each stalk bearing three flowers, and as many large, pale, reticulated, smooth, overshadowing bractæas, which well mark this species, and caused Buxbaum to distinguish it as a genus, by the name of *Cucullaria*. The plant is, however, a true *Valantia*.

VALARSA-KERD, in *Geography*, a town of Turkish Armenia; 15 miles W. of Diadin.

VALAY, a small island near the west coast of North Uist. N. lat. 57° 37'. W. long. 7° 29'.

VALBASE, a town of Spain, in Old Castile; 15 miles W.S.W. of Burgos.

VALCA, a river of the Popedom, which runs into the Tiber, about 5 miles above Rome.

VALCALDE, or VILLA CALDE, a town of the Genoese republic; 10 miles N. of Genoa.

VALCKENBURG, a town of Holland; 3 miles N.W. of Leyden.

VALCKENSTEIN, a town of the duchy of Wurzburg; 5 miles N. of Geroltzhofen.

VALCOUR. See WALCOUR.

VALDAGNO, a town of Italy, in the Vicentin; 17 miles W. of Vicenza.

VALDAIA, or VALDAY, a town of Ruffia, in the government of Novgorod; 72 miles S.E. of Novgorod. N. lat. 57° 50'. E. long. 33° 44'.

VALDARACETE, a town of Spain, in New Castile; 22 miles S.E. of Madrid.

VALDASNES, a town of Portugal, in the province of Tras os Montes; 9 miles E.S.E. of Mirandela.

VALDAY MOUNTAINS, mountains of Ruffia, in the government of Novgorod, which are crossed in travelling from Petersburg to Moscow, and are probably a continuation of the Lapland mountains. They were known to the ancient geographers by the name of Mons Alaanus. At present they are indifferently called Vhifokaya Ploftchade, high rising ground, or the mountains of Valday, from the town and the lake Valday, which are situated on their summits. The country about Valday, being the highest point of the mountain, is extremely pleasant. Fine, slow-rising hills, a charming pellucid lake, with an island on which stands a noble monastery, delightful groves, and an extensive scenery, form the most pleasing variety. These mountains afford numerous and large blocks of granite, quartz, and sand-stone, together with felspar, hornblende, mica, schorl, porphyry, jasper and steatites. The granite blocks are covered with sand and clay. The Valday eminence, which is the highest ridge of these mountains, shapes its course from the north, and appears to take its departure from between the lakes Ladoga and Onega. It then stretches across the Mita, runs between the Ilmen lake and the Seliger, and extends its foot as far as into the governments of Smolensk, Orel, and Novgorod-Severski. About its western, southern, and eastern declivities, are several strong strata of chalk and marl, which in farther progress are lost in marshy and sandy plains. Some naturalists are of opinion, that the whole of this Valday chain of mountains is the effect of violent inundations, and that it entirely consists of a chalk-stone risen from crumbled and destroyed marine productions. But it is no less probable, that the middle part is a primitive mountain, having granite for its principal stratum, which, through a long interval of time, and perhaps under water, is so much decayed as to be in a manner smoothed. No chalk-pit has yet been opened on its summit. Upon the whole it is supposed, that all these elevations may be an original mountain decayed and destroyed on its surface, on which, round about its declivities, the loose chalk and marl are floated and deposited. Among these mountains no mine has yet been explored. Some specimens have been obtained of copper and lead; but here is plenty of iron and stone. The extreme elevation of the Valday mountains is very moderate, as the highest point is scarcely 200 fathoms above the level of St. Petersburg. Besides the Valday lakes, there are others of inferior note; and at the western foot is the great lake Ilmen, at the southern, the Seliger, &c. Of the rivers, some spring from the mountains, and others are supplied by the lakes that lie at their feet; such are the Volga, the Duna, the Volkhof, the Lovat, the Pola, the Tihagedo, the Kolp, the Dnieper, the Dou, the Oka, &c. These mountains are sparingly

sparsely clothed with forests, but so much the more with beautiful meadows and fields, so that the graziers derive from them considerable profit. The species of wood are the several sorts of pines and firs, the birch, the linden, the aspen, the alder, &c. The soil in the valleys mostly consists of clay and marle, and is generally fertile. Tooke's View of the Russian Empire, vol. i.

VALDEBURON, a town of Spain, in the province of Leon; 34 miles N.N.E. of Leon.

VALDECONA, a town of Spain, in Catalonia, on the borders of Valencia; 15 miles S. of Tortosa.

VALDEMANZANAS, a town of Spain, in the province of Leon; 8 miles S.W. of Astorga.

VALDEMORO, a town of Spain, in New Castile; 13 miles S. of Madrid.—Also, a town of Spain, in New Castile; 18 miles E.N.E. of Cuenca.

VALDENSES, in *Ecclesiastical History*. See VAUDOIS.

VALDEPENAS, in *Geography*, a town of Spain, in the province of Jaen; 8 miles S.W. of Jaen.—Also, a town of Spain, in New Castile; 22 miles S.E. of Ciudad Real.

VALDERAS, a town of Spain, in the province of Leon; 23 miles S. of Leon.

VALDERIES, a town of France, in the department of the Tarn; 6 miles N.N.E. of Alby.

VALDES, JOHN, in *Biography*, a Spanish reformer and a lawyer, was knighted by Charles V. During a tour in Germany he imbibed the principles of Luther; and afterwards settling in Italy, and chiefly at Naples, he became secretary to the king. During his abode in this city, he communicated his sentiments to several persons, and particularly to Peter Martyr and Ochinus. But though in his religious sentiments he concurred with the reformers, and in his notions with respect to the Trinity with those that were denominated Unitarians, he does not appear to have formed any separation from the church of Rome. His disciples, however, were numerous, and attracted the notice of the Inquisition; the dread of which induced several of them to quit the country, and others to retract their opinions. Valdes died at Naples about the year 1540, with an established character for piety and virtue, and leaving several works, particularly "Commentaries on various Parts of the New Testament, &c." some of which have been inserted in the Index of the Inquisition, and others censured by the reformers. Beza condemns his treatise entitled "Considerations," charging it with being the source of the errors of Ochinus. Bayle.

VALDESIA, in *Botany*, a genus in the *Flora Pedemontana*, page 57, so named in memory of Don Antonio Valdez, a Spaniard, minister of the Spanish marine, founder of a botanic garden. *De Théis*.

VALDIA. See OVIEDA.

VALDIGEM, in *Geography*, a town of Portugal, in the province of Beira, near the Duero; 3 miles N.E. of Lamego.

VALDIVIA, a river of Chili, which runs into the South Pacific ocean, near Valdivia.

VALDIVIA. See BALDIVIA.

VALDORE, a town of Hindoostan, in the Carnatic; 8 miles W.N.W. of Pondicherry.

WALDORF, or WALDORF, a town of Westphalia, in the county of Ravensberg; 3 miles S.W. of Bielefeld.

VALDROME, a town of France, in the department of the Drôme; 18 miles S.S.E. of Die.

VALDUS, or WALDUS, PETER, in *Biography*, was the son of a rich merchant of Lyons, who lived in the twelfth century, and derived his name from Vaux in Dauphiné, the

place of his nativity. With a mind deeply impressed by the sudden death of a friend, he directed his views entirely to another world, distributed his wealth in alms, and employed himself in propagating just sentiments, as he conceived them to be, of true religion. From another account of this reformer we learn, that about the year 1160, he employed a priest in translating the four gospels from Latin into French, and by the perusal of them adopted opinions very different from those of the Romish church. In 1180, connecting himself with a small society of sentiments similar to his own, he assumed the character of a public preacher. Attempts were made to seduce him, but they proved ineffectual; and the number of his followers gradually increased. Expelled from Lyons, he retired to the mountains of Dauphiné and Savoy, and propagated his opinions, which were eagerly adopted by the multitude through the adjacent valleys, where they took deep root, so that no persecution or violence could eradicate them. From him, as some say, sprung the sect of the Waldenses. For other particulars, we refer to the article VAUDOIS.

VALE of a Pump, at Sea, a term for the trough by which the water runs from the pump along the ship's sides, to the scupper-holes.

VALE or Valley Lands, in *Agriculture*, are terms applied to any of those which lie in low, narrow, hollow tracts or depressions between hills or rising grounds on their different sides. They are, for the most part, applicable in a more particular manner to grass and dairy practices than others, but sometimes, when suitably dry, to those of the arable kind. They are in many cases very quick in vegetation, and extremely productive; being readily capable of improvements by warping, watering, and other such means, at but little expence, which should always be well attended to, in all such lands where there is the possibility of effecting them.

The latter is likewise a term sometimes applied to a gutter or channel in a road or other such situation.

VALEDIA, in *Geography*, a sea-port town of Africa, in the kingdom of Fez, situated on the coast of the Atlantic, in a stony plain: here is a very spacious natural basin, surrounded by rocks, capable of containing above 1000 ships; but the entrance, which is entirely open to the west, is extremely difficult and dangerous. The coast is lined with rocks near 30 feet in height, which anciently must have been washed by the sea, the Moors living in the caverns hollowed out by the water. At the bottom of the rocks, the sands heaped up by time have formed a plain, laid out into gardens and cultivated: the town is little more than a circle of walls, containing but few inhabitants; 27 miles S.S.W. of Mazagan.

VALEGAR, a town of Hindoostan, in Coimbetore; 15 miles W. of Damiccotta.

VALEGGIO, or VALEZZO, a town of Italy, in the department of the Benaco, on the river Mincio; 14 miles S.W. of Verona.

VALEGGIO, a town of Italy, in the department of the Gogna; 4 miles N.E. of Lumello.

VALENCA, a town of Portugal, in the province of Entre Duero e Minho, on the S. side of the Minho, opposite Tuy in Spain, and said to have been founded by the foldiers of Viriatus. It contains two parish-churches, an hospital, two convents, and about 900 inhabitants; 16 miles W. of Oporto. N. lat. 42°. W. long. 8° 20'.

VALENÇA de Alcantara, a town of Spain, in Estremadura, on the borders of Portugal; 24 miles S.W. of Alcantara.

VALENÇA de Duero, a town of Portugal, in the province of

of Beira, situated about half a league from the Duero; 12 miles W. of St. Joao de Pefqueira.

VALENCE, a town of France, and principal place of a diftrict, in the department of the Lot and Garonne; 12 miles S.W. of Agen. N. lat. $44^{\circ} 6'$. E. long. $0^{\circ} 59'$.—Alfo, a city of France, and capital of the department of the Drôme, on the left fide of the Rhône; anciently a Roman colony, called Julia Augusta. Before the revolution it was the fee of a bifhop, and capital of a principality called Valentinois. An univerfity was brought hither from Grenoble in the year 1454; $16\frac{1}{2}$ pofts N. of Avignon. N. lat. $44^{\circ} 55'$. E. long. $4^{\circ} 59'$.

VALENCE *en Albegeois*, a town of France, in the department of the Tarn; 12 miles N.E. of Alby.

VALENCIA, a province of Spain, bounded on the N. by Aragon and Catalonia, on the E. and S.E. by the Mediterranean, on the S.W. by Murcia, and on the W. by New Caftile, about 220 miles in length from N. to S.; the breadth is unequal, from 20 to 45. Valencia is, in proportion to its extent, one of the beft peopled provinces of Spain, and contains feven cities: has four fea-ports, the moft confiderable of which is that of Alicant; the foil is extremely fertile, although divided by mountains. Thefe contain mines of finopica, or blood-ftone, iron, and alum. There are alfo found quarries of marble, jafper, plafter, lapis calaminaris, and potter's-clay, of which different kinds of earthen veffels are made. The climate is mild and pleafant, but there is fomewhat enervating and faintifh in the air; vegetables with the fineft outward fhew imaginable are not good to the tafte. No women work in the fields; but this may proceed from their conflant employment within doors, as much as from any remains of Moorifh jealousy, though the Valencians ftill retain much of the features and manners of their old Saracen mafters. To this day the farmers will not allow their wives to fit at table, but make them ftand at their elbow and wait upon them. The inhabitants of this province are faid to have more of the filth and fullen unpolifhed manners of the old Spaniards, and to have adopted lefs of foreign improvements in civilization, than moft other parts of Spain. This kingdom and city were conquered by the Moors under Abdallah Cis, and recovered in 1094, when the famous Cid Ruy Diaz de Vivar, taking advantage of the confufion and civil war that raged in Valencia, after the murder of Sultan Hiaya, made himfelf mafter of the city by ftorm, at the head of a chofen band of valiant knights. This was the laft exploit of that hero, fo long the terror of the Muffulmen. A few days after his death, the king of Caftile, finding it too far diftant from his other dominions to be conveniently fuccoured in cafe of a fudden attack, thought proper to withdraw his troops, and fuffer the Moors to repoffefs themfelves of it. It was again taken from them by James I., king of Aragon, in the year 1238, and for ever united to that crown, the fate of which it has ever fince followed through all its various revolutions. In the beginning of the reign of Charles V. this province was diftracted by civil commotions and ftuggles between the nobility and commons. The population of the whole kingdom of Valencia amounts to 79,221 vecinos, or 716,884 fouls, refident in 570 towns and villages. The manufactures of filk are the caufe of a population that may be reckoned confiderable, if compared with that of other provinces of Spain. The produce of this article, on an average of one year with another, amounts to about 900,000 pounds, worth a doubloon *per* pound, in the country. Government has prohibited the exportation of Valencia raw filk, in order to lay in a ftock to keep the artificers constantly employed in bad years; for it has fometimes happened, that half the

workmen have been idle for want of materials. The great nurseries of mulberry plants in the plains of Valencia are produced from feed, obtained by running a rope of *Efparto* over heaps of ripe mulberries, and then burying the rope two inches under ground. As the young plants come up, they are drawn and tranfplanted. The trees, which are all of the white kind, are afterwards fet out in rows in the fields, and pruned every fecond year; in Murcia only every third year; and in Granada never. The Granada filk is efteemed the beft of all, and the trees are all of the black fort of mulberry. The fruit exported from Valencia to the N. of Europe may be efimated, *communibus annis*, at two millions of pefos, about 334,000*l.* ftirling. The annual crop of hemp may be worth 300,000 pefos, at three pefos *per* arroba: 140,000 loads of rice, at 10 pefos a load, make 1,400,000 pefos. The vintage of 1767 produced 4,309,000 meafures of wine, which, at three reals a meafure, come to 861,133 pefos. There is alfo much cotton made in this province from the cotton-plant, which rife to the height of three feet at moft, and very much refembles the raspberry-bufh. They make in good years 450,000 arrobas, worth 1,350,000 pefos, and in middling years 285,600 arrobas. Notwithstanding all this abundance, nothing can be more wretched than the Valencian peasantry, who can with difficulty procure food to keep their families from ftarving. Valencia is watered by 35 rivers, all of which run towards the E. It was formerly inhabited by the Celtiberians, the Turdetani, the Lufoni, &c. &c. Valencia was erected into a kingdom, in the year 788, by Abdalla, governor of Valencia, who revolted from the king of Cordova, but was however obliged to pay an annual tribute of 17,000 maravedis. This kingdom continued till the 13th century, when the laft king, Zahen, was difpoffeffed of his capital, and compelled to leave his dominions with 50,000 Moors.

VALENCIA, a city of Spain, and capital of the province fo called. Its ancient name is unknown; but it is faid to have been taken and fortified by Scipio, deftroyed by Pompey, and rebuilt by Cæfar. It was taken from the Romans by the Goths, and from the latter by the Moors, who twice poffeffed it 230 years; for it was taken in 1094, by the famous Cid Ruy Diaz de Vivar, and bore, during four years, the name of *Valencia of the Cid*. The Moors retook it, but it was finally conquered in 1238, by the king Don Jayme, and embellifhed as well as enlarged by Don Pedro IV. king of Aragon. It is about half a league in circumference, and the walls are built for ornament rather than defence. Mariana the hiftorian fays, that in Valencia cheerfulness enters at the doors and windows: the defcription he gives of this city is in many refpects devoid of truth, and fuch that the author proves himfelf more a poet than an hiftorian. Several geographers who have had implicit faith in Mariana, have even exaggerated his account of Valencia, and faid the houfes here are all palaces, on which account the name of *Bella* was given to the city, an epithet difficult to reconcile with narrow, crooked, and unpaved ftreets, impaffable after rain; and in which there are but two or three houfes built with tafte, and a few churches diftinguifhed by their architecture. It is the fee of an archbifhop, and an univerfity, intituted in the year 1470. Here is a tribunal of inquiry, with a royal audience, in which the governor, the captain-general of the province, and a royal regent, prefide. The number of inhabitants is efimated at 100,000, but perhaps 80,000, or between both, is nearer the truth; 170 miles E.S.E. of Madrid. N. lat. $39^{\circ} 27'$. W. long. $0^{\circ} 27'$.

Accounts are kept at Valencia in libras of 20 fúeldos, or 240 dineros; alfo in reals of new plate of 24 dineros. The libra of Valencia is equal to the pefo of plate,

or dollar of exchange; it is, therefore, worth 8 reals of old plate, 10 reals of new plate, or 15 reals 2 maravedis vellon. The real of Plata Valenciana, $13\frac{1}{3}$ of which make a libra, is worth $1\frac{1}{2}$ fuedo, or 18 dineros, that is, $\frac{3}{4}$ ths of a real of new plate. The libra is worth $39\frac{1}{2}d.$ sterling nearly; or, more accurately, 1l. sterling = 6 libras, 1 fuedo, 5 dineros of Valencia. A carga or carica weighs 3 quintals, or 12 arrobas; the arroba, 24lbs. peso grueso, or 36lbs. peso futile: the former pound is 18 oz. the latter 12 oz.; and the ounce is $\frac{1}{4}$ heavier than the Castilian ounce: hence 50lbs. peso grueso, or 75lbs. peso futile, answer nearly to 59lbs. avoirdupois. The futile, or lighter weight, is used for bread, sugar, tobacco, and spices; the grueso, or heavier weight, for most kinds of merchandize.

Corn is measured by the cahiz of 12 barfellas, or 48 celemines: 100 cahizes produce $58\frac{1}{2}$ English quarters. The cantara, or arroba, liquid measure, contains 4 azumbres; and 25 such arrobas = 88 English wine gallons nearly. The carga of wine consists of 15 arrobas; the carga of oil of 12 arrobas. The vara or ell is divided into 4 palmos, and is about $\frac{1}{4}$ th longer than the Castilian vara, measuring, therefore, $36\frac{5}{7}$ English inches. Kelly's Un. Camb.

VALENCIA, a town of South America, in the government of the Caraccas; 16 miles S.W. of Caraccas. This city was founded in 1555, under the government of Villacinda, with a view of establishing a port near to Caraccas, in order to facilitate the conquest of the country, which had been much extolled by Faxardo. But Alonzo Dias Moreno preferred a situation farther distant from the lake Tacarigua, now Valencia, or half a league W. of it on a beautiful plain, where the air was pure and the soil fertile. N. lat. $10^{\circ} 9'$. W. long. from Paris $70^{\circ} 45'$. Its population in 1801 consisted of 6548 persons, according to some reports, but according to others, said to be more accurate, of 8000 souls. The inhabitants are generally Creoles, and the issue of very ancient families, excepting some from the Canaries, and very few Biscayans. The streets are wide, and for the most part paved. The houses are built like those of Caraccas, but not with stone. There is one church tolerably well built, and in the eastern part of a beautiful square, from which it receives, and to which it gives an embellishment, that constitutes the principal decoration of the city. In 1804 another church was erected, and dedicated to our Lady of la Chandaleur. The Franciscans have a monastery, occupied by eight monks, which has a very neat and elegant church. The inhabitants had formerly the character of being the most indolent in the whole province; but in consequence of some vigorous measures that have been lately adopted, a spirit of greater activity and industry has been excited among them. The situation of Valencia is peculiarly favourable for trade: being separated by only ten leagues of good road from Porto Cavallo, it may transport its commodities thither at a small expence; and besides, every commodity from the interior of the country shipped at Porto Cavallo goes through Valencia, and that which is destined for Guayra passes through Caraccas. The adjacent country produces every sort of provision and fruit in the greatest abundance, and of a most exquisite flavour; and its plains furnish its markets, at a very low price, with every kind of animal which they can consume. Depons's Travels in South America, vol. ii.

VALENCIA, *Lake of*, called by the Indians *Tacarigua*, but different from the bay or lake of the same name, (see TACARIGUA,) a lake of the government of Caraccas, less extensive but more useful than that of Maracaibo. This lake stretches $13\frac{1}{2}$ leagues from E.N.E. to W.S.W., and its greatest breadth is four leagues. Its form is oblong; it lies

at the distance of one league from Valencia, and is situated in a valley furrounded with mountains, excepting on the W. where it extends into the interior of the country. It receives the water of twenty rivers without any visible outlet. It is six leagues from the sea, and separated from it by inaccessible mountains. It probably discharges itself by a subterraneous passage, as well as by evaporation, so beneficial to vegetation. Its eastern part is appropriated to the cultivation of tobacco for the king's benefit; and this tract being divided into five plantations, employs 15,000 persons. The remainder of the land gained from the lake is laid out in other kinds of culture. Its vicinity is enlivened by a variety of birds, whose plumage is beautiful, and whose notes are melodious. It also abounds with aquatic game, and its borders are embellished with unfading verdure. It is interspersed with a number of small islands, which are inhabited; and one of them, called Caratopona, contains a population sufficient to raise provisions, fruits, and vegetables for market. It furnishes a great quantity of fish, that called by the Spaniards, guavina, being the most abundant. Many reptiles are seen upon its borders; and among these are two kinds of lizard, which are particularly distinguished; and of which the Indians and some Spaniards make their most delicious meals. Depons's Travels, vol. i.

VALENCIENNES, a city of France, and principal place of a district, in the department of the North, situated on the Scheldt, which runs through the town in several places, and here becomes navigable. It is supposed to have derived its name from the emperor Valentinian I., who, taken with the temperature of the climate, and charming situation of the place, laid the foundation of a town, about the year 367, endowing it with many privileges and immunities, and particularly of being an asylum for debtors and criminals. This privilege, which extended over the greater part of the town, was called "banlieu;" but it has since been limited, to prevent abuse from fraudulent bankrupts and assassins. Before the revolution, it belonged to Hainaut, and contained several churches and convents. The town-house is an ancient building of free-stone, founded in the 14th century; the square or grand place is handsome, but the streets are in general narrow, dark, and crooked. The form of its municipal government was considered so good as to serve for the model of several republics, particularly Venice and Nuremberg, which sent deputies to collect the laws. Near the town is a coal-mine. Valenciennes was one of the first towns which revolted against Philip II. king of Spain; it took part with the States and the Protestant religion, and refused to receive a garrison sent by Margaret of Parma; in consequence of which it was besieged, in the year 1567, by John de Noircames, baron of Selles, and at the end of three months surrendered at discretion: thirty-six of the principal ringleaders were punished, and the town deprived of its privileges. It was afterwards several times taken and retaken by the duke of Alva and the States General. In the year 1656, it was besieged by the French, under the command of marshals Turenne and La Ferté; but they were compelled to raise the siege, after the loss of 4000 men killed and wounded, in several assaults. In the year 1677, it was besieged by Louis XIV. in person; and after 17 days, taken by assault. It remained to France by the peace of Nimeguen, which happened in the following year, when a new and handsome citadel was built, at the expence of the citizens, and other fortifications added. In 1793, Valenciennes was invested by the allies, under the conduct of the duke of York, and the governor Ferrand summoned to surrender. On the 14th of June, the trenches were opened. The British commander then summoned the garrison;

garrison; but receiving an unsatisfactory answer, the artillery began to play upon the town with great vigour, and in the course of the night above 500 red-hot balls were poured upon it. Towards the beginning of July, the besiegers were able to bring 200 pieces of heavy artillery to play without intermission on the town, and the greater part of it was reduced to ashes. The most singular fact in the history of this siege is, that a considerable part of the war was carried on under ground, mines and counter-mines innumerable having been formed both by the besiegers and besieged. The principal of these, on the side of the former, were one under the glacis, and one under the horn-work of the fortrefs; these mines were completed and charged on the 25th of July, and in the night between nine and ten o'clock were sprung with the most complete success. The English and Austrians immediately embraced the opportunity to throw themselves into the covered way, of which they made themselves masters. The die was now cast, and on the 26th the duke of York again summoned the place, which surrendered on capitulation the succeeding day; the duke of York taking possession of it in behalf of the emperor of Germany. The following year, however, in consequence of the successes of the French arms, Valenciennes surrendered to the republicans, by capitulation, on the 26th of August. The garrison were made prisoners of war, but to be conducted to the first post of the imperial and Dutch armies, on condition that they were not to serve against the republic till regularly exchanged. Considerable stores of every kind, with 200 pieces of cannon, 1,000,000 pounds of gunpowder, and 3,000,000 florins in specie, and 6,500,000 livres, were found in Valenciennes; 1000 head of horned cattle, and great quantities of oats and other corn, were also included within the fortrefs. So earnest indeed had the emperor been to retain this important place, that he is said to have expended 3,000,000*l.* in repairing and improving the fortifications. What is the most to be lamented is, that upwards of 1000 unhappy emigrants were surrendered on this occasion to the vengeance of their enraged countrymen. The principal manufactures are lace, cambric, and woollen mitts, camlets, &c.; $4\frac{1}{2}$ posts E. of Douay. N. lat. $50^{\circ} 21'$. E. long. $3^{\circ} 36'$.

VALENGIN, or **VALLENGIN**, or *Valangin*, a town and capital of a lordship, in the county of Neuchâtel; 3 miles N.N.W. of Neuchâtel. See **NEUCHATEL**.

VALENS, **FLAVIUS**, in *Biography*, a Roman emperor, was born at Cibalis in Pannonia, and associated in the empire with his brother Valentinian A.D. 364, at the age of thirty-six. To him his brother, to whom he was much attached, assigned the eastern portion of the Roman dominions, comprehending the whole of Asia, with Egypt and Thrace: upon this division, Valens made Constantinople the seat of his empire. Alarmed by the movements of the Persians on the borders of his territory, he departed for Syria, and at Cæsarea, in Cappadocia, he was informed that Procopius had taken possession of his capital. The emperor was so terrified by this intelligence, that he intended to negotiate with the usurper, and to propose to him an abdication of the empire. His ministers, however, advised him to detach a body of troops, in order to suppress the insurrection at its commencement: but these troops joined Procopius, and contributed to his success. At length many of the insurgents abandoned their commander, who rendered himself unpopular by his rapacity and tyranny, and he was ultimately betrayed to Valens, who ordered him to be beheaded. The emperor was thus established on the throne; but his conduct was such as to cool the ardour of his friends, and to excite enmity and opposition. In process of time, from the year 366 to

369, he contended successfully with the Goths, and having reduced them to great distress, consented to conclude a treaty with them, which was ratified with great magnificence in barges upon the Danube. Having accomplished this object, Valens returned in triumph to Constantinople.

Valens, having received his Christian creed from Eudoxus, the Arian bishop of Constantinople, disgraced himself by becoming a persecutor of the Athanasians: and in a contest between these two parties, he acted in a manner so rigorous and violent, as to entail indelible reproach on his memory. In 371 he lost his only son, and in the following year he defeated the Persians, and afterwards readily consented to a truce. Whilst he was passing the winter at Antioch, in the year 374, he manifested, in his treatment of persons who recurred to magical practices for ascertaining the name of the future successor to the imperial throne, the jealous cruelty of his character. Many persons were involved in real or suspected guilt, and consigned to the punishment of torture, banishment, or death. Having resided five years at Antioch, watching the motions of the Persian king, repressing the incursions of the Saracens and Isaurians, and conducting state inquisitions and religious persecutions, his attention was excited by a terrible inroad of the Huns upon the territories of the Visigoths, and these Goths, having obtained permission to cross the Danube, penetrated into the cultivated part of Thrace. The Gothic tribes were joined by the Huns and Alans. The emperor arrived at Constantinople in 378, and urged by the clamours of the people, marched against the enemy to the vicinity of Constantinople. An engagement ensued, which proved singularly disastrous to the Romans. Valens, deserted by his guards and wounded, betook himself to a cottage, in which his attendants were dressing his wound: the cottage was beset by the enemy, who being resisted, set fire to a pile of faggots, that consumed the emperor and all that were with him. Thus did Valens terminate his life at the age of fifty, and in the sixteenth year of his reign. His character, as it has been delineated by historians, merits in many respects contempt and detestation. He was nevertheless modest and temperate in his mode of living; addicted to no private vice or superfluous expence; ready to listen to the complaints of his subjects, and to protect them from the oppression of the military, among whom he preserved exact discipline; and it has been said that the Eastern provinces in general were never happier than under his government. Anc. Un. Hist. Gibbon's Rom. Emp. Gen. Biog.

VALENSOLE, in *Geography*, a town of France, in the department of the Lower Alps; 18 miles S. of Digne.

VALENTANO, a town of the Popedom, in the duchy of Castro; 14 miles S.W. of Orvieto.

VALENTIA, in *Ancient Geography*, a town of Hispania Citerior, upon the Turia. See **VALENCIA**.

VALENTIA, a town and colony of Gallia Narbonensis, belonging to the Segalauni, according to Ptolemy, but to the Cavares, according to Pliny. In the Itinerary of Antonine, this town is marked on the route from Mediolanum to Lugdunum, between Augusta and Urfolæ. At the fall of the Roman empire this town became subject to the Burgundians, afterwards to the Merovingians; but under the Carolingians, it belonged to the kingdom of Burgundy and Arles.—Also, a country of the isle of Albion, according to Ammianus Marcellinus. It was conquered by Theodosius the elder, and made a fifth Roman province. (See **OTODINI**.)—Also, a town of Italy, in Messapia, between Clipia and Civitas Brundisi, according to the Itinerary of Jerusalem.—Also, a town situated in the interior of the isle of Sardinia.

VALENTIA, in *Geography*, a small island on the coast of

Kerry, Ireland, in the barony of Iveragh, from which it is separated by a channel, which is a safe harbour. Though Valentia contains extensive bogs, it has more inhabitants and better culture than could be expected in so remote a spot; it is indeed esteemed the granary of the country. Oliver Cromwell had forts erected at both ends of the channel, which have gone to ruin. Valentia is the property of the marquis of Lansdowne. Its northern point is in N. lat. $51^{\circ} 54'$. W. long. $10^{\circ} 10'$.

VALENTIA Harbour, a bay of Ireland, on the east side of Dingle bay, between the isle of Valentia and Dowlas Head.

VALENTIAM. See CAPE *ad Valentiam*.

VALENTINE, PETER, in *Biography*, was born at Colomiers en Brie in 1600, and studied some time under Simon Vouet, but leaving that master before he had made any considerable progress, travelled to Rome, where he passed the remainder of his life: he may therefore be rather considered of the Roman than the French school. The powerful and vigorous style of Michael Angelo Caravaggio made so strong an impression on him, that he attached himself to an imitation of it, with a devotion that was never diminished. Like that artist, he indulged in an extravagant, but effective contrast of light and shadow; like him, he was a faithful follower of nature, and was equally indifferent and unfortunate in his choice of it; like him, he was frequently incorrect, and always ignoble. He was, however, an intelligent master of the chiaro-scuro, and his masses are disposed so as to produce the most striking effect. Though he occasionally painted altar-pieces for the churches, his powers appear to have been better adapted to other subjects, which he also appears to have painted in preference. His best pictures represent fortune-tellers, gamesters, concerts of music, and corps de gardes; to which his taste was more competent than to the dignity of historic painting. The patronage of cardinal Barberini, nephew to Urban VIII., procured him the commission to paint a large picture for the Basilica of St. Peter, representing the Martyrdom of S. S. Processo e Martiniano, which is esteemed his best historical picture. He also painted for his patron, the Decollation of St. John, in the Palazzo Barberini; and there is an admired picture by him in the Corsini palace, of Peter denying Christ. This pleasing painter died in 1632, at the early age of thirty-two, of a fever, being brought on by going into a cold bath when he was heated.

VALENTINE, in *Geography*, a town of France, in the department of the Upper Garonne; 2 miles S.W. of St. Gaudens.

VALENTINE'S Bay, a bay on the south-east coast of Terra del Fuego, west of Cape Success.

VALENTINI, MICHAEL BERNHARD, in *Biography*, a native of Giessen, in Germany, where he was born in 1657, and became a medical professor, and where he died in 1729. The subjects of his writings, which are numerous, chiefly comprehend botany and the materia medica: of these we shall here mention his "Letters from the East Indies;" "Praxis Medica," in two parts; "Amphitheatrum Zootomicum," fol.; and a "Corpus Juris Medico-legalis," fol. referring for other works to the botanical article VALENTINIA. Haller.

VALENTINI, PIETRO FRANCESCO, of Rome, who flourished about the year 1645, and whose patience and abilities in the construction of canons seem to have made every subsequent canonist despair of emulating his subtilties and dexterity in the art. Indeed he appears to have surpassed all that the most determined canonists had ever achieved, by the several works which he published on the subject, in the

following order: "Canon to the words *Illos tuos misericordes oculos ad nos converte*, with the Resolution in more than two thousand ways, for two, three, four, and five Voices, Rome, 1629;" "Canon, called the Knot of Solomon, for ninety-six Voices, Rome, 1631;" "Canon on four Subjects for twenty Voices, Rome, 1645." The first and most curious of these works seems to have been reprinted in 1655, as M. Marpurg of Berlin, and several other musical writers, in speaking of it, refer to an edition of that date. But P. Martini, who is in general very accurate in dates and citations, mentions Valentini's first canonical work under the year 1629. Kircher gives the subject, and an account of this canon, in his *Musurgia*. M. Marpurg, in a periodical work called *Kritische Briefe*, or "Critical Letters on the Art of Music," vol. ii. 1763, 4to. has bestowed upwards of fifty pages on this canon, and not only given it a hundred different ways in notes, but explained more than two hundred of the several contrivances used by Valentini in the construction of canons on the subject given.

Numerous musicians of the name of Valentini have been recorded by musical writers; among whom Gerber gives an article to a namesake of the canonist, Pietro Francesco Valentini, an opera composer at Rome in the middle of the seventeenth century, who, besides *Intermezzi*, set to music several dramatic fables written by good poets, such as "La Metra," a Greek fable; "The Death of Orpheus;" "Pythagoras finding Musical Proportions," 1654; "The Transformation of Daphne," a moral fable. His *Intermezzi* were the Rape of Proserpine, and the Captivity of Mars and Venus in the Net.

VALENTINI, ROBERTO, an Englishman, a voluminous composer for the common flute, whose works were chiefly published by Roger, at Amsterdam.

VALENTINI, GIUSEPPE, about the latter end of the seventeenth century, among other composers for the violin, *à doz-zina*, published in Holland nine different works for that instrument, the seventh and last of which were "Concerti Grossi," for four violins, tenor, and two basses; but they have been long since consigned to oblivion, without any loss to the public, or injustice to the author.

VALENTINI, URBANI, the first soprano opera singer who appeared on our stage, arrived in England 1707, after the attempts that were made at operas upon the Italian model.

VALENTINIA, in *Botany*, received that appellation from Dr. Swartz, in memory of two writers of the name of Valentini, who have both of them contributed to the general stock of botanical information, particularly with relation to the *Materia Medica*. Michael Bernard Valentini, professor of medicine at Giessen, who died in 1729, aged 72, published *Prodromus Historiæ Naturalis Hassiæ*, in 1707, *Viridarium reformatum*, in 1719, *Museum Museorum*, in 1704, and *Historia simplicium reformatata*, printed at different times; besides several dissertations, illustrative of the natural history of Sago, Cloves, Nutmegs, Pepper, Cinnamon, Dates, Aloes wood, &c. His son, Christopher Bernard Valentini, published *Tournefortius contrañus*, being an arrangement of Tournefort's *Institutiones* in the form of tables; with some other works.—Swartz Prodr. 63. Ind. Occ. 687. t. 14. Schreb. Gen. 801. Willd. Sp. Pl. v. 2. 344. Mart. Mill. Dict. v. 4.—Clas and order, *Oxandria Monogynia*. Nat. Ord. uncertain.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, concave, coloured, in five deep, obtuse, concave, spreading, undivided segments. *Cor.* none, unless the calyx be taken for such. *Stam.* Filaments eight, awl-shaped, erect, rather shorter than the calyx; anthers roundish. *Pist.* Germen superior, roundish; style one, the length of the stamens, thick, cylindrical; stigma

stigma capitate. *Peric.* Capsule pulpy, roundish, bursting into three or four revolute valves, juicy within, of one cell. *Seeds* four, oblong.

Ess. Ch. Calyx coloured, in five deep spreading segments. Corolla none. Capsule superior, pulpy, of one cell, and four seeds.

1. *V. ilicifolia*. Holly-leaved *Valentinia*. Swartz Ind. Occ. 689. Willd. n. 1. (*Malpighia aquifolii amphioribus foliis*; Plum. Ic. 160. t. 167. f. 2. *Ilex folio agrifolii americana*; Pluk. Phyt. t. 196. f. 3.)—Native of the most barren stony parts of Hispaniola, towards the ocean; also of Cuba, about the Havannah, flowering in January. A *shrub*, two or three feet high, branched, of a rigid habit, without thorns; the *branches* smooth. *Leaves* alternate, oblong, rigid, stalked, with axillary buds; their length three or four inches; their breadth more than one; their margins undulated, and beset with broad spinous teeth, like our common Holly; both surfaces smooth and veiny. *Flowers* at the ends of the branches, stalked, somewhat umbellate, scarlet. *Calyx* permanent. *Fruit* in an early state snow-white, afterwards scarlet. *Seeds* three or four, smooth, imbedded in yellow pulp.—Burmans, with more than his usual sagacity, suspected this plant was not really a *Malpighia*, because of its alternate leaves. Dr. Swartz thinks it belongs to the same natural order as *Ilex*, but the want of a *corolla*, and the structure of the *fruit*, cause some difficulties.

VALENTINIAN I., in *Biography*, a Roman emperor, descended from an obscure family of Cibalis, in Pannonia, and born A.D. 321. Dedicated to the profession of arms, he distinguished himself by attention to military discipline, and in the reign of Constantine commanded a body of cavalry in Gaul. Under Julian he was tribune of one of the bands of imperial guards, and displayed his zeal for the Christian religion. On the accession of Jovian, he served in Gaul; and returning to the East, he was at Ancyra at the time of Jovian's death: and here he was raised to the purple by general applause in 364, in the 43d year of his age. On his arrival at Constantinople, he declared his brother Valens his partner in the empire. On the division of the empire (see VALENS), he reserved to himself the western portion, consisting of Illyricum, Italy, Spain, Gaul, Britain, and Africa. After this event he resided at Milan. Soon after, his reign was disturbed by an irruption of the Alemanni into Gaul. In 368 he crossed the Rhine with a powerful army, and having forced the camp of the Alemanni, he returned to Treves, and fortified the banks of that river, so that Gaul was secured from any hostile attacks during the remainder of his reign. The spirit of his government was that of vigorous discipline; and till he was corrupted by power, he paid a regard to justice and the public good; enacting many salutary laws in favour of the poor and diseased, providing for the instruction of youth, and exercising toleration in matters of religion. Accordingly he allowed unmolested liberty to Jews and Pagans, whilst he proscribed magical rites, and punished those who practised them. He also restrained the avarice and luxury of the clergy, and declared donations, that were injurious to families, illegal; and proceeded so far as to incapacitate all persons of the ecclesiastical order from receiving any testamentary bequest, except such as came to them by inheritance.

Valentinian was rash and violent in his temper, and liable to be imposed upon by his ministers and officers. Among the other events of his reign, we may mention an invasion of the Alemanni by the Burgundians, at his solicitation; the predatory incursions of the Saxons on the maritime provinces of Gaul; and the recovery of the Roman province in Britain from the invasion of the Picts and Scots. Being en-

camped near Basil, in 374, he received intelligence that the Quadi had entered Pannonia, and that the Sarmatians had invaded Mœsia; he advanced to the Danube, and crossing that river, laid waste the country of the Quadi with fire and sword. When the Quadi sued for peace, he menaced and reproached them with such an excess of passion, that he broke a blood-vessel, and fell speechless into the arms of his attendants. This disaster was soon followed by his death, which happened in 375, in the twelfth year of his reign, when he attained the age of about fifty-four years. The historian Socrates affirms that he had two wives at a time, issuing an edict that extended the same privilege to all his subjects. But this circumstance has been doubted, as no less inconsistent with the religion and manners of the period in which he lived, than with his own disposition and character, for he does not seem to have been addicted to licentious pleasures. Habituating himself to scenes of torture and death, he at length took delight in them; and he is said to have kept two enormous bears near his person, which he employed as executioners, for his private amusement. Upon the whole, however, his government was beneficial; and whilst he defended the empire with vigour, he promoted its reputation and prosperity by good laws and useful institutions. *Anc. Un. Hist. Gibbon's Rom. Emp. Gen. Biog.*

VALENTINIAN II., a Roman emperor, was the son of the former by the empress Justina, and born in 371. On the death of his father, when his half-brother Gratian, his partner in the empire, was at a distance, he was declared emperor by the principal ministers and officers of his deceased parent, and Gratian acquiesced in the appointment. His portion of the empire comprehended Italy, Illyricum, and Africa. As his mother was attached to the Arian sect, she was involved in a contest with Ambrose, archbishop of Milan, and thus the people became disaffected to her son; so that upon the death of Gratian, the usurper Maximus invaded Italy, and obliged Justina and Valentinian to take refuge in Aquileia. Hence they proceeded to Thessalonica, and implored the assistance and protection of Theodosius, emperor of the East. Theodosius having prevailed with Valentinian to renounce the Arian doctrine, promised to support his cause, and the consequences of his interposition were the defeat and death of Maximus, in the year 388. Upon this the young emperor was restored to his dominions; and displayed those virtues which served to gain for him the eulogy of Ambrose and other ecclesiastical writers. Such was his religious zeal, that he refused to grant to his pagan subjects a restoration of their privileges to the heathen priests and temples. Whilst Valentinian was at Vienne, in Gaul, the barbarians on the frontiers of Italy threatened an invasion; but the emperor, before he exposed himself to the hazards of war, determined to be baptized, and sent for Ambrose to administer the rite. He also wished to engage the prelate's mediation with Arbogastes, the Frank, who had assumed an almost uncontrolled power over the government. He also fought the assistance of Theodosius. In the mean while he received Arbogastes, whilst he was seated on his throne, and delivered to him a paper, expressing his dismissal from all his employments. The Frank told him that his authority did not depend upon the will of a monarch, and threw the paper contemptuously on the ground. Valentinian was enraged, and attempted to avenge himself by wresting a sword from one of his guards; but his violence was restrained. However, a few days after he was found strangled in his apartments, May, A.D. 392, being then in his twenty-first year, and having nominally reigned 16½ years. *Anc. Un. Hist. Gibbon's Rom. Emp. Gen. Biog.*

VALENTINIAN III., a Roman emperor, the son of Placidia,

cidia, sister of the emperor Honorius, by Constantius, one of that emperor's generals, was born in the year 418, and after the death of Honorius, declared emperor of the West. In 437 he was married to Eudoxia, the daughter of Theodosius II.; but during the life of his mother, who died in 450, he took no part in the government. The dread of Attila caused him to retire from Ravenna to Rome, where he proposed terms of accommodation with this formidable enemy, which were accepted. The weakness and timidity of this emperor occasioned a jealousy of the famous general Aetius, and base measures were secretly concerted for putting him to death. Valentinian himself perpetrated the foul deed of his assassination: and this act was followed by the murder of several of his friends. This detestable act, which took place in 454, was succeeded by the violation of the chaste and beautiful wife of Petronius Maximus, a wealthy senator. Her husband, as soon as he was informed of it, determined upon revenge; and for this purpose engaged two of the imperial guards who had served under Aetius. One of these seized the opportunity of some military sports in the Campus Martius to stab the emperor to the heart. This event happened in March 455, when Valentinian was thirty-four years of age, and after he had borne the title of emperor twenty-nine years. He was the last emperor of the race of Theodosius, and had all the weakness, with none of the virtues of that line. *Anc. Un. Hist. Gibbon. Gen. Biog.*

VALENTINIANS, in *Ecclesiastical History*, an ancient and famous sect of Gnostics; thus called from their leader Valentinus, an Egyptian by birth, who was eminently distinguished by the extent of his fame, and the multitude of his followers. His sect, which took rise at Rome towards the close of the second century, grew up to maturity in the isle of Cyprus, and spread itself through Asia, Africa, and Europe, with amazing rapidity. His principles were much the same with those of the Gnostics, though, in many respects, he entertained opinions peculiar to himself. He placed in the pleroma, as the Gnostics called the habitation of the deity, thirty æons, half male and half female: to these he added four others, which were of neither sex, *viz.* Horus, Christ, the Holy Ghost, and Jesus. The youngest æon, called Sophia, or Wisdom, conceived an ardent desire of comprehending the nature of the Supreme Being, and by the force of this propensity, brought forth a daughter, named Achamoth; who being exiled from the pleroma, fell down into the undigested mass of matter, and arranged it; and, by the assistance of Jesus, produced the demiurge, the lord and creator of all things. This demiurge separated the animal from the terrestrial matter; and out of the former created the superior world, or visible heavens; and out of the latter, the inferior world, or the terraqueous globe. He also made man, uniting in his composition the animal and terrestrial matter, to which Achamoth added a spiritual and celestial substance. The demiurge, according to Valentinus, arrogating the honours of God alone, sent prophets to the Jewish nation to urge his claims; and his ambition was imitated by the other angels that preside over the different parts of the universe. In order to chastise this lawless arrogance, and to illuminate the minds of rational beings with the knowledge of the true and supreme Deity, Christ appeared on earth, composed of an animal and spiritual substance, and clothed, moreover, with an aerial body. The Redeemer, in descending upon earth, passed through the womb of Mary; and Jesus, one of the supreme æons, was united to him when he was baptised by John in Jordan. The creator of this world, perceiving that the foundations of his empire were shaken, caused him to be apprehended and nailed to the cross; but before Christ submitted to this

punishment, not only Jesus the Son of God, but the rational soul of Christ, ascended up on high; so that only the animal soul and the ethereal body suffered crucifixion. Those who, abandoning the service of false deities and the worship of the God of the Jews, live according to the precepts of Christ, and submit the animal and sensual soul to the discipline of reason, shall be truly happy; and when all the parts of the divine nature, or all souls, are purified thoroughly and separately from matter, then a raging fire shall spread its flames through the universe, and dissolve the frame of the corporeal world. Such is the doctrine of Valentinus and the Gnostics; and such, in general, are the tenets of the oriental philosophy. The sect of the Valentinians was divided into many branches. See PTOLEMAITES, SECUNDIANS, HERACLEONITES, and MARCOSIANS. *Mosheim's Eccl. Hist. vol. i.*

VALENTINUS, the founder of a sect of heretics, for an account of which, see VALENTINIANS.

VALENZA, in *Geography*, a town of Italy, in the department of the Gogno, on the Po; 6 miles N. of Alexandria.

VALEPONGA, in *Ancient Geography*, a town of Hispania Citerior, at the eastern foot of mount Ubeda, near the source of the river Turia. In the Itinerary of Antonine it is marked on the route from Laminium to Toletum, between Ad Putea and Urbicaa.

VALERE. See PERINDE Valere.

VALERIA, VALERA, in *Ancient Geography*, a town in the interior of Hispania Citerior, S. of Ergavica. Pliny reckons it in the number of colonies, and Ortelius gives it the epithet of Julia. It was situated in Celtiberia, E. of Sucro, and W. of Lobetum.—Also, a town of the isle of Corfica, which had the title of a colony, according to Ptolemy.—Also, a country of Germany, comprehending a part of Pannonia, and so called by Maximian, after the name of Valeria, his wife, the daughter of Dioclesian. It was situated between the Danube and the Drave.—Also, the thirteenth province of Italy, to which Nurtia was annexed. It was between Umbria, Campania and Picenum, and comprehended the country of the Marsi and their lake, called "Fucinus."—Also, a town of Italy, in Latium, on the Valerian way.

VALERIAN, P. LICINIUS VALERIANUS, in *Biography*, a Roman emperor, the descendant of an illustrious family at Rome, was betimes so distinguished by his attention both to civil and military affairs, that he was appointed consul and prince of the senate, and also censor. He occupied other stations of considerable trust and importance. At length his own troops proclaimed him emperor, in which choice every individual of the empire was disposed to concur. Accordingly he was invested with the purple A.D. 253, after having passed his sixtieth year. The commencement of his reign was rendered illustrious by many popular and laudable acts, from which eulogy, however, we must except the appointment of his son Gallienus, a vicious youth, to be his colleague in the empire; more especially as in the progress of it he had many enemies with whom to contend; among whom we may enumerate Franks, Goths, Allemans, and Persians, the latter of whom may be deemed the most formidable. When Antioch was surpris'd and pillaged, under the instigation of Sapor, king of Persia, by Cyriades, who assumed the title of emperor, Valerian marched to the restoration of this city, and having expelled the Scythians, who had taken possession of it, he hastened to cross the Euphrates, in order to relieve Edessa, which was besieged by Sapor. After a vain attempt for this purpose, he was reduced to the necessity of negotiating with the Persian king. The result, however, was, that

that he became a captive to Sapor, A.D. 260, and was treated cruelly and ignominiously in his captivity. This distress was aggravated by the ingratitude of his son Gallienus, who afforded him no relief in his captivity, but took advantage of a report of his death to raise him to the rank of a god. After languishing in this state for a considerable time, he died in Persia; and it was rumoured, that after his death, his skin, stuffed with straw, was hung up in a temple, where Sapor exhibited it as an humiliating spectacle to the ambassadors from Rome. Valerian, whose administration was charged with want of vigour and activity in resisting the foes of the empire, was not unjustly reproached as a persecutor of the Christians. Regarding them as the enemies of paganism, he issued an edict, which produced the eighth persecution, as it has been called by ecclesiastical historians, and which was both general and severe, and lasted from the year 257 to the period of his captivity. The calamities which he suffered have been represented as a judgment upon him for this cruelty. He was twice married, Gallienus being the offspring of the first marriage; and by the second he had at least two sons. Anc. Un. Hist. Crevier. Gibbon.

VALERIANA, in Botany, a name which seems to have originated with the physicians of the dark ages, and which is evidently derived from *valere*, to be powerful, or efficacious, in allusion, as Caspar Bauhin and Ambrosinus tell us, to the many virtues of the plant. Linnæus, in Phil. Bot. 171, unaccountably ranks this name among those derived, like *Gentiana*, *Eupatorium*, &c. from kings.—Linn. Gen. 22. Schreb. 29. Willd. Sp. Pl. v. 1. 175. Vahl Enum. v. 2. 1. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 1. 73. Sm. Fl. Brit. 37. Prodr. Fl. Græc. Sibth. v. 1. 20. Pursh 28. Juss. 195. Tourn. t. 52. Lamarck Illustr. t. 24. Gærtn. t. 86.—Class and order, *Triandria Monogynia*. Nat. Ord. *Aggregatæ*, Linn. *Dipsacæ*, Juss.

Gen. Ch. *Cal.* scarcely any, except a slight border at the top of the germen. *Cor.* of one petal, irregular; tube swelling, or spurred, underneath at the base, where it bears honey; limb in five obtuse segments. *Stam.* Filaments three, in some cases fewer, awl-shaped, erect, the length of the corolla; anthers roundish. *Pist.* Germen inferior; style thread-shaped, the length of the stamens; stigma thickish. *Peric.* a crust, which does not split, deciduous, crowned. *Seed* solitary, oblong.

Eff. Ch. Calyx obsolete. Corolla superior, of one petal, gibbous on one side, at the base. Seed solitary.

Obs. Linnæus remarks as follows on the wonderful diversities of form and number in the parts of fructification, among the various species of this genus.

The *calyx* in some is a scarcely discernible border; in others five-cleft. Tube of the *corolla* in some oblong; in a few furnished with a spur-shaped nectary: in others very short. Its limb in some equal; in others two-lipped, the upper lip divided. *Stamens* in several three; in some two; in others one or four; in some removed to a different flower from the pistil. *Stigma* in some three-cleft; in others emarginate; in others globose. *Pericarp* in some scarcely any; in others a thick capsule; in others of two cells. *Seed* sometimes crowned with feathery down, whose form is various; sometimes without any.

By the above detail, the reader will be aware that Linnæus includes under this genus the *FEDIA* of Adanson, (see that article,) which is what Tournefort, Vaillant, and recently Decandolle, have called *Valerianella*. The same genus is adopted, under the last-mentioned name, by our worthy friend Mr. W. J. Hooker, in his continuation of Curtis's *Flora Londinensis*. Such diminutives of already established names, however, being contrary to the laws of

Linnæus, *Phil. Bot. sect.* 227 and 228, and, which is still more important, repugnant, in the highest degree, to good sense, have never been admitted by any writer, even the least correct, since Linnæus first promulgated found principles of nomenclature, and can have been resorted to by the above excellent botanists, through inadvertence only. *Fedia*, being unexceptionable, and received by Vahl in his *Enumeratio*, must supersede *Valerianella*, provided the genus be allowed to remain, of which we have already expressed our doubts. We have indeed little scruple, all things considered, in rejecting it. (See our 33d, 45th, and following species.) But having already noticed *Fedia* in its proper place, we shall here confine ourselves to the generally admitted *Valeriana*, which constitute an ample genus, recently augmented by Vahl, whose arrangement of species we follow, from the *Flora Peruviana*, and other sources; to which we have also something to add.

The genus under consideration is composed of herbaceous plants, either perennial or annual, with an upright round stem, and opposite leaves; which are mostly simple; rarely ternate or pinnate. *Flowers* terminal, numerous, opposite, corymbose or paniced; generally reddish, or flesh-coloured; rarely yellowish; scarcely blue. The roots of some are distinguished by a most potent and very peculiar odour.

1. *V. rubra*. Red Valerian. Linn. Sp. Pl. 44. Willd. n. 1. Vahl n. 1. Fl. Brit. n. 1. Engl. Bot. t. 1531. (*V. rubra* Dodonæi; Ger. Em. 678. *V. marina*; Rivin. Monop. Irr. t. 3. f. 2. *Phu peregrinum*; Camer. Epit. 24.)—Stamen one. Spur of the flower elongated. Leaves lanceolate, nearly entire.—Native of walls, waste ground, chalk-pits, and dry hilly places, in England, Switzerland, France, the north of Africa, Greece, and other parts of the Levant. Certainly wild in the chalk-pits of Kent; flowering from June to September. The plant is common in gardens, and on old walls. A deep red variety is usually preferred for cultivation. The root is perennial, fetid, rather fleshy. Whole herb very smooth, a little glaucous, eighteen inches or two feet high. Upper leaves often toothed, broadly ovate, with a long point. *Flowers* pink, rarely white, slender, not inelegant, very numerous, in a dense repeatedly branched corymb. *Seed-crown* of many feathery entangled rays, gradually unrolled after the flower is past.

2. *V. angustifolia*. Narrow-leaved Red Valerian. Willd. n. 2. Vahl n. 2. Ait. n. 2. Cavan. Ic. v. 4. 32. t. 353. Sm. Fl. Græc. Sibth. v. 1. 22. t. 29. (*V. rubra* ♂; Linn. Sp. Pl. 44. *V. rubra angustifolia*; Bauh. Hist. v. 3. part 2. 211.)—Stamen one. Spur of the flower elongated. Leaves linear-lanceolate, bluntish, entire.—Native of hilly situations in France, Italy, Switzerland, and the Levant, but not yet observed in England. Dr. Sibthorp gathered it on the highest hills about Athens. This is very nearly related to the former, with which it agrees altogether in habit and flowers, but the leaves are all uniformly narrow, almost linear, quite entire, and more obtuse at the extremity.

3. *V. calcitrapa*. Cut-leaved Valerian. Linn. Sp. Pl. 44. Willd. n. 3. Vahl n. 3. Ait. n. 3. Sm. Fl. Græc. Sibth. v. 1. 22. t. 30. (*V. foliis calcitrapæ*; Morif. sect. 7. t. 14. f. 7. *V. annua*, seu *æstiva*; Clus. Hist. v. 2. 54. Ger. Em. 1077.)—Stamen one. Corolla slightly spurred. Leaves all pinnatifid and sessile.—Native of Portugal, the north of Africa, the Levant, and even of Peru; but Vahl justly suspects its having been transported thither from Europe. It is become a weed on many walls about Chelsea, having, doubtless, escaped from the physic garden there. An annual upright herb, scarcely branched, flowering in May and

and June; the *leaves* slightly lyrate; *flowers* small, rose-coloured. *Seeds* spiked, with a feathery crown.

4. *V. orbiculata*. Round-leaved Valerian. Sm. Fl. Græc. Sibth. v. 1. 23. t. 31, marked *rotundifolia*.—Stamen one. Corolla slightly spurred. Lower leaves stalked, orbicular, somewhat heart-shaped, slightly toothed.—Gathered by Dr. Sibthorp and Mr. Ferdinand Bauer, on hills in the isle of Cyprus, flowering in the spring. Annual, and agreeing in habit with the last, but of rather humbler growth, and essentially distinguished by its round *leaves*, hardly an inch broad, purple beneath; the uppermost pair only being pinnatifid at their base. *Flowers* variegated with red and white, in twin-stalked *spikes*, much elongated as the *seeds* ripen.

5. *V. oblongifolia*. Oblong-leaved Valerian. “Fl. Peruv. v. 1. 40. t. 65. f. a.” Vahl n. 4.—“Hairy. Radical leaves oblong, toothed, obtuse; those of the stem linear, with tooth-like deep ferratures.”—Found on the lofty mountains of Peru. *Root* fibrous, rather thick. *Stems* several, striated, almost leafless, except under the flowers; the central one tallest, eighteen inches high. Radical *leaves* stalked, distantly toothed; the floral ones sessile, linear-lanceolate. *Flowers* sessile, in a dense *corymb*. Vahl.

6. *V. dioica*. Small Marsh Valerian. Linn. Sm. Pl. 44. Willd. n. 4. Vahl n. 5. Fl. Brit. n. 2. Engl. Bot. t. 628. Curt. Lond. fasc. 4. t. 3. Fl. Dan. t. 687. Poit. et Turp. Paris. t. 41. (*V. minor*, et *V. flore exiguo*; Rivin. Monop. Irr. t. 2. Ger. Em. 1075. *Phu minimum*; Matth. Valgr. v. 1. 38. Camer. Epit. 23.)—Flowers dioecious, with three stamens. Radical leaves ovate, those of the stem deeply lyrato-pinnatifid.—Native of moist boggy meadows in the more northern or temperate parts of Europe, flowering in June. *Root* creeping. *Stems* six or eight inches high. *Leaves* all smooth, and generally, but not always, entire; radical ones somewhat spatulate. *Flowers* bluish-coloured, in dense, forked, cymose panicles. The male plant is always smallest and weakest. Some *flowers* have *stamens* as well as *pistils*, but not both perfect in the same.

7. *V. Phu*. Garden Valerian. Linn. Sp. Pl. 45. Willd. n. 7. Vahl n. 6. Ait. n. 6. (*V. hortensis*; Ger. Em. 1075. Rivin. Monop. Irr. t. 3. *Phu magnum*; Fuchs. Hist. 856. Matth. Valgr. v. 1. 36.)—Radical leaves elliptical, undivided; the rest pinnatifid, somewhat lyrate; the upper ones with lanceolate, acute, entire segments.—Native of Germany. An old inhabitant of our gardens, where it was anciently called Setwall, or Cettiwall. A large perennial species, flowering from May to July. *Stems* three or four feet high. *Herbage* smooth, light green, with spreading *leaves*, mostly lyrate, except those at the bottom. *Flowers* copious, pale purplish bluish-coloured. The fleshy *root* has a peculiar aromatic scent, and is supposed to partake of the virtues of the Official Valerian. Cats are extremely fond of it, and delight in rolling themselves among the stalks and leaves, which they thus frequently destroy.

8. *V. hyalinorbiza*. Transparent-rooted Valerian. “Fl. Peruv. v. 1. 41. t. 67. f. b.” Vahl n. 7.—“Radical leaves roundish-spatulate, crenate, undivided or auricled; those of the stem pinnatifid.”—Found in dry sandy parts of Chili. *Herb* downy. *Root* tuberous, obovate, pellucid, insipid. *Stem* half a foot high, purplish. Radical *leaves* stalked; the innermost with an additional leaflet at each side: those of the stem distant, connate, lanceolate. *Corymbs* forked. *Calyx* obsolete. *Corolla* yellow. *Seed* square, crowned with minute teeth. Vahl.

9. *V. crispa*. Curled Valerian. “Fl. Peruv. v. 1. 41.” Vahl n. 8.—“Lower leaves ovate-oblong, with tooth-like

ferratures; the rest somewhat pinnate, with ferrated undulated leaflets.”—Native of meadows, fields, and cultivated ground, in Chili. *Root* with many small fibres. *Stem* two feet high, branched, brittle, striated, hollow. *Leaves* stalked; those of the stem more or less perfectly pinnate; their *leaflets* sessile, reflexed, wavy and crisped, gradually smaller downward; the odd one very large. *Clusters* forked. Vahl.

10. *V. interrupta*. Interrupted-leaved Valerian. “Fl. Peruv. v. 1. 42. t. 67. f. a.” Vahl n. 9.—“Radical leaves interruptedly pinnatifid; their longer segments also somewhat pinnatifid. *Stem* nearly leafless.”—Found on the lofty mountains of Peru. *Root* perennial, thick, divided. *Herb* juicy and smooth. *Leaves* all radical, except a pinnatifid pair under the *corymb*, not much unlike those of *Scorzonera laciniata*. *Stalks* terminal, three together, each bearing a head of sessile *flowers*, with linear *bractæas* to each. *Corolla* white, five-cleft. Vahl.

11. *V. lyrata*. Lyrate Valerian. Vahl n. 10.—“Radical leaves lyrate; segments oblong, with tooth-like ferratures; the terminal one somewhat pinnatifid: those of the stem-leaves linear-lanceolate.”—Native of Peru; seen by Vahl in Jussieu’s herbarium. *Stem* smooth, a span high, bearing two leaves. Radical *leaves* stalked, half the length of the stem; their terminal lobe very large, measuring two inches; lateral ones alternate; deeply and bluntly ferrated: stem-leaves sessile, half an inch long; all smooth. Partial *flower-stalks* racemose, three-cleft, forked. The aspect of the plant is like *V. calcitrapa*. Vahl.

12. *V. pinnatifida*. Pinnatifid Jagged Valerian. “Fl. Peruv. v. 1. 40. t. 69. f. b.” Vahl n. 11.—“Lowest leaves lanceolate, entire; the rest pinnatifid, with deeply ferrated segments. Branches of the *corymb* forked.”—Native of elevated hills about Lima. *Root* tuberous, long, perennial. *Herb* succulent. *Stem* perfectly simple, striated, hollow; leaflets in its lower part. Radical *leaves* on long stalks; those of the stem half clasping it; their segments with tooth-like ferratures. *Panicle* elongated; lower partial stalks first three-cleft, then forked, with an intermediate sessile flower between. *Bractæas* linear. *Stamens* three. Vahl.

13. *V. globifera*. Globular-headed Valerian. “Fl. Peruv. v. 1. 43. t. 65. f. b.” Vahl n. 12.—“Hairy, stemless. Leaves pinnate; leaflets deeply toothed or sinuated. Heads globose.”—Native of the high mountains of Peru. *Root* rather thick, once or twice divided. *Leaves* radical, stalked, with sessile leaflets. *Flower-stalks* several, radical, measuring four or five inches, scarcely longer than the leaves, round, striated. *Flowers* sessile, in a globular head, with intermediate spatulate, rather membranous, *bractæas*. Vahl.

14. *V. pauciflora*. North American Valerian. Michaux Boreal.-Amer. v. 1. 18. Pursh n. 1. Vahl n. 13.—“Radical leaves pinnate; those of the stem ternate; leaflets oval, acute, ferrated. Panicles loose, of few flowers.”—In shady woods of the Allegany mountains, and Tenassee, North America, flowering in June and July. Perennial. *Flowers* white.

15. *V. polystachya*. Many-spiked Valerian. Sm. Pl. Ic. t. 51. Willd. n. 19. Vahl n. 14.—Leaves pinnate; leaflets decurrent, nearly entire. Spike compound, whorled.—Gathered by Commerson, in watery situations at Buenos Ayres. *Stem* two feet high at least, ascending, striated, smooth, leafy. *Leaflets* smooth, nearly uniform, about an inch and half long; the odd one now and then slightly toothed; the lowermost much diminished. *Flowers* white, very numerous, in dense copious *whorls*, subtended by lanceolate

ceolate *bracteas*, and forming a compound *spike*, not unlike that of some *Menthæ*. It is doubtful whether the *seed* has any feathery crown.

16. *V. officinalis*. Great Wild Valerian. Linn. Sp. Pl. 45. Willd. n. 6. Vahl n. 15. Ait. n. 5. Fl. Brit. n. 3. Engl. Bot. t. 698. Curt. Lond. fasc. 6. t. 3. Woodv. Med. Bot. t. 96. Fl. Dan. t. 570. (Valeriana; Rivin. Monop. Irr. t. 1; and *V. foliis angustioribus*; *ibid.* t. 2. *V. major sylvestris*; Ger. Em. 1075. Phu; Colum. Phytob. 114. Ph. parvum; Matth. Valgr. v. 1. 37. Ph. minus; Camer. Epit. 22. Ph. germanicum; Fuchf. Hist. 857.)—Leaves all pinnate; leaflets lanceolate, ferrated, nearly uniform.—Common in marshy places, the banks of rivers, or hilly groves and thickets, flowering in June, throughout the more northern parts of Europe. *Root* perennial, fleshy, aromatic, but with a strong and peculiar, very nauseous, flavour, highly grateful to cats. *Stem* about four feet high, furrowed, leafy. *Leaves* stalked, from eight to twelve inches long; leaflets of the radical ones, in the upland variety, somewhat broader, and more ovate, than in the marsh kind; while those of the stem, in the same variety, are sometimes very narrow and entire. *Flowers* numerous, flesh-coloured or white, in large corymbose tufts. *Seed* crowned with large feathery down.

This plant having, till very lately, see the next species, been generally taken for the famous *çou*, or Valerian, of Dioscorides, has been universally employed in medicine, for the cure of nervous head-aches, hysterical and epileptic disorders. The mountain kind, being less acrid and more aromatic, is preferred for use, and is kept in all apothecaries' shops, in whose "compound of villainous smells" its flavour notably predominates.

17. *V. Diofcoridis*. Ancient Grecian Valerian. Sm. Fl. Græc. Sibth. v. 1. 24. t. 33. (*çou*; Diof. book 1. chap. 10.)—Stamens three. Leaves all pinnate; leaflets of the lyrate radical ones ovate, with wavy teeth. *Root* tuberous.—Gathered by Dr. Sibthorp near the river Lymyrus in Lycia, as we are informed by Mr. Hawkins, the learned companion of his tour. The professor himself first, of all modern botanists, discovered this plant, and justly concluded it to be the real *çou*, for which our common wild Valerian has been always mistaken. The oblong tuberous perennial *root* has a much more pungent, peppery, more durable, and yet less nauseous, odour than the last described. The *stem* is hollow, simple, two feet high. *Herb* smooth. Radical *leaves* numerous, lyrate, distinguished by the ovate form, and wavy margin, of all their *leaflets*, of which the odd one is much the largest, and somewhat heart-shaped: those of the stem few, lanceolate, narrow, partly ferrated. *Flowers* very like the last.

18. *V. italica*. Italian Valerian. Lamarck Illustr. v. 1. 92. Vahl n. 16. (*V. tuberosa*; Imperato Hist. Nat. 656. Bauh. Hist. v. 3. part 2. 207. *V. tuberosa* Imperati; Tourn. Cor. 5. Barrel. Ic. t. 825. *V. œnanthes* radice; Morif. sect. 7. t. 15. f. 4.)—Stamens four. Leaves all pinnate; leaflets of the radical ones ovate, nearly uniform, sharply toothed. *Root* tuberous.—Gathered by Imperato on the mountains of Liguria. We have only his figure, which all authors have copied, to guide us; except Vahl's description, made from a specimen in Jussieu's collection. This appears very nearly the same with our *V. Diofcoridis*, especially the *root*, which is said to smell like Nard. The *leaves* however are represented as much more strongly toothed, more equally pinnate, and not lyrate; the upper pair indeed have narrow entire leaflets, resembling our last. The *flowers* are white, more densely corymbose, and asserted by Lamarck to have four *stamens*, which, if correct, and con-

stant, indicates an essential difference. It would be very desirable to compare specimens of this Italian Valerian with those of Dr. Sibthorp.

19. *V. sifymbriifolia*. Water-cress-leaved Valerian. Vahl n. 17. (*V. orientalis*, sifymbrii Matthioli folio; Tourn. Cor. 6.)—"Leaves all pinnate; leaflets roundish-ovate, entire."—Native of the Levant; examined in Jussieu's herbarium by Vahl, who declares it, contrary to Buxbaum's opinion, to be totally distinct from *V. dioica*. The plant resembles *Sifymbrium Nasturtium*. *Stem* from six to twelve inches high, finely striated, smooth, as well as every other part. *Leaves* stalked, pinnate, of two or three pair of *leaflets*; the innermost of which are smallest, alternate, and somewhat stalked; the outer sessile and opposite; the odd one an inch long, ovate or roundish, very blunt, obscurely ribbed; sometimes the top leaves are ternate only. *Flowers* in a dense, level-topped, nearly simple *corymb*, resembling those of *V. officinalis*. *Bracteas* linear, shorter than the flower. *Stamens* three. *Style* three-cleft. This appears, by the above description of Vahl, to be likewise related to *V. Diofcoridis*. We have seen neither specimen nor figure.

20. *V. capensis*. Cape Valerian. Thunb. Prodr. 7. Willd. n. 5. Vahl n. 18.—"Leaves pinnate; leaflets ovate, toothed. *Stem* hairy at the joints."—Found by Thunberg at the Cape of Good Hope. The *stem* is said to be furrowed; smooth, except the joints. *Corymbs* forked.

21. *V. paniculata*. Panicked Valerian. "Fl. Peruv. v. 1. 41. t. 70. f. a." Vahl n. 19.—"Hairy. Radical leaves undivided, heart-shaped; those of the stem pinnate, with ovate finely-toothed leaflets. Branches of the panicle forked."—Native of boggy stony places in Peru. *Root* branched. *Herb* villous. *Stems* several, aggregate, slightly leafy, near a yard high, quite simple, somewhat two-edged, furrowed, hollow. Radical *leaves* two, entire; *lower stem-leaves* of seven pair of acute leaflets, gradually smaller downwards; uppermost of all ternate. *Footstalks* sheathing. *Panicle* diffuse. *Bracteas* small, linear, opposite. *Calyx* marginal, with ten angles. *Tube* of the *corolla* very small. *Seed* oblong, but little compressed, crowned with ten rays. *Vahl*.

22. *V. decussata*. Cross-branched Valerian. "Fl. Peruv. v. 1. 42. t. 70. f. b." Vahl n. 20.—"Leaves pinnate; leaflets lanceolate, finely toothed; hoary and downy beneath. Branches of the panicle forked and divaricated."—Found about hedges, and stony places, in Peru. *Stem* herbaceous, though somewhat climbing, three feet high, striated, hollow, a little downy. *Leaves* on short stalks; leaflets gradually larger outwards, distantly and minutely toothed; downy above; more densely so beneath. *Panicle* very large, with horizontal partial flower-stalks. *Bracteas* under each division linear. *Corolla* minute, white. *Seed* crowned with ten or twelve rays. *Vahl*.

23. *V. scandens*. Climbing Valerian. Linn. Sp. Pl. 47. Loefl. It. 235. Vahl n. 21.—"Leaves ternate. *Stem* climbing."—Gathered by Loefling in his journey from Cumana to the river Oroonoco, flowering in January.—The *flowers* grow in lateral, somewhat forked, spiked panicles. *Corolla* tubular, greenish-rose-coloured, with five equal spreading teeth. *Stamens* three. *Seeds* compressed, ovate, striated, with a feathery crown. *Loefling*. We have never seen, or heard of, a specimen of this plant in Europe, Linnæus having described it from Loefling's authority only.

24. *V. sanguisorbifolia*. Burnet-leaved Valerian. Cavan. Ic. v. 5. 34. t. 456. Vahl n. 22.—"Leaves pinnate; leaflets ovate, toothed. *Corymbs* compound. *Stem* hairy at the joints.—Native of the Cordilleras of Chili, flowering in January. The *stem* is about a foot high, ascending, leafy. Radical *leaves* stalked, of about six pair of small, roundish-

roundish-ovate leaflets, furnished with one or two broad blunt teeth at each side; the odd one much more elongated and narrower. Branches of the panicle compound, corymbose. Seed-crown of ten feathery rays.

25. *V. virgata*. Many-twig'd Valerian. "Fl. Peruv. v. 1. 42. t. 66. f. b." Vahl n. 23.—Leaves pinnate; leaflets cloven or three-cleft, with linear segments. Branches of the corymb forked.—Native of precipices in Peru. Smooth, with the habit of *Tagetes minuta*. Stem rather shrubby, three feet high, much branched, square, striated, scarcely hollow, obscurely downy; the branches upright and wand-like. Leaflets minute; some undivided; others with two, three, or four, linear, emarginate or entire, segments; shining on the upper side. Partial flower-stalks forked, with opposite linear bractes. Flowers sessile in the forks. Seeds striated on one side, gibbous on the other. Vahl.

26. *V. montana*. Mountain Valerian. Linn. Sp. Pl. 45. Willd. n. 9. Vahl n. 24. Ait. n. 8. Jacq. Austr. t. 269. (*V. alpina*, scrophulariæ folio; Bauh. Prodr. 87.)—Leaves ovate-oblong, simple, unequally toothed; the lower ones stalked; upper pointed. Stem simple, rather downy.—Not very uncommon in stony ground, on the alps of Switzerland, the Grisons, Germany, and the Pyrenées, flowering in July and August. The root is long, creeping, perennial, with a slight degree of the flavour belonging to this genus. Stems a foot high, more or less, ascending, leafy, unbranched. Radical leaves on long stalks, heart-shaped or spatulate, acute, smooth, an inch or two in length, with various broad, shallow, wavy teeth; the rest more oblong and pointed, on short stalks. Flowers numerous, corymbose, small, pale flesh-coloured.

27. *V. intermedia*. Ambiguous Valerian. Vahl n. 25.—"Leaves simple, nearly entire; the lowermost oblong-heart-shaped; uppermost lanceolate; three pair on the stem."—Brought from the Pyrenées by Mr. Hornemann. Akin to the last, though the leaves being not heart-shaped, nor toothed, as in that, but lanceolate and entire, induced professor Vahl to esteem it distinct.

28. *V. tripteris*. Three-leaved Valerian. Linn. Sp. Pl. 45. Willd. n. 8. Vahl n. 26. Ait. n. 7. Jacq. Austr. t. 268. (*V. alpina prima*; Bauh. Prodr. 86. *V. alpina saxatilis minor*, flore albo; Barrel. Ic. t. 742. *V. alpina minor*, et minima; Pluk. Phyt. t. 231. f. 7, 8.)—Leaves toothed; the radical ones heart-shaped, simple; those of the stem ternate, ovate-oblong; their lateral leaflets lanceolate.—Found on the alps of Austria and Switzerland, intermixed with *V. montana*, but flowering a little earlier, and the flowers are more generally white. Nevertheless, these two species are so very nearly akin, that we could almost suspect them to be varieties of each other, and that Vahl's *intermedia* may belong to one and the same species.

29. *V. villosa*. Downy Valerian. Thunb. Jap. 32. t. 6. Willd. n. 18. Vahl n. 27.—Stamens four. Corolla equal. Leaves densely downy; the radical ones auricled; floral ones toothed.—Native of various places in Japan, flowering in September and October. The root appears to be perennial. Whole herb densely downy or hairy, a span high, unbranched. Leaves all toothed; the radical ones stalked, oval, near two inches long, with a pair of much smaller confluent auricles. Panicle corymbose, forked. Flowers yellow. Willdenow refers this species, like *V. sibirica*, to the *Fedia*, but Vahl makes it a *Valeriana*. Having seen no specimen, we are unable to form a decided opinion, the fruit rot having been noticed by Thunberg, whose figure and description are our only authority.

30. *V. pyrenaica*. Heart-leaved Valerian. Linn. Sp. Pl. 46. Willd. n. 14. Vahl n. 28. Don. Herb. Brit. fac. 4. 77. Sm. Compend. ed. 2. 8. Engl. Bot. t. 1591. (*V. maxima*, cacaliæ folio; Pluk. Phyt. t. 232. f. 1. *V. canadensis*; Rivin. Monop. Irr. t. 4.)—Stem-leaves heart-shaped, serrated, all stalked; the upper ones pinnate or ternate.—Native of the Pyrenées, and of Scotland; having been found by the late Mr. George Don, about ditches and walls at Blair-Adam, Kinrossshire, and subsequently near Glasgow and Edinburgh, flowering in June. Dr. Brown of Glasgow has also met with this plant in several woods of the south of Scotland, widely separated from each other. It is perennial, from three to five feet high, of a stout habit, and dark green hue, nearly smooth, possessing the smell, probably the virtues, of *V. officinalis*, *Discofordis*, &c. Stem downy about the summit, as are the upper footstalks all over. Leaves large, with copious, unequal, tooth-like serratures; the radical ones, sometimes the others, simple; but for the most part the stem-leaves bear one or two pair of small lanceolate leaflets on their stalks. Flowers rose-coloured, in a dense, large, compound, terminal corymb. Spur obsolete. Stamens three.

31. *V. alliariaefolia*. Garlick-mustard-leaved Valerian. Vahl n. 29. (*V. orientalis*, alliariæ folio, flore albo; Tourn. Cor. 6. Buxb. Cent. 2. 19. t. 11.)—Leaves heart-shaped, unequally toothed, all simple; the upper ones sessile.—Gathered by Tournesfort in Cappadocia. Distinguished from the last, with which Linnæus confounded it, by being perfectly smooth, with thinner leaves, besides what is expressed in the specific definition. Vahl examined Tournesfort's original specimens. The flowers are white.

32. *V. lapathifolia*. Doek-leaved Valerian. Vahl n. 30.—"Leaves heart-shaped-ovate, undivided, nearly entire; the upper ones sessile."—Gathered by Commerçon, in the straits of Magellan. Root perennial. Stem a foot or more in height, as thick as a goose-quill, striated, smooth. Leaves three inches long, gradually smaller upward, acute, entire, or sometimes slightly crenate, ribbed, obscurely veined, smooth, except the upper side of the ribs; those at the root, and lower part of the stem, stalked; upper pair sessile; lowest floral leaves linear, obtuse, fringed at the base. Flower-stalks corymbose; the axillary ones opposite, of few flowers; terminal ones three-forked, many-flowered. Stamens three. Vahl. We find no specimen of this species among the large communications of M. Thouin to the younger Linnæus.

33. *V. carnosa*. Flethy-leaved Valerian. Sm. Plant. Ic. t. 52. Willd. n. 22. Vahl n. 31. (*V. magellanica*; Lamarck Illustr. v. 1. 93.)—Leaves oval, toothed, fleshy, glaucous; the radical ones on long stalks.—Gathered by Commerçon, in the straits of Magellan. Stems about a foot high, erect, simple, smooth. Leaves all, according to Commerçon, thick, succulent and glaucous; radical ones obtuse, an inch or inch and half long, with broad unequal teeth; tapering at the base, into a footstalk twice or thrice their own length; stem-leaves about three pair, much smaller, nearly sessile. Flowers purple, nearly regular, triandrous, in small, dense, level-topped corymbs. Seed crowned with teeth, rather than with feathery down; so far at least as we can judge from our specimens. It is not impossible that this species may be a *Fedia*, as Willdenow makes it; though the seed, like that of *Fedia* (or *Valeriana*) *Cornucopia*, resembles true Valerians. Indeed our *carnosa* and *polystachya* appear to form, through *V. Cornucopia*, the connecting links of these two genera.

34. *V. tuberosa*. Tuberos-rooted Valerian. Linn. Sp. Pl. 46. Willd. n. 11. Vahl n. 32. Ait. n. 10. (*Nardum*

Jum montanum; Matth. Valgr. v. 1. 32. *Nardus montana*; Ger. Em. 1079. *N. montana*, longius radicata; Camer. Epit. 16.)—Leaves obtuse, entire at the margin; radical ones lanceolate-ovate, undivided; those of the stem pinnatifid, with linear segments.—Found in mountainous situations, in the south of France, Italy, Sicily, Dalmatia, and many parts of the Levant. Dr. Sibthorp, who gathered this species very plentifully on the hills of Cilicia, Crete, Cyprus, and even on Parnassus, justly esteems it, as most botanical critics have done, the *varedo*; *ορειων* of Dioscorides. The tuberous perennial *root* is nearly as thick as the finger, very powerfully scented. *Stem* solitary, a span high, simple, smooth, most leafy below, bearing in its upper part only one pair of *leaves* in narrow linear segments, the other pair so divided being near the base. *Flowers* reddish, in a dense corymbose head. *Seeds* ribbed, with a feathery radiant crown, not displayed till they are almost ripe.

35. *V. Spica*. Spikenard Indian Valerian. Vahl n. 33. (“*V. jetamanfi*; John in Act. Bengh. (Asiatic Researches?) v. 2. 405. v. 4. 433, with a figure.”)—“Radical leaves heart-shaped, those of the stem oblong.”—Native of Bengal. The Rev. Dr. John supposes it the Spikenard of the ancients. The *root* is perennial, somewhat branched, covered with bristles in the upper part. *Stem* from six to twelve inches high; its base permanent, encompassed with fibres. *Leaves* smooth; the two lowermost heart-shaped-oblong, waved, acute. *Corymb* forked. *Vahl*.

36. *V. elongata*. Long-clustered Valerian. Linn. Sp. Pl. 1664. Willd. n. 13. Vahl n. 34. Jacq. Enum. 205. t. 1. Austr. t. 219. (*Nardo celtica* *filivis* alia, five Valeriana alpina minor; Linn. Am. Acad. v. 1. 154.)—Radical leaves ovate, wavy; those of the stem sessile, somewhat heart-shaped, broadly toothed and cut. Panicle loose, elongated.—Native of the Austrian mountain of Schneeberg. We have specimens also, gathered by Mr. Sieber, from Carinthia; and one found by Scopoli in Carniola. This is one of the rarest alpine plants, and appears never to have been seen by Vahl. It is perennial, flowering in June and July. *Root* long, slender, with numerous long simple fibres. *Stem* from four to six inches high, simple, leafy, smooth like the rest of the herb. *Leaves* from an inch to an inch and half long, mostly ovate; the upper pair small, narrow, and jagged. *Flowers* small, pale yellow, with a tawny tinge, forming a lax, racemose, forked, compound panicle, about two inches long. We have not seen the crown of the *seed*, nor does any author describe it.

37. *V. supina*. Dwarf Valerian. Linn. Mant. 27. Willd. n. 17. Vahl n. 35. Ard. Spec. fasc. 2. 13. t. 3. Wulf. in Jacq. Misc. v. 2. 114. t. 17. f. 2.—Leaves simple, spatulate, entire, fringed; the uppermost lanceolate.—Found about the boggy sandy margins of mountain rills, on the alpine heights of Austria, Carinthia, and the Tyrol, near the limits of perpetual snow. The creeping perennial *roots* throw out many trailing scyons, and are crowned with several dense tufts of stalked, obovate, bright-green *leaves*, smooth on both sides, finely fringed with short hairs. *Stems* two or three inches high, more or less leafy, corymbose at the top. *Braçees* long, lanceolate, acute, fringed. *Flowers* of a delicate rose-colour. *Stamens* occasionally four. *Seed-crown* long and feathery.

38. *V. saxatilis*. Rock Valerian. Linn. Sp. Pl. 46. Willd. n. 12. Vahl n. 36. Ait. n. 11. Jacq. Austr. t. 267. (*V. sylvestris alpina altera saxatilis*; Clus. Hist. v. 2. 56. *V. alpina angustifolia*; Ger. Em. 1077.)—Leaves simple, undivided; radical ones elliptical, three-ribbed, rather hairy, entire, or slightly toothed; those of the stem linear. *Corymbs* racemose.—Native of the alps of Styria,

Italy, and Austria, but rarely in the latter country, as we are informed by professor Jacquin, jun. to whom we are indebted for specimens. The *root* is perennial, crowned with fibrous remains of old leaf-stalks. *Stem* a span high, slender, smooth. Radical *leaves* on long stalks, erect, an inch and half or two inches long, obtuse, almost perfectly entire, a little hairy occasionally; tapering at the base: those on the stem long and narrow, stalked, sometimes a little jagged, scarcely more than one pair, about half way up the stem, except the still narrower and smaller *bractees* at the base of the inflorescence. *Flowers* few, white, corymbose, each little tuft supported by a very long slender stalk. Jacquin asserts them to be dioecious. He gives no account of the structure of the *seed-crown*, nor do we find that part any where described.

39. *V. Saliunca*. Italian Nard Valerian. Allion. Pedem. v. 1. 3. t. 70. f. 1. Vahl n. 37. (*Saliunca neapolitana*; Dalech. Hist. 982. *Nardus ex Apulia*; Bauh. Pin. 165.)—Leaves linear-wedge-shaped, entire or partly toothed, rather fleshy, quite smooth. *Flowers* in a dense round tuft.—Native of the mountains of Italy and Dauphiny. The *root* is cylindrical, woody and perennial, branched at the top, and crowned with many tufts of oblong-lanceolate, or spatulate, stalked *leaves*, more or less obtuse, of a much thicker texture than the last, an inch and half long. *Stems* solitary, two or three inches high, bearing about the middle a pair of combined smaller leaves, occasionally jagged or pinnatifid at the base. Sometimes there is a similar pair lower down. The *flowers* are crowded into a round head, sometimes accompanied with two small corymbose branches just below, and subtended by two or four oblong entire *bractees*, as well as intermixed with smaller ones, all slightly fringed. *Stamens* three. *Seed* striated, with a feathery crown. The *herb* is smooth in every part, except the *bractees*, and very strongly scented.

40. *V. celtica*. Celtic Nard Valerian. Linn. Sp. Pl. 46. Willd. n. 10. Vahl n. 38. Ait. n. 9. Jacq. Coll. v. 1. 24. t. 1. (*V. n. 209*; Hall. Hist. v. 1. 91. *Nardus celtica*; Ger. Em. 1079. *Spica celtica*; Camer. Epit. 14.)—Leaves oblong, obtuse, entire, rather fleshy, quite smooth. *Flowers* racemose; partial stalks capitate.—Native of the alps of Austria, Switzerland, &c. *Root* oblong, creeping, scaly, with a very powerful and oppressive peppery smell. *Herb* of the stature of the last, with fleshy, smooth, but always entire, *leaves*. *Inflorescence* widely different, so that these species can never be confounded by those who have seen them in flower. The *cluster* of the present is about two inches long, lax; each branch, whether simple or forked, terminating in a little bracteated head, of three or four sessile yellowish *flowers*, with three *stamens*. The *seed* has a feathery crown, and is sometimes covered with dense hairs.

41. *V. spatulata*. Spatulate Downy Valerian. “*Fl. Peruv. v. 1. 40. t. 68. f. b.*” Vahl n. 39.—“Leaves spatulate-oblong, downy. *Flowers* terminal, sessile, with a simple involucre. *Corolla* three-cleft.”—Found on the lofty mountains of Peru. *Root* branched, perennial, tufted. *Stem* about four inches high, two-edged, clothed in the lower part with copious foliage. Radical *leaves* densely crowded; upper ones scattered, a little spreading, entire, minutely fringed. *Involucre* in several linear acute segments, and containing from four to six *flowers*. The *calyx* is a slight rim. *Seed* crowned with a border. *Vahl*.

42. *V. connata*. Combined-leaved Valerian. “*Fl. Peruv. v. 1. 39. t. 67. f. a.*” Vahl n. 40.—“Leaves lanceolate, combined, entire. *Corymbs* racemose, compact. *Stems* procumbent, rather woody.”—Native of the colder regions

of Peru. The habit of this species is like *Polygonum Perficaria*. Stems several, much branched, with a grey bark; branches ascending, straight, jointed, somewhat sheathed, hollow; marked when young with two downy lines, alternately crossing each other, of a dark tawny colour, striated. Leaves tapering and fringed at the base, but otherwise smooth. Common flower-stalk elongated; partial ones opposite, three-cleft, with a pair of small combined leaves at each side. Bractees lanceolate, obtuse. Calyx bordered. Stigma cloven. Seed-down hairy. Vahl.

43. *V. salicariaefolia*. Loosetrife-leaved Valerian. Vahl n. 41.—“Leaves lanceolate, entire, sessile. Corymbs terminal, twice compound.”—Gathered at Buenos Ayres by Commerfon, and preserved in Jussieu’s herbarium. Plant all over smooth. Stem eighteen inches high, quite simple, striated, throwing out roots in the lower part. Leaves three or four inches long; the lower ones tapering towards the base; the upper somewhat heart-shaped at their insertion; destitute of rib or veins. Vahl.

44. *V. pilosa*. Plantain-leaved Valerian. “Fl. Peruv. v. 1. 39. t. 66. f. a.” Vahl n. 42.—“Hairy. Leaves lanceolate, entire, revolute. Corymbs racemose.”—Native of the colder regions of Peru. This has the aspect of *Plantago albicans*. Root branched. Stem solitary, occasionally two or three, erect, a foot high, striated, bearing two linear leaves about the middle. Radical leaves very numerous, six inches long, unequal, erect. Corymbs opposite, in the upper part of the stem, with from three to five partial stalks. Flowers sessile, in a head, with obovate bractees intermixed. Calyx bordered. Stigma cloven. Seed-down hairy. Vahl.

45. *V. coarctata*. Close-flowered Valerian. “Fl. Peruv. v. 1. 40. t. 68. f. a.” Vahl n. 43.—“Leaves wedged-shaped-lanceolate, minutely toothed, fringed. Flowers in whorled spikes.”—Native of cold situations, on the lofty mountains of Peru. Root tapering, perennial, divided in its lower part. Stem nearly a foot high, striated, downy with deciduous hairs; naked below; leafy above. Radical leaves imbricated, six or eight inches long, channelled, tapering at the base; purplish externally; the floral ones three or four, lanceolate, smooth on both sides, finely toothed and fringed, as well as the radical ones. Flowers sessile, in crowded whorls, the lowest whorl only being distant from the rest. Bractees short, wedge-shaped. Seed oblong, crowned with five scales. Vahl. It is manifest that this species and the three following are as much entitled to be ranked with *Fedia* as many others.

46. *V. ferrata*. Serrated Valerian. “Fl. Peruv. v. 1. 40. t. 68. f. c.” Vahl n. 44.—“Leaves wedged-shaped-lanceolate, serrated towards the extremity. Flowers in whorled spikes.”—Native of cold situations in Peru. Root perennial, thick. Herb tufted, smooth. Stems several, striated, nearly leafless; the middle one six inches high, leafy under the flowers. Radical leaves numerous; floral ones serrated at the extremity. Spike terminal, five or six inches long. Flowers sessile, in many-flowered whorls, of which the lower ones are distant, the upper crowded. Bractees wedge-shaped, membranous between the flowers. Seed oblong, crowned with five scales. Vahl.

47. *V. rigida*. Rigid Valerian. “Fl. Peruv. v. 1. 39. t. 65. f. c.” Vahl n. 45.—“Stem none. Leaves lanceolate, aggregate, imbricated, spreading, the upper ones gradually smaller.”—Native of the mountains of Peru. Root spindle-shaped, perennial. Radical leaves extremely numerous, spreading in the form of a rose, an inch and half long, entire, with a cartilaginous edge, coriaceous, rigid, without rib or veins; minutely dotted on both sides; shining on the upper surface; fringed towards the base; terminating in a

rather pungent point; lying over one another in an imbricated manner, the innermost being gradually smaller. Flower-stalks, if any, very short, in the centre of the leaves, compressed, white, tapering at the base. Flowers with a general, as well as partial, involucre, each of one leaf, sheathing, divided. Calyx a very minute border. Stigma cloven. Seed naked. Vahl.

48. *V. tenuifolia*. Taper-leaved Valerian. “Fl. Peruv. v. 1. 39. t. 65. f. d.” Vahl n. 46.—“Stem none. Leaves linear-awlshaped, aggregate, sessile, imbricated, spreading; the outermost very long.—Native of the mountains of Peru. Root perennial, spindle-shaped. Radical leaves numerous, unequal, spreading in the manner of a star, entire, veinless, smooth and shining, with a rather rigid point; dilated and membranous at the base; ciliated in their lower part. In other respects this species agrees with the last, both being widely different in habit from the rest of their genus. Vahl.

VALERIANA, in Gardening, contains plants of the hardy, herbaceous, perennial kind, among which the species cultivated are, the common or broad-leaved red valerian (*V. rubra*); the narrow-leaved red valerian (*V. angustifolia*); the cut-leaved valerian (*V. calcitrapa*); the garden or white Alsatian valerian (*V. phu*); the three-leaved valerian (*V. tripteris*); the mountain valerian (*V. montana*); the Celtic valerian (*V. celtica*); the tuberous-rooted valerian (*V. tuberosa*); the Pyrenean valerian (*V. pyrenaica*); the official valerian (*V. officinalis*); and the common corn-fallad, or lamb’s lettuce (*V. olitoria*).

The first sort differs in some degree in the colour of its flowers; they being in some plants of a deep red, in others of a pale red, a bright red, and there are others which have white flowers. The second sort has bright red flowers, smaller than those of the former. The third is an annual plant, which has the flowers shaped like those of the fourth sort, but smaller, and tinged with flesh-colour at the top: and it varies with the lower leaves pinnatifid. The fourth sort has the branches terminated by bunches of small white flowers, the odour of which is very agreeable. The fifth has the flowers numerous, white, and in loose bunches. In the sixth sort the stem is upright, simple, a foot or eighteen inches high, with the flowers of a whitish or purplish colour, in a bunch. The seventh sort has the stem slender, simple, and terminated by a few small whitish flowers in a bunch. The eighth sort is easily distinguished by its tuberous roots: and there is a variety with the roots in the form of an olive. The ninth sort has the stem and branches terminated by umbels of pale flesh-coloured flowers, with very short spurs. The tenth sort has the stalks two feet high, all of which and the branches are terminated with umbellated clusters of flowers tinged with purple. The last sort has the flowers very small, of a pale blueish colour, and collected into a close little bunch. It is used in fallads in the early spring and winter, under the name of corn-fallad, or lamb’s lettuce.

There is a variety which is smaller, with jagged leaves: the sizes of the leaves also differ much, being in some narrow, and in others broad, and likewise in the shape; but they are all used indifferently as fallad herbs while young.

Method of Culture.—The two first sorts may be increased by parting the roots, and planting them out in the autumn or spring season, where they are to grow.

They may also be raised from seed sown at the same times, in the situations where the plants are to grow. The third may likewise be raised from seeds, by sowing them as above, without any trouble. The fourth may be increased by parting the roots, and planting them out in the autumn, on fresh ground where they are to grow. The fifth may be raised

raised in the same way, being allowed good room, as it spreads much. The three following sorts are more difficult to preserve, requiring a stony soil and cold exposure. The ninth sort may be raised from seeds sown in a moist shady border soon after they are ripe, managing the plants as in the first sort. The tenth sort, as well as the fourth, are mostly cultivated as medicinal plants, for which purpose they should be disposed in beds with others of the same kind. They may be raised by parting the roots, as well as by the seeds. The last sort, when cultivated for the purpose of fallads, should be sown in the latter end of summer, or beginning of autumn, in an open place, where it is to grow; the plants being afterwards thinned out by hoeing, and kept clean from weeds; when they will be fit for use very early in the spring while quite young.

All the sorts, except the last, may be introduced in the borders, for the purpose of variety, and most of them continue many years. They may all be had at the proper planting seasons, as the autumn, winter, and spring, in the public nurseries.

The last is used as an early spring salad-herb.

VALERIANA, in the *Materia Medica*. There are various kinds of valerian; but those chiefly in medical use are the large garden valerian, *valeriana hortensis*; called by Dioscorides *φν, φβυ, folio olusatris*; and the *valeriana sylvestris*, or great wild valerian.

The former is an ingredient in Venice treacle; its chief use is in disorders of the nerves; in which respect, however, it is held inferior to the latter.

The wild valerian, *valeriana officinalis* of Linnæus, or *valeriana sylvestris major montana* of Bauhin, is perennial, and grows wild in dry mountainous places. The root consists of tough strings, with numerous smaller threads, matted together, issuing from one head, of a dusky-brownish colour approaching to olive. Cows eat the leaves, and cats are very fond of the roots. Rats are also said to be equally fond of these roots, and rat-catchers employ them to draw the rats together. Another species, or variety, of wild valerian is met with in moist watery grounds, distinguishable by the leaves being broader, and of a deep glossy-green colour. Both sorts have been used indiscriminately; but the mountain sort is much the most efficacious, and is, therefore, expressly ordered for the official species by the London College.

The mountain valerian, or narrow-leaved variety of this species, not exceeding two feet in height, and affecting dry heaths and high pastures, is chiefly in repute: its root manifests stronger sensible qualities, and possesses more medicinal power: its smell is strong, resembling that of a mixture of aromatics with fetids, and it has an unpleasent, warm, bitterish, subacid taste: the strength of the smell and taste is the only certain test of its genuineness and goodness. It is a medicine of great esteem against obstinate hemicrania, hysterical and the different kinds of nervous disorders, and is commonly considered as one of the principal antispasmodics. Dioscorides and Galen mention it as an aromatic and diuretic. Columna reports, that he was cured by it of an inveterate epilepsy after many other medicines had been used in vain.

M. Marchant, in the Memoirs of the Academy of Sciences, has confirmed this virtue, by many instances within his own knowledge: and what is very remarkable is, that in the two observations he enlarges most upon, the patients, on taking it, voided great quantities of worms. His custom was always to purge before he administered it.

On more extensive trials it has been found, in some epileptic cases, to effect a cure, in several to abate the violence

or frequency of the fits, and in many to prove altogether ineffectual; oftentimes it either purges or operates by sweat or by urine, or brings away worms, before it prevents a fit. The dose of the root in powder is from a scruple to a drachm or two, which may be repeated, if the stomach will bear it, two or three times a day. Dr. Withering says, that in habitual costiveness it is an excellent medicine; and frequently loosens the bowels when other stronger purgatives have been tried in vain. A remarkable instance of its efficacy in a catalepsy is given by Mr. Mudge (on the *vis vite, &c.*); doses of half an ounce of the powder were exhibited twice a day, and a less quantity was found ineffectual.

The advantages said to be derived from this root in epilepsy, caused it to be tried in several other complaints denominated nervous, particularly those produced by increased mobility and irritability of the nervous system, in which it has been found highly serviceable. Bergius states its virtue to be antispasmodic, diaphoretic, emmenagogue, diuretic, and anthelmintic. And under the head of its use, he enumerates epilepsy, convulsions, hysteria, hemicrania, and visus hebitudo. Fordyce commends it in this last disease. Whytt, who joined it with manna, experienced its utility in epilepsy. Joined with guaiacum, Morgan found it useful in resolving glandular or stromous tumours. Dr. Cullen allows, that its antispasmodic powers are well established, and he thinks it should be given in larger doses than those that are commonly used. Accordingly he has found it frequently useful in epileptic, hysterical, and other spasmodic affections. It is said, however, that it has been sometimes given in cases of epilepsy, to the extent of two ounces a day without effect; and Dr. Woodville observes, that his own experience warrants him in saying, that it seldom has been found to answer the expectation of the prescriber.

The powdered root, infused in water, or digested in rectified spirit, impregnates both menstrua strongly with its smell and taste, and tinges the former of a dark brown, and the latter of a brownish-red colour. Water distilled from it smells considerably of the root, but no essential oil separates: the extract obtained by inspissating the watery infusion, which is about one-fourth the weight of the root, has a pretty strong taste, disagreeably sweetish, and somewhat bitterish: the spirituous extract, which is about one-eighth the weight of the root, is less disagreeable, and more perfectly resembles the root itself.

Tinctures of it are prepared in the shops, by digesting four ounces of the powdered valerian in a quart of proof-spirit, in the same quantity of the volatile aromatic spirit, or of the dulcified spirit of sal ammoniac. The root in substance, however, is generally found to be more effectual than any preparation of it: and its flavour may best be covered with mace. Lewis and Woodville.

VALERIANELLA, in *Botany*, the diminutive of VALERIANA, see that article and FEDIA.

VALERIANO BOLZANI, PIERIO, in *Biography*, was born at Belluno, in 1477, in such a low condition, that he had no opportunity of acquiring the first elements of literature till he attained the age of fifteen years. After having been reduced to the necessity of entering into the service of a noble person at Venice for support, he devoted himself to study under eminent teachers; and agreeably to the practice of the age in which he lived, changed his baptismal name of Giampietro for Pierio. In his 23d year he engaged in the study of philosophy at Padua, and passed three years in a retreat at mount Olivet, in the Veronese. Upon his return to his native place, he found it possessed by the imperial army

army in 1509, so that he was obliged to make his escape to Rome. Here he fortunately became known to cardinal Giovanni de Medici, by whom, when pope Leo X., he was honourably provided for in his court. At the termination of this pontificate, he passed some time at Naples; but upon the accession of Clement VII. he returned to Rome, and was promoted to the chair of eloquence, with the title of protonotary and private chamberlain, to which was added a canonry, and some other benefice in Belluno. Having employed himself in Latin poetry, he relinquished the composition of elegies and amatory pieces, by which he had acquired reputation, upon taking holy orders. To him Leo X. committed the instruction of his two nephews, Ippolito and Alessandro de Medici, and he accompanied them to Florence, where he resided in the year 1527, when they were expelled from that city. After sharing their misfortunes, he attended them to Florence in 1530. Upon their death, he withdrew first to Belluno, and then to Padua, where he closed his life in 1558, at the age of eighty-one years.

The work by which he is principally known, is his treatise "De Infelicitate Literatorum," first printed at Venice in 1620, and often reprinted. Another of his publications was intitled "Hieroglyphica, sive de sacris Ægyptiorum aliarumque Gentium literis Commentariorum, Lib. LVIII.," Basil, 1566. Some of his other performances were, "De Fulminum Significationibus," Romæ, 1517; "Pro Sacerdotum Barbis defensio," 1531; "Caltigationes Virgilianæ lectionis," first printed in R. Stephens's edition of Virgil, Paris, 1532, and since annexed to various other editions; and "Antiquitates Bellunenfes." He also published two volumes of his Latin poems. Moreri. Tiraboschi. Gen. Biog.

VALERIUS FLACCUS. See FLACCUS.

VALERIUS MAXIMUS, a writer whose history is little known. The work which has been ascribed to him, and entitled "De Dicitis et Factis Memorabilibus Antiquorum, Lib. IX." appears to have been written in the reign of Tiberius, probably after the death of Sejanus, and dedicated with high eulogy to Tiberius. It is cited by Pliny the elder, Plutarch, and A. Gellius; and it was much read and quoted at the revival of literature in Europe. One of the early editions, which were numerous, is supposed to have been prior to 1460; of the later editions, the most esteemed are the "Variorum," Lugd.-Bat. 1670; the "Delphin," Paris, 1679; "Torrenii," Lugd.-Bat. 1726; and "Kappii," Lipsi. 1782.

VALERIUS POPLICOLA, PUBLIUS, an eminent Roman, and one of the founders of the republican government, distinguished by his simplicity, eloquence, and liberality. In a contention about the consulate, at the expulsion of the Tarquinian family, he was elected to supply the place of Collatinus, who was removed from office, and lived on terms of the utmost harmony with his colleague, the celebrated Junius Brutus. In the subsequent battle with the allies of Tarquin, in which Brutus was slain, Valerius gained a victory, for which he obtained a triumph, B.C. 507. Delaying the election of a new consul, and having built a house on the Palatine hill, that overlooked the forum, he excited the suspicion of the people; but as soon as he understood the ground of their jealousy, he ordered the house to be levelled in the night, and gave orders for supplying the vacancy in the consulate. The father of Lucretia was chosen, but by his death soon after his election, Valerius was again the sole chief magistrate. In the exercise of his office he enacted several laws, abridging the consular authority, and meliorating the condition of the people; and hence obtained the name of *Poplicola*, or the people's friend. As a proof of his inte-

grity and disinterestedness, he removed the public treasury from his own house to the temple of Saturn, thus committing it to the charge of two senators appointed by the people. Upon an election of consul, his popularity occasioned his being chosen a second time. When, in the following year, Porcena, king of Clusium, in Tuscany, attempted the restoration of Tarquin, and by an army which he marched to Rome reduced the city to great difficulties, Poplicola agreed to resign some of their conquests as the price of peace; and his own daughter Valeria was one of the hostages. In a war with the Sabines, Poplicola was nominated for the fourth time a consul; and by his military skill obtained a complete victory over the enemy, and recovered the town of Fidenæ. For this success he obtained a triumph, and soon after died, having established the character of one of the greatest men and most virtuous citizens of Rome. Although he had occupied many lucrative posts, he did not amass money sufficient to defray the expence of his funeral, which was paid by the public; and in honour of his memory, as in the case of Brutus, the matrons of Rome wore mourning for a year. His principles were transmitted to his family from one generation to another, so that the Valerii were assertors of the rights of the people. Livy. Dionysius Hal. Anc. Un. Hist. Gen. Biog.

VALERIUS, LUCAS, an eminent mathematician, acquired great celebrity at Rome as professor of geometry, and was honoured by Galileo with the appellation of the Archimedes of his time. He died in this city in 1618. He prosecuted the discovery of the centres of gravity of solids, and shewed how to determine them in all the conoids and spheroids, and their respective segments formed by planes parallel to the bases. The result of his investigation was published in 1604, in a work entitled "De Centro Gravitatis Solidorum." He also proposed a quadrature of the parabola different from that of Archimedes. His method was published in 1606, and annexed to the fore-mentioned treatise. Montucla.

VALES REALES, or *Royal Bonds*, in *Commerce*, are a kind of paper currency, which was first issued by the Spanish government in the year 1800, for the following sums:

600 dollars =	9035 reals 10 maravedis vellon.
300 ditto =	4517 ditto 22 ditto.
150 ditto =	2258 ditto 28 ditto.

These bonds are transferrable only by indorsement: they bear an interest of 4 per cent. per annum, and were made a legal tender for their full amount, with any interest that might be due upon them; but, from various causes, they have experienced a considerable depreciation. Kelly's Un. Cambist.

VALESINIANS, VALESIANI, in *Ecclesiastical History*, ancient sectaries, so called from one Valesius, a person unknown to Epiphanius, who, however, makes mention of this sect, Hær. 58. though he owns he knew but very little of them; only this, that they admitted none into their society but eunuchs; at last, if any were admitted before castration, they obliged them not to eat any meat till the operation was performed. For then, being no longer subject to the motions of the flesh, they allowed them to eat any kind of meats. Whiston says of them, that they sprung up about the year 240, and that they rejected the law and the prophets.

VALESIIUS, in *Biography*. See VALOIS.

VALESTRA, in *Geography*, a town of Italy, in the department of the Panaro; 12 miles S.W. of Modena.

VALET, or VALECT, a French term, anciently written *varlet*.

In France, valet is a common name for all domestic servants employed in the lower and more servile offices; including what we call *grooms, footmen, coachmen, bailiffs, &c.* But the word is not used among us in this sense, nor any otherwise than in the phrase *valet de chambre*; which is a servant, whose office is to dress and undress his master, to look to his bed-chamber, wait on him at table, &c. the same with what we otherwise call his *gentleman*.

In the History of Lewis XII. by Scifel, we always find *varlet de chambre du roi, varlet de la gard-robe, &c.* But *varlet*, like *knave*, and divers other words, is now degenerated into a term of reproach.

Valet, valec, vadelec, vadlet, and vallet, Camden observes, were anciently used at our court for a gentleman of the privy-chamber.

Selden, in his Titles, relates, that valets anciently signified young gentlemen, and heirs of great estate and quality; especially such as were to be knighted.

In the accounts of the Inner Temple, valet is used for a bench's clerk, or servant. The butlers of the house still call them *varlets*.

VALET, in the *Manege*, a stick armed at one end with a blunted point of iron, to prick and aid a leaping horse.

Formerly, a valet was called *aiguillon, i. e. goad*, and some of them had spur-rowels upon them, only the points beaten down; and when a horse was first begun round a pillar, without a rider, they used to prick his flanks with the valet, to make him know the spur, and obey it, without resisting. At present the valet is not used for that purpose, and the name of goad is suppressed, as being only proper for oxen.

VALETTA, or CITTA NUOVA, in *Geography*, a city of Malta, and capital of the island, which, in the year 1566, was built by the grand-master Frederic John de Valetta, on a hill, in form like a neck of land extending itself into the sea, and was called by his name. Its walls are of large square stones, dug out of the rock, and planted with several batteries. On the point towards the sea stands the castle of St. Elmo, a fortress which defends both the harbours; one of which, called Marfa Mascietto, lies at the entrance from the sea to the right of the town, and incloses a small island, on which stand both a fort and a lazaretto. The other harbour, on the left side, is simply called Marfa, or The Great Harbour, being the largest, safest, and most commodious in this island, and having some bays. Its entrance, besides the castle of St. Elmo, is guarded by Fort Ricafoli, which stands on the Punta del Orfa, to the left. The town of Valetta lies on its right, and on its left the towns Il Borgo, or Vittoriosa, and Senglea. In Valetta is a handsome palace, where the grand-master resides, and before it a spacious area for exercises. Each of the seven nations, or tongues of this order, has its peculiar hall. The principal church is dedicated to St. John the Baptist. The Jesuits had a college here; besides which are several convents and nunneries, a large hospital, and a building where Turkish slaves are kept. The number of the inhabitants is computed to be about 2000. See MALTA.

VALETTE, LA, a town of France, in the department of the Iere; 15 miles S.S.E. of Grenoble.—Also, a town of France, in the department of the Charente; 12 miles S. of Angoulême.—Also, a fort of France, in the department of the Var, near Toulon.

VALETUDINARY, VALETUDINARIUS, a term sometimes used, by the writers on medicine, for a person of a weak, sickly constitution, who is very frequently out of order, &c.

Dr. Cheyne, by all means, directs the weakly, the stu-

dious, the sedentary, and the valetudinary, to a low, spare regimen.

VALEUR *des Notes*, Fr.; *Value of Notes*, in *Music*. Besides the position of the notes on the staff, which fix the tone with respect to gravity and acuteness, they have all some peculiarity of figure, which marks their duration as to time, or comparative value as to length. In the ancient primitive time-table, in which all the notes are black or full, except the semibreve and minim, which are white and open, the shortest notes then in use are the longest now, and all that are open. The breve, indeed, equal to two semibreves, is still to be found in church-music of some antiquity, known by the titles *alla breve*, or *à capella*; but in all secular music, the semibreve is placed at the head of the other characters for time; and that note, divided into its aliquot parts, furnishes all the fractions in the most rapid compositions.

The dual measure, or common time, is governed by even numbers; as 2 minims, 4 crotchets, 8 quavers, 16 semiquavers, 32 demisemiquavers, all which only amount to a semibreve.

Triple time, or ternary measure, is governed by the number 3: as $\frac{3}{2}$, $\frac{3}{4}$, $\frac{3}{8}$, $\frac{3}{16}$. In these numbers, the upper figure tells how many notes there are in each bar, and the under, of what kind in the time-table; as $\frac{3}{2}$ implies 3 minims, $\frac{3}{4}$ three crotchets, $\frac{3}{8}$ three quavers.

One-third is added to the value of a note by a point or dot: as a semibreve equal to two minims, by a point is equal to three; a minim equal to two crotchets, the point makes equal to three, &c. See *Musical CHARACTERS, TIME, and Plate Time-table*.

It was to John de Muris, who flourished about the year 1330, that the characters for time in music were long ascribed; but on examining and collating MSS. in the several great libraries of Europe, it has been clearly proved that it was not John de Muris who invented these characters, as he himself owns in one of his tracts, but Magister Franco of Cologn, author of a treatise "De Musica Mensurabili," written in the eleventh century, long before De Muris was born; in which the form of the notes is given, and their relative value explained.

This very scarce treatise is preserved in the Bodleian library, 842, f. 49. See FRANCO and DE MURIS.

VALEY ISLAND, in *Geography*, a small island in the North sea, separated by a strait called Valey Sound, from the south-west coast of the island of Shetland. N. lat. 60° 15'. W. long. 1° 58'.

VALFROICOUR, a town of France, in the department of the Vosges; 6 miles S. of Mirecour.

VALGI. When the legs were deformed in such a manner that the feet were twisted outwards, the persons thus disfigured were termed *valgi*; while others, who were deformed by an inclination of their toes inwards, received the appellation of *vari*.

VALGOM, in *Geography*, a town of the island of Ceylon; 6 miles N. of Candy.

VALGORGE, a town of France, in the department of the Ardèche; 9 miles N.W. of Largentiere.

VALGRANA, a town of France, in the department of the Stura; 9 miles W. of Coni.

VALHERMOSA, a town of Portugal, in the province of Estramadura; 9 miles N.E. of Leyria.—Also, a town on the north-west of the island of Gomera.—Also, a town of Spain, in New Castile; 12 miles E.S.E. of Guadalajara.

VALI, in the mythological romances of the Hindoos, is a name given to a monkey, begotten by their god Indra,

on a damsel of the semi-celestial tribe, called Upfara. We may just notice, that this warlike monkey was killed by the great RAMA, the hero of the extraordinary poem Ramayana.

VALIAM, in *Geography*, a small Russian island, in lake Ladoga; 92 miles N. of Petersburg.

VALIANO, a town of Etruria; 10 miles S.S.W. of Cortona.

VALID, a term applied to acts, transactions, expeditions, &c. which are clothed in all the formalities requisite to their being put into execution, and to their being admitted to a court of justice.

A contract by a minor is not valid, or is *invalid*: a marriage is not valid, unless performed with the solemnities enjoined.

VALIERO, AGOSTINO, in *Biography*, a celebrated prelate of the church of Rome and a voluminous writer, was born of a noble family at Venice in 1531. Having studied both at Venice and Padua, with a view to the ecclesiastical profession, he graduated both in theology and canon law. In 1558, having previously been employed in several public offices, he became professor of moral philosophy at Venice, which post he occupied till the year 1565, when he was elected successor to his uncle as bishop of Verona, and he presided over that see for forty-one years. In 1583 he was created a cardinal by Gregory XIII. Through the whole of his life, which terminated at Rome in 1606, in the 75th year of his age, he distinguished himself as the patron and promoter of literature, as well as by his zeal, charity, and munificence. The catalogue of his writings includes one hundred and twenty-eight. Of those that were printed, many being in MS., the most important are, "De Acolytorum Disciplina;" "De Rhetorica Ecclesiastica;" "Episcopus, seu de Optimo Episcopi formâ;" "Cardinalis, five de Optima Cardinalis formâ;" "De rectâ philosophandi ratione;" "De Cautione adhibenda in edendis libris." That his sentiments were liberal for the time in which he lived, appears from his treatise designed to prove that comets are not presages of calamities, and from another against the barbarism of the scholastics. He also wrote on the order and connection of the sciences and arts, and a large work on the Venetian history. Moreri. Tiraboschi.

VALIGA, a name given by some medical writers to an infusion or tincture of jalap in spirit of wine, or spirit of citron, with the addition of a little saffron.

VALIMONT, in *Geography*, a town of France, in the department of the Moselle; 8 miles N.W. of Morhange.

VALINCOURT, JOHN-BAPTIST DU TROUSSET DE, in *Biography*, was born of a noble family at St. Quentin, in Picardy, in 1653, educated at the Jesuits' college in Paris, and distinguished himself as a man of letters. In 1685 he was appointed, by the count of Toulouse, admiral of France, his secretary-general, and afterwards secretary of the marine; but through life he cultivated polite literature, and became a member of the French Academy in the room of Racine, an honorary member of that of Sciences, and an associate of the Academy della Crusca. He succeeded Racine as joint-historiographer with Boileau; but his labours on the reign of Louis XIV. were consumed with his library in 1725, a loss which he bore with philosophical composure, observing to one of his condoling friends, "I should little have profited by my books, if I had not learned how to lose them." He was an active promoter of literature and a protector of learned men, who had always free access to his house; and his character was distinguished by probity, sincerity and good sense. He was held in such estimation, that Boileau dedicated to him his satire on True and False Honour. His time was so much occupied, that his writings are few; they

consist of a critique on the celebrated novel of "The Princess of Cleves;" "A Life of Francis Duke of Guise, surnamed Le Balafre;" "Critical Observations on the Œdipus of Sophocles," and a few poems. Such was his regard for religion, that towards the close of life, he held several conferences with ecclesiastics, for the purpose of terminating the divisions of the church with respect to the bull Unigenitus. He died at Paris, generally esteemed, in 1730, aged seventy-seven years. Moreri.

VALINSAY, in *Geography*, a town on the W. coast of the island of Luçon. N. lat. 16° 18'. E. long. 120° 6'.

VALIODA, a town of Hindoostan; 15 miles E.N.E. of Travancore.

VALJOVA, a town of European Turkey, in the province of Servia; 50 miles N. of Jenibasar.

VALIQUERVILLE, a town of France, in the department of the Lower Seine; 6 miles N.N.W. of Caudebec.

VALIZ. See BALIZE.

VALK, a town of Russia, in the government of Riga; 72 miles N.E. of Riga. N. lat. 57° 50'. E. long. 25° 44'.

VALKI, a town of Russia, in the government of Charkov; 16 miles S.W. of Charkov. N. lat. 49° 36'. E. long. 35° 44'.

VALKENBURG. See FAUQUEMONT.

VALKOVAR, or BARKOVAR, or *Valko*, a town of Slavonia, near the right bank of the Drave; 15 miles S.E. of Efzeck.

VALL, or VALE, in *Commerce*, a weight for gold and silver at Bombay and Surat. See TOLA.

VALL, in *Geography*, a town of Sweden, in Warmeland; 28 miles E.S.E. of Carlstadt.

VALLA, GIORGIO, in *Biography*, a native of Placentia, and professor of polite literature in the university of Pavia in 1471 and 1476, from which he removed to the chair of eloquence at Venice in 1486. As he was one morning preparing to go to his school, where he explained Cicero's Tusculan Questions, and held daily disputations on the immortality of the soul, he died suddenly at the close of the 15th century. He was the author of many works, which are for the most part collections and transcripts from ancient writers, and translations from Greek authors, useful in that age, but not distinguished by judgment or accuracy. Bayle.

VALLA, LORENZO, was probably a relation of the preceding Valla, and born at Rome, as it has been said, in the year 1415, but as Tiraboschi says, before the year 1406. He was educated in his native city, and continued there till his twenty-fourth year. Having visited Placentia to take possession of the inheritance bequeathed to him by his relations, he settled at Pavia as professor of eloquence in the university. Here he was chargeable with some instances of misconduct, so that he changed his abode several times, till he became attached to Alphonso, king of Naples, in which city he resided for some time; but in 1453, on the return of pope Eugenius to Rome, he settled in that city. Investigating the pretended donation of Constantine to the holy see, which he discredited, and reflecting on the characters of several popes, he incurred the displeasure of Eugenius, and found it necessary to withdraw first to Ostia, then to Naples, and finally to Barcelona. From hence he addressed an apology to the pope, and a defence of his writings on moral philosophy and dialectics, without any reference to Constantine's donation. He afterwards returned to Naples under the protection of Alphonso, and there opened a school of eloquence, to which many scholars resorted; but notwithstanding his popularity as a teacher, he was accused and brought into danger on account of the freedom with which

which he maintained his peculiar opinions. Of these, we may mention his rejection of the letter of Christ to Abgarus as a fiction, and his reproach of a celebrated preacher for asserting that each article in the apostles' creed was composed by one of them separately. For the latter of these offences he was brought before the Inquisition, and owed his escape to the interposition of Alphonso, after a private flagellation in the cloister of monks. At length he was invited to Rome by pope Nicholas V., who was distinguished by his patronage of literature; and in this metropolis he opened a school of eloquence, A.D. 1450. Here he entered into a dispute with George of Trebifond, secretary to the pope, on the respective merits of Cicero and Quinctilian, to the latter of whom he gave a decided preference. His next contest was with Poggio Braciolini, who attacked him in five invectives, to which Valla opposed as many antidotes, or dialogues, against Poggio. The manner in which this literary contest was prosecuted was disgraceful to both parties, and has been severely censured by Tiraboschi. Although Valla was much occupied with disputes of this kind, he pursued his studies, and by order of Nicholas V. undertook a version of the Greek of Thucydides into Latin, for which he received from the pope a recompence of 500 gold crowns, a canonry of St. John Lateran, and the place of apostolic scribe. For these favours on the part of the pope, Valla is charged with ingratitude. In the latter years of his life he visited king Alphonso at Naples, who exhorted him to translate Herodotus, but his death prevented his finishing the proposed version; however, for the part which he completed he was liberally rewarded. This translation was concluded by another person, and dedicated to Pius II. Valla's death occurred in August, 1457. The character of Valla is thus sketched by one of his biographers. He was "a man confident of his talents and acquirements, intolerant of other men's opinions, and free in his own, arrogant and contentious. His conduct was probably far from correct, though his enemies may have brought false or exaggerated charges against him. His philosophy was professedly Epicurean, placing the highest good in pleasure, which, however, he might explain in the least obnoxious sense. He was never married, but he confessed in one of his answers to Poggio, that he took a young woman to live with him, by whom he had three children, and whose fidelity to himself he extols, adding, that he hoped to procure for her a husband; but concubinage was at that time very common among the scholars attached to the court of Rome. In the capacity of a reviver of letters he has always held a high rank, which he merited by unwearied application, and an enlarged course of study, comprehending history, criticism, dialectics, moral philosophy, and theology. That in the latter his notions were liberal, may be conjectured from some of the circumstances above related, and also from his notes on the New Testament, in which he was one of the first to consider the sense as a critic rather than as a divine, whence he was led to make many corrections in the received translations. He is however said to have been but moderately versed in the Greek language, and Huet speaks very disparagingly of his versions of Thucydides, Herodotus, and Homer's Iliad. Of his numerous writings, his 'Elegantiae Latini Sermonis,' containing the grammar of that tongue, and rules for composing in it, has been the most generally esteemed, and still retains its reputation: his own style, however, was defective in point of purity and elegance. He has had many eulogists among the learned, and has been particularly praised by Erasmus, as one of those who have most contributed to the revival of sound learning." Tiraboschi. Gen. Biog.

VALLABREGUES, in *Geography*, a town of France,
VOL. XXXVI.

in the department of the Mouths of the Rhone; 3 miles N. of Tarascon.

VALLADOLID, a town of Spain, in the province of Leon, on a small river called Esquava, near the Pisuerga; the see of a bishop, and an university, founded in the year 1346. Several of the churches of Valladolid, those especially of the Dominicans and of San Benito, are elegant, agreeably to the Spanish taste, that is handsome, and full of altars richly gilt. Valladolid is not wholly without manufactures; some stuffs and coarse cloths are made there from the wool of the sheep which are kept in the neighbourhood. There are also gold and silver-smiths; and one street is entirely inhabited by jewellers: this is very lively, and full of business, as are all the others, which terminate in the great square. An academy of the belles lettres was established here in the year 1752. Here was a palace, in which Philip II. was born, now reduced to bare walls; 84 miles N.N.W. of Madrid. N. lat. $41^{\circ} 42'$. W. long. $4^{\circ} 47'$.

VALLADOLID, a town of South America, in the audience of Quito; 40 miles S. of Loja.—Also, a town of Mexico, in Yucatan. N. lat. $19^{\circ} 50'$. W. long. $80^{\circ} 30'$.

VALLADOLID, or *Comayagua*, a town of Mexico, in the province of Honduras; the see of a bishop, who takes the title of bishop of Honduras. N. lat. $14^{\circ} 30'$. W. long. $88^{\circ} 19'$.

VALLADOLID. See MENCHACAN.

VALLAGAM, a town of Hindoostan, in Golconda; 21 miles S. of Combamet.

VALLAIS. See VALAIS.

VALLANCE, a town of France, in the department of the Gers; 4 miles S. of Condom.

VALLAR, VALLARIS, formed from *vallum*, a stake with branches, of which they made the palisade of a camp, called *lorica*, in *Antiquity*, an epithet given to a kind of crown, which the Roman generals bestowed on him who, in attacking the enemy's camp, first broke in upon the line of palisades.

The *corona vallaris* was the same with what was otherwise called *corona castrensis*, from *castra*, a camp. Aulus Gellius assures us, that it was of gold, as the mural and naval crowns also were: yet, though they were made of that precious metal, they were not the most valued; for Pliny, lib. xxii. cap. 3. gives the preference to the *corona obsidionalis*, which was yet only of gramen, or grass. See CROWN.

VALLARIOS, in *Geography*, a town of Spain, in Aragon; 15 miles W. of Balbastro.

VALLARIS, in *Botany*, so called by Burmann, apparently from *vallo*, to inclose, because it serves, in Java and Amboyna, to make bowers and fences, whose shade is very grateful in a tropical climate.—Burm. Ind. 51. Brown Tr. of Wern. Soc. v. 1. 63.—Class and order, *Pentandria Monogynia*. Nat. Ord. *Contorta*, Linn. *Apocinea*, Juss. Brown.

Ess. Ch. Corolla salver-shaped; mouth and tube perivious, without scales; limb in five obtuse segments. Stamens prominent; filaments inserted into the throat, very short, with a fleshy tubercle externally, at the top; anthers arrow-shaped, adhering to the stigma. Germs of two cells; style thread-shaped; stigma conic-ovate. Scales at the base of the germs five, combined below, fringed at the points. Follicles

Obs. Mr. Brown remarks, that "this, the *Flos Pergularis* of Rumphius, was considered by Linnæus as the first species of his genus *Pergularia*." It does not, however, belong to the same order with the plant that afforded his generic

neric character, and to which the name has been since generally applied. See PERGULARIA.

1. *V. Pergulanus*. Sweet Bower-vine. Burm. Ind. 51. (*Flos pergulanus*; Rumph. Amboin. v. 6. book 7. 51. t. 29. f. 2. Carack nassi of the Malays. *Pergularia glabra*; Linn. Mant. 53. Willd. Sp. Pl. v. 1. 1247.)—This, the only known species, is a native of Java and Amboyna, used for bowers and treillis-work, as it makes a very thick shade. The Malay women are fond of adorning their hair with its fragrant flowers. The stem is perennial, shrubby and twining. Leaves opposite, stalked, ovate, acute, entire, thick and shining, five inches long, two and a half or three wide, with strong pale veins. When the leaves or twigs are wounded, they discharge a thick, viscid, yellow milk. Flower-stalks from between the footstalks, forked, corymbose. Flowers white, and highly fragrant, compared by Rumphius to those of Jasmine, (probably *Jasminum Sambac*,) but having a shorter tube, with five shining bodies in the middle. He speaks of the scent of these flowers as too strong for Europeans, though highly esteemed by the natives of the country where they grow.

VALLE, PIETRO DELLA, in *Biography*, a Roman patrician, who, in the year 1614, commenced his travels into Egypt, Turkey, Persia, and India. At Bagdat he fell in love with a young female of the Maronite sect of Christians, and married her. She accompanied him in his journey, and on his return towards Italy, she died near the Persian gulf. The loss so much affected him, that he had her remains embalmed, and carried them with him during his subsequent travels, and on his return to Rome, they were magnificently interred in the church of Ara Cœli; and he himself pronounced her funeral eulogy, which was printed. The account of his travels, written by himself in Italian, and contained in fifty-four letters, was published at Rome in 1650. They have been often cited as authority, though not destitute of marks of credulity, and still bear a respectable rank among books of travels. The style is pure and elegant, though the narration is prolix. Doni has spoken of him in terms of high commendation, and represents him as well acquainted with the Oriental languages, and with music. He wrote on other subjects besides his travels, and was a member of the Academy degli Umoristi. His second wife was a Georgian, attached to his first wife, and the companion of his travels. Moreri.

For the opinion of this agreeable writer concerning the music of his own times, we refer to the article OPERA, inserting here his account of the manner in which the first opera, or musical drama, was exhibited at Rome, which is extremely amusing and curious. "Though no more than five voices, or five instruments, were employed, the exact number which an ambulant cart could contain, yet these afforded great variety: as, besides the dialogue of single voices, sometimes two, or three, and, at last, all the five sung together, which had an admirable effect. The music of this piece, as may be seen in the copies of it that were afterwards printed, though dramatic, was not all in simple recitative, which would have been tiresome, but ornamented with beautiful passages, and movements in measure, without deviating however from the true theatrical style; on which account it pleased extremely, as was manifest from the prodigious concourse of people it drew after it, who, so far from being tired, heard it performed five or six several times; there were some even who continued to follow our cart to ten or twelve different places where it stopt, and who never quitted us as long as we remained in the street, which was from four o'clock in the evening till after midnight."

This narration seems to furnish a curious circumstance to

the history of the stage, which is, that the first opera, or musical drama, performed in modern Rome, like the first tragedy in ancient Greece, was exhibited in a cart. It has been imagined by many of the learned, that the recitative in modern operas is a revival of that species of *melos* in which ancient dramas were sung; and here the *moveable stage* on which it was performed, like that used by Theſpis at Athens, furnishes another resemblance.

"————— Plautus vexiffe,
Poemata Theſpis." Hor.

Della Valle, after having proved that the singing of his time was better, and the compositions more varied, more rational, and amical to poetry, than the more ancient, proceeds to speak of instrumental music; and after discriminating the different kinds of playing on an instrument, in a solo, in a full piece, in accompanying a voice, or leading a band; he says, he must agree with his friend, that solo playing, however exquisite and refined, at length tires; and that it had frequently happened to organists of the highest class, when lost and immersed in carrying on a happy subject of voluntary, to be silenced by a bell; which never happened to singers, who, when they leave off, displease the congregation or audience, to whom their performance seems always too short.

After discussing instrumental music, he comes to *singing*, and this he considers in solo songs, and in music of many parts. His friend, among the *soprani*, or treble voices, of his youth, had greatly praised the *falsetti* who used to sing in the pope's chapel, and elsewhere; and Della Valle says he remembered one of them, Gio. Luca Falsetto, who had great execution, and went up to the clouds; and mentions Orazio, a very good singer, either in a falset or tenor; Ottavuccio and Verovio, famous tenors, who all three sung in his cart. "However, these," he adds, "trills, graces, and a good *portamento*, or direction of voice, excepted, were extremely deficient in the other requisites of good singing; such as *piano* and *forte*, swelling and diminishing the voice by minute degrees, expression, assisting the poet in fortifying the sense and passion of the words, rendering the tone of voice cheerful, pathetic, tender, bold, or gentle at pleasure: these, with other embellishments in which singers of the present times excel, were never talked of even at Rome, till Emilio del Cavaliere, in his old age, gave a good specimen of them from the Florentine school, in his oratorio, at the Chiesa Nuova, at which I was myself, when very young, present."

What follows is extremely curious and satisfactory concerning a delicate point of musical history, which is, the first establishment of *evirati* in the pope's chapel, and the use of them in early operas.

It is astonishing how much sooner Della Valle got rid of the pedantry of the then old school, than any of his contemporaries. He manifests as much good taste in his reflections on imitative and dramatic music, as any writer of the last century.

Della Valle's biographers seem to have known nothing of the correspondence with Guidiccioni, or of his skill and good taste in music. This agreeable and intelligent traveller died in 1652, aged 66.

VALLE, in *Geography*, a town of Norway, in the province of Christianland; 16 miles S.W. of Christianland.—Also, a town of Norway, in the province of Christianland; 44 miles N. of Christianland.—Also, a town of Istria, and chief place of a district; 8 miles N. of Pola. N. lat. 45° 9'. E. long. 13° 57'.—Also, a town of Italy, in the department of the Adda and Oglio; 8 miles N.N.E. of

of Breno.—Alfo, a town of Italy, in the department of the Gogna; 5 miles W. of Lumello. N. lat. 45° 8'. E. long. 8° 40'.

VALLE *Calanochica*, a town of South America, in the province of Tucuman; 40 miles N.E. of St. Louis.

VALLE *Ruffica*, a town of the island of Corfica, in the diftrict of La Porta.

VALLE *di Spagna*, a town on the eaft coast of the ifland of Cephalonia.

VALLEA, in *Botany*, owes its name to Mutis, who fent the plant to Linnæus. In the *Supplementum* it is faid to commemorate a perfon named Valle, "praifed by Allioni." No one having vouchsafed to indicate where this praife is beftowed, and De Theis having transferred the honour of the prefent genus, with true French patriotifm, to one of his own countrymen, Robert Valle, of Rouen, who publifhed, in 1500, fome Commentaries upon Pliny, we have thought it neceffary to inquire into the matter; efppecially as the genus is well worth claiming. In a note to *Allioni's Rariorum Pedemontii Stirpium, Specimen primum*, page 23, the mystery is unravelled, by a narrative, of which the following is the fubftance. Dr. Valle, a phyfician of Turin, a botanift of no common merit, after having attentively investigated the plants around that city, and thofe of the neighbouring alps, was led by an ardent love of botany, and other branches of natural hiftory, to procure, in 1747, the appointment of phyfician to the army in Corfica, in order to examine the productions of that country. There he made ample collections of plants, feeds, fhells, infefts, and other things worthy of notice. But being more anxious to acquire knowledge than to take care of himfelf, the heat of the climate threw him into a violent fever, which carried him off in three days. His dried Corfican plants, falling into the barbarous hands of ignorant people, were all deftroyed. Whatever his friend Allioni could meet with, by the affiftance of the family, he purchafed; and thus became poffeffed of numerous fpecimens, gathered by Dr. Valle about Savona, as well as in various parts of the alps, of which he had drawn up a defcription, after Tournefort's fyftem; but this was completed no further than the firft four claffes.—The name of Valle therefore deferves to be embalmed with thofe of Bartfch, Borone, Lippi, and other premature martyrs to botany, who have juftly been thought worthy of fuch an unfading memorial.—Linn. Suppl. 42. Schreb. Gen. 363. Willd. Sp. Pl. v. 2. 1212. Juff. 434. Poiret in Lam. Dict. v. 8. 318.—Clafs and order, *Polyandria Monogynia*. Nat. Ord. *Tiliaceæ*, Juff.?

Gen. Ch. *Cal.* Perianth inferior, of one leaf, in four or five deep, ovate, ftriated, coloured, deciduous fegments. *Cor.* Petals four or five, obovate, three-cleft, rather larger than the calyx. Nectary a flattifh, undulated, fhining, coloured border, under the germen. *Stam.* Filaments numerous, 30—40, awl-shaped, flattifh, coloured, incurved, fhorter than the calyx, inferted into the receptacle, beneath the nectary; anthers linear, erect, with two pores at the fummit. *Pift.* Germen fuperior, ovate; ftyle nearly cylindrical, as long as the calyx; ftigma four or five fender divifions. *Peric.* Capsule with four or five angles and as many valves, each valve appropriated to two cells. *Seeds* feveral.

Eff. Ch. Calyx in four or five deep fegments, inferior. Petals four or five, three-cleft. Stigmas four or five. Capsule with four or five valves, twice as many cells, and feveral feeds.

1. *V. ftipularis*. Linn. Suppl. 266. Willd. n. 1.—Native of the colder parts of New Granada. A tree, twelve feet high, with round, ftriated, leafy, hairy branches. *Leaves* alternate, on hairy ftalks an inch long, fpreading, fimple,

heart-shaped, acute, entire, two or three inches long and half as broad, fingle-ribbed, beautifully reticulated with innumerable veins; fmoother and fhining above; paler, clothed with fhaggy tawny hairs, efppecially about the rib and larger veins, beneath. *Stipulas* rather large, leafy, kidney-shaped, entire, ftalked, in pairs at the bafe of each footftalk, and clafping the ftem above it. *Flowers* blood-red, near an inch in diameter, in forked, cymofe, hairy, axillary, and terminal *panicles*, fhorter than the leaves.—Linnæus cites Mutis, Amer. v. 7. t. 10, by which botanifts have been led to underftand, that Mutis had publifhed an important work on American plants, extending to feven volumes, at leaft. But in fact no fuch work exifts. The reference is, in every point, erroneous, and alludes merely to a collection of thirty-two Indian-ink drawings of Mexican plants, fent by that learned Spaniard, with numerous dried fpecimens, to Linnæus. (See MUTIS.) From his drawing of the *Vallea*, compared with the fpecimen, we have, as our readers may obferve, ventured to correct fome part of the generic characters. By that drawing the *feed-velfel* appears to have four valves, (fometimes, it feems, varying to five,) each of which has inflexed edges, befides a central partition; and thefe, all meeting at a central column, may eafily be conceived to form a *capsule* of eight or ten cells, explaining the ftrange expreffion in the *Supplementum*, of "*loculis bilocularibus*." Several circumftances indicate the affinity we have hinted above, of this genus, to Juffieu's *TILIACÆ*; fee that article.

VALLEFREDA, in *Geography*, a town of Naples, in Lavora; 8 miles N.W. of Sezza.

VALLELONGA, a town of Italy, in Calabria Ultra; 18 miles E.N.E. of Nicotera.

VALLENÇAY, a town of France, in the department of the Indre; 21 miles N. of Châteauroux. N. lat. 47° 10'. E. long. 1° 38'.

VALLENGEN, or VALLANGEN. See VALENGIN.

VALLERAUQUE, a town of France, in the department of the Gard; 6 miles N. of Le Vigan.

VALLERS, a town of France, in the department of the Indre and Loire; 12 miles W.S.W. of Tours.

VALLESIA, in *Botany*, thus named in the *Flora Peruviana*, after Dr. Francis Valles, phyfician to Philip II. of Spain, and author of a work, amongft others, on the plants of the holy fcriptures; free from herefy, no doubt, if not from error.—"Fl. Peruv. v. 2. 26. t. 151. f. B." Poiret in Lamarck Dict. v. 8. 319.—Clafs and order, *Pentandria Monogynia*. Nat. Ord. *Contortæ*, Linn. *Apocineæ*, Juff.

Gen. Ch. *Cal.* Perianth inferior, fmall, of one leaf, in five acute fegments. *Cor.* of one petal, funnel-shaped; tube much longer than the calyx, fwelling upwards; limb flat, in five ovate, equal, fpreading fegments. *Stam.* Filaments five, very fhort, inferted into the upper part of the tube; anthers arrow-shaped, in the mouth of the corolla. *Pift.* Germen fuperior, oval, cloven; ftyle thread-shaped, as long as the tube of the corolla; ftigma obtufe. *Peric.* Drupas two, oval, obtufe, divaricated, of one cell. *Seed.* Nut folitary, oval, woody, fibrous, ftriated, with a folitary kernel.

Eff. Ch. Drupas two. Nuts folitary, fibrous. Corolla funnel-shaped. Anthers fimple, arrow-shaped.

1. *V. dichotoma*. Forked *Vallesia*. Fl. Peruv. as above. Poir. n. 1. ("V. cymbæfolia; Orteg. Dec. 5. 58." *Rauwolfia glabra*; Cavan. Ic. v. 3. 50. t. 297. Willd. Sp. Pl. v. 1. 1218. Lamarck Dict. v. 6. 83. See *RAUWOLFIA*, n. 2.)—Native of Peru and New Spain. A *fkrub* eight or ten feet high, with fmoother, flexible, round, alternate *branches*. *Leaves* alternate, on fhort ftalks, ovato-lanceolate,

lanceolate, acute, entire, smooth, shining, single-ribbed, two or three inches long and one broad. *Panicles* or *cymes* small, forked, opposite to the leaves. *Flowers* small, white. *Fruit* whitish. *Poirer, after the Fl. Peruv.*

VALLET, in *Geography*, a town of France, in the department of the Lower Loire; 12 miles E. of Nantes.

VALLEY, in *Natural History* and *Geology*, is a tract of ground bordered by hills or mountains on two opposite sides, between which it extends in a straight or waving line. If the valley be short, and the length is not much greater than the breadth, it is called an opening, or pass, through a mountain or chain of mountains.

Large valleys have generally a number of small valleys joining them, like branches to a main trunk. - In almost every valley there is either a lake or a river, and the magnitude of the river bears some proportion to the valley. The lower end of a valley, where the river empties itself into a larger river or lake, or into the sea, is generally much broader than its upper or higher end. Some valleys are nearly closed in at each end, forming elliptical hollows in mountainous districts. Such valleys have once been lakes, but the water having worn itself a passage at the lower end, has reduced the lake to a small stream in the middle, or the lakes have been filled up by the debris from the adjoining mountains.

Sauflure divides valleys into two orders, which he calls *longitudinal* valleys and *transversal* valleys. Grand mountain chains are commonly formed of many ranges of mountains running parallel to the highest or central range, each range diminishing in height as its distance from the central range increases. It is between these parallel ranges that longitudinal valleys are situated. Sauflure cites the valley of the Rhone as a striking example of this kind of valley.

Transversal valleys are those openings which communicate between the longitudinal valleys, either at right angles with them, or obliquely. It is observed by Patrin, that the transversal valleys which cut through the central range of mountains, are sometimes nearly horizontal, at least for a short distance; but those which cut the collateral chains have always a more or less rapid descent; and as they are frequently excavations formed by water-courses, they sometimes present corresponding salient and retiring sides, like the valleys in secondary mountains; but it is evident that this effect is accidental.

One of the essential characters of longitudinal valleys is, that their direction is parallel with the *line of bearing*, or range of the beds of which the mountains are composed. Transversal valleys cut through the beds in the direction of their line of dip or inclination. See *Plate II. Geology, fig. 2.* in which the side of the mountain fronting a represents the beds of a mountain in their line of bearing; and a spectator placed at the station *a*, may be supposed to be placed in a longitudinal valley, in which the edges of each bed in the opposite mountain would appear to range horizontally. The same appearance would present itself to the spectator placed at *B*, *fig. 5.* A transversal valley cutting through the beds at right angles to the former, would shew the true dip or inclination of each bed to a spectator placed at *b*, in the former *fig. 2.* The side *E* of the mountain represents the direction of a longitudinal valley, the side *G*, the direction of a transversal valley.

The Alps present many longitudinal valleys. The valleys in the Pyrenees are transversal. This difference has been supposed to arise from the central parts of the Pyrenees ascending more precipitously above the lower beds; hence the waters, falling with great impetuosity, have cut

passages through the lower beds in direct lines, and taken the shortest course to the plains below.

In the Alps, the currents, being less violent, have followed the course of the longitudinal valleys, which had been traced out by nature in the original formation of those mountains.

Some mountain groups are disposed in forms nearly circular, so as to include great tracts of flat country, as is the case with Swabia, Hungary, Transylvania, &c. These circular basins or valleys have formed lakes, when the relative level of the ocean was much higher than at present; and on inspecting the best maps, where the inequalities of the surface are delineated, we may be led to suspect that a considerable part of Europe has once been covered by these lakes, the present mountain chains forming the boundaries.

The Rhone and the Rhine pass through several smaller circular valleys in their course; and the river Don, in Aberdeenshire, has its course through valleys of this kind. At the mouth of the Don, the rocks confine it to a narrow channel, and give to it an aspect which would convey the idea of its flowing through a mountainous and rugged country, where no space was left for forming even a commodious road along its banks; but on ascending it for about one mile, the hills recede on each side so as to form a spacious vale, through which the river flows in a flow majestic course for many miles. Nor is the prospect here uniform, but agreeably diversified, the hills above Iverury approaching again close to the river, through which it seems to have forced its way with difficulty; then all at once it opens into another spacious vale, from which the hills recede on either hand to a great distance; then it closes again; and after another temporary confinement among rocks, hills, and woods, its waters once more open into another plain of great extent. Such is the general character of this river.

The Danube, whose history has been so well illustrated by the count de Marfigli, has its source in the mountains of Swabia, from whence it passes through Swabia, Bavaria, Austria, Hungary, and Walachia, into the Black sea. Swabia is a great circular valley, from which the Danube escapes by a narrow opening into Bavaria: during its progress through Bavaria, it passes through several circular valleys into Lower Austria, which is also a circular valley. It flows through Austria, and at Presburg, where the valley is nearly shut up, it forces its way through rocks and hills into Hungary, which is one of the most extensive circular valleys in Europe. At the lower extremity of Hungary, the river is again forced to seek its way through a narrow rocky channel to Orfova, which is the only opening between Hungary and Walachia. It now continues its course through Walachia, and at length falls into the Black sea. We have a continuation of this chain of valleys, although still filled with water, in the Black sea, the sea of Marmora, and the Mediterranean.

The valley of Cashmere presents one of the most striking examples of a circular basin or valley, containing a small lake, which has probably once filled a considerable part of the great cavity formed by the surrounding mountains. "This happy valley," says Mr. Pennant, "this Hindoostan paradise of the Indian poets, is of an oval form, about eighty miles long, and forty broad, and is supposed to have been once entirely filled with water, which having burst its mound, left the vale nourished to the most distant ages by the fertilizing mud of the river, which fed its expanse. This delicious spot is surrounded by mountains of vast height and rude aspect, covered with snow, and enclafed in glaciers, in which this enchanting jewel is firmly set."

The formation of valleys has been by some philosophers ascribed

ascribed almost exclusively to the action of running water. That many of the present valleys have been so formed, is rendered probable by various existing phenomena, but other causes must also have operated. Among these we may enumerate the original inequalities of the surface; these were indeed necessary to make the waters flow in a particular course. The sudden elevation of parts of the earth's surface, and the subsidence of other parts, are also proved by the fractures and dislocations of the strata which mountainous districts almost every where present. There are likewise evident marks that the ocean has been thrown suddenly, and with great violence, over our present continents, tearing away and transporting to distant countries various parts of the surface, scooping out hollows in the softer strata, breaking down the boundaries of immense lakes, and thus changing the course of rivers, and opening new valleys where none before existed. Great and sudden risings of the sea have been known to take place in our times, by the agency of subterranean fire operating on a small extent of the globe; and we have only to conceive the same agent operating more powerfully, to explain the changes which may have taken place from the ocean suddenly rising and sweeping over a large portion of the globe. See *SYSTEM of Geology*.

The theory of the formation of valleys by the action of rivers has been supported by Dr. Hutton and professor Playfair. "Every river (says the latter) appears to consist of a main trunk, fed by a variety of branches, each running in a valley proportioned to its size, and all of them together forming a system of valleys communicating with one another, and having such a nice adjustment of the declivities, that none of them join the principal valley either in too high or too low a level, a circumstance which would be infinitely improbable, if each of these valleys was not the work of the stream that flows through it. When the usual form of a river is considered, the trunk divided into many branches, and these again subdivided into an infinity of smaller ramifications, it becomes strongly impressed upon the mind, that all these channels have been cut by the waters themselves, and that they have been slowly dug out by the washing and erosion of the land." This is an accurate description of the structure of many valleys, but there are others in which the smaller valleys do not join the larger at the same level, but terminate abruptly, and the rivers which flow through them fall in cascades to the lower valleys. The valley of Wattenlugh, in Cumberland, is a striking instance of this kind. The lower extremity joins the vale of Keswick, in which the lake of that name is situated, but it does not enter it at the same level, but terminates in a precipice between two cliffs, down which the water is thrown, forming the cataract of Lowdere, which empties itself into the lake.

Where the corresponding strata on each side of a valley have nearly the same elevation as is represented in *Plate III. Geology, fig. 4*, it is obvious that the excavation between the opposite hills has been formed by water which has once flowed at a much higher level than at present. Also, where the strata on the opposite sides of a valley have the same angle of inclination with the horizon, (see *Plate II. Geology, fig. 5*.) we may infer that it has been excavated by water: but where the strata on the sides of a valley dip in an opposite direction, or have a much greater dip on one side than on the other, the original formation of the valley may be attributed to the elevation or subsidence of the strata, forming a fissure through which the water has run, and in the course of ages has worn down and enlarged the passage. Some circular valleys and lakes

may have originated in the subsidence of the surface, forming a large cavity, the sides of which are gradually worn down in many parts into gentle slopes. An accurate examination of the true line of dip of the beds, can alone discover to which of these causes the formation of any particular valley can be ascribed; and it is frequently more difficult to ascertain the true angle of inclination than is generally supposed, and still more difficult to determine whether a slight variation in the angle is occasioned by a fracture, or by an original inequality or waving of a stratum.

That lakes are passing to the state of valleys, and that many of the present valleys have been lakes, is obvious to the most common observer who will attend to the appearances which they present. A lake, says professor Playfair, is but a temporary and accidental condition of a river, which is every day approaching its termination; and the truth of this is attested not only by the lakes that have existed, but by those which continue to exist. Where any considerable stream enters a lake, a flat meadow is usually observed increasing from year to year: the soil of this meadow is disposed in horizontal strata; the meadow is terminated by a marsh, which marsh is acquiring solidity, and is soon to be converted into a meadow, as the meadow will be into an arable field. All this while the sediment of the river makes its way slowly into the lake, forming a mound or bank under the surface of the water, with a pretty rapid slope towards the lake. This mound increases by the addition of new earth, mud, and gravel, poured in over the slope, and thus the progress of filling up gradually advances. By an accumulation of vegetable matter in shallow lakes, marshes and peat bogs have been formed at the bottom of valleys where the waters have not flowed with sufficient rapidity to drain away the moisture. These are common in various parts of the Highlands, and in Ireland. The filling up of lakes, and the enlargement of valleys, by the process above described, may be distinctly seen in the vicinity of the lakes of Cumberland and Westmoreland. Larger lakes exemplify the same process. Where the Rhone enters the lake of Geneva, the beach has been observed to receive an annual increase; and the Portus Valaisie, now Prevallais, which is at present half a league from the lake, was formerly close upon its bank. Indeed the sediments of the Rhone appear clearly to have formed the valley through which it runs, to the distance of about three leagues from the place where the river now discharges itself into the lake. The ground there is perfectly horizontal, composed of sand and mud, little raised above the level of the river, and full of marshes. The deposition made by the Rhone, after it enters the lake, is visible to the eye, and may be seen falling down in clouds to the bottom.

Where lakes are situated at a considerable elevation above the sea, or the adjacent country, they may be emptied by the wearing down of the strait which forms the outlet. Many of the North American lakes are connected by small straits or rivers, which have a rapid descent. On some of them are prodigious water-falls, which are constantly enlarging the passage from one to the other, and will ultimately drain the upper lakes. The falls of Niagara are observed to be progressively shortening their distance from the upper lake, since the banks have been inhabited by Europeans; and when it has completed its progress, the upper lake will become an extensive valley, surrounded by rising grounds, and watered by a river or smaller lake, which will occupy the lowest situation.

Valleys constitute the most fertile and habitable parts of almost

almost every country. Their superior fertility is derived from a constant supply of fresh soil, and from natural irrigation, and a more equal temperature; the vegetation being sheltered and protected from the boisterous winds that sweep over extensive plains, and the more elevated parts of the globe. It has been observed, however, that low valleys are not so favourable to the longevity of the human race as dry and mountainous districts.

VALLEY of Heroes, in *Geography*, a name given to the delightful plains of Oujan, which are said to produce the finest pasture in Persia. It is so called by the natives, from having been formerly the favourite hunting park of the kings and heroes of Iran, and particularly of Bahram Gour, who had seven palaces of different colours in the neighbourhood. This prince, passionately devoted to the chase, took his surname of Gour from the gour khur, or wild ass, with which this valley abounds. In one of the roads from Persepolis to Ispahan there is a pass or defile, called Iman Zada Ishmael, two furlongs in length, and commencing at the 38th mile from Persepolis, which leads into the above-mentioned plains.

VALLEYS, in *Building*, denote the gutters over the sleepers in the roof of a building.

VALLI, in *Ancient Geography*, a people of Asia, upon the Gordian mountains, near the Caucasian gates, which were in these mountains, according to Pliny.

VALLI, in *Botany*, Juss. Gen. 267. Rheede Hort. Malab. v. 7. t. 6—11, the name of several East Indian climbing shrubs, which Jussieu considers as belonging to the genus *VITIS*, hereafter to be described in its proper place. *Kareta-Valli* of the same volume, t. 45, is referred by him to the neighbouring genus *Cissus*.

VALLI, in *Geography*, a town of Naples, in Lavora; 12 miles E.S.E. of Capua.

VALLIERE, a town of France, in the department of the Creuse; 6 miles S.W. of Aubusson.

VALLIES, FOUR, *District of*, otherwise called *The District of Pignerol*, a province of Piedmont, bounded on the north by the marquisate of Suza, on the west by France, on the south by the marquisate of Saluzzo, and on the east by Carmagnola. The four vallies are those of Peroufa, Lucerna, St. Martin, and Angrogna. The province is about 24 miles long, and from eight to eleven broad. The principal towns are Pinerolo, Lucerna, Peroufa, St. Martin, and Fenestrelle. These vallies are watered by the Cluson, and several other smaller rivers; they are all surrounded with mountains and sharp rocks, in which are found white hares, foxes, pheasants, partridges, wolves, and bears; and in the most lofty of the neighbouring alps is found the marmotte, a creature something larger than a rabbit, but more of the nature of the badger; the chamois; and the bouquetin, an animal something like a goat or chamois, but more fleet than either. Among the tame animals is the jumart, produced by a bull and a mare, or a bull and a sheaf. The vallies are fertile in pasturage, and the mountains in fruit, particularly chestnuts. These vallies are celebrated for the cruel persecution of the inhabitants, who were called Waldenses, on account of their religion, about the year 1655. But now they enjoy in peace the worship they embraced, though they have a Catholic church in each parish. The number of inhabitants is reckoned at about 8000, of whom 7000 are supposed to be Protestants.

VALLIS, in *Ancient Geography*, a town of Africa Propria, upon the route from Carthage to Cirta, between Sicilibras and Coreva, according to Antonine's Itinerary.

VALLIS Achor, *Valley of Achor*, a valley of Palestine, north of Jericho.

VALLIS Ajalon, *Valley of Ajalon*, a valley of Palestine, in the tribe of Dan, between Thammath and Bethshemesh.

VALLIS Artificum, *Valley of Craftsmen*, a valley of Palestine, in the tribe of Benjamin, near Jordan.

VALLIS Arundinis, *Valley of Reeds*, a valley of Palestine, near the Dead sea.

VALLIS Benedictionis, *Valley of Blessing*, a valley of Palestine, in the tribe of Judah, west of the Dead sea.

VALLIS Cariniana, a place of Pannonia, on the route from Sopiane to Acincum, between Pons Sociorum and Corfium or Gorgium. Anton. Itin.

VALLIS Cadaverum, *Valley of Tophet*, the slaughter-house of Jerusalem. It lay south of the city, in the valley of the children of Hinnom. It is said, that a fire was constantly kept here for burning the carcases, and other filth, that were brought hither from the city. (Isaiah, xxx. 33.) Others think, that the name of Tophet is given to the valley of Hinnom, on account of the sacrifices offered there to the god Moloch, by beat of drum, to drown the cries of the consuming children; a drum in Hebrew being called *toph*.

VALLIS Domitiana, a place of Lower Mœsia, upon the route from Atrabium to Nicomedia.

VALLIS Gibonis, *Valley of Gibon*, a valley of Palestine, west of Jerusalem, so named from the fountain of Gibon, whose spring is in this place, and runs from west to south.

VALLIS Emona, a town of Judea, in the tribe of Benjamin.

VALLIS Jezreel, a valley of Palestine, having the chain of mount Hermon to the north-east.

VALLIS Illustris, the *Illustrious Valley*, a valley of Palestine, near Sichem. This was the vale or plain of Moreh.

VALLIS Montium, the *Valley of Mountains*, a name given by the prophet Zechariah to the valleys round about Jerusalem, where the inhabitants of that city took shelter, when the city was besieged by the Romans.

VALLIS Rephaim, or *Valley of the Giants*, called in Greek the Valley of the Titans, and in the Vulgate, the Valley of the Giants (2 Sam. xxiii. 13.), lay near Jerusalem, and belonged either to the tribe of Judah or that of Benjamin.

VALLIS Salinarum, the *Valley of Salt* or *Salt-pits*, generally placed in the southern part of Idumæa, S. of the Dead sea, but situated, according to Calmet, in the eastern part of Idumæa, between Tadmor and Bozrah.

VALLIS Sylvestris, the *Vale of Woods*, a valley of Palestine, in which were situated the cities of Sodom and Gomorrah, and where the lake Asphaltites, or the Dead sea, was formed. This was called the vale of Siddim.

VALLIS Tabernaculorum, the *Valley of Succoth*, or *Vale of Tents*, lay beyond Jordan, near the city of Succoth. The psalmist puts the valley of Succoth for the whole country beyond Jordan.

VALLIS Terebinthi, called the Valley of Elah (1 Sam. xvii. 2.) or of the Oak, lay S. of Jerusalem, towards Sochoh and Azekah. The valley of the Terebinthus is also a name given to the valley of Mamre, on account of the terebinthus under which Abraham entertained the angels.

VALLISNERI, ANTHONY, in *Biography*, a celebrated Italian naturalist, was born of a good family, May 3d, 1661, at the castle of Tresilico, of which his father was governor for the duke of Modena. He was first instructed in the rudiments of the learned languages by the Jesuits, at Modena, and was afterwards taught rhetoric, and the Aristotelian philosophy, under the same auspices, at Reggio, where he defended his thesis on that subject in 1682. Nevertheless he began, even at this period, to be dissatisfied with the prevailing system, which he called a philosophy of words; and happening to have a more liberal and enlightened preceptor

preceptor than usual, his attention was directed to natural and experimental philosophy, and the then prevalent hypotheses of Des Cartes. His tutor Biagi, a Jesuit, had the good sense and honesty to avow, that the philosophy of Aristotle might suit theologians and monks, but that he himself knew many able and distinguished men, at Bologna, and elsewhere, who, so far from being indebted to that great person, never thought of his doctrines but to refute them. Vallisneri therefore removed to Bologna in 1683, and very soon gave up theories and hypotheses for the observation of nature. Here the great Malpighi, to whose particular favour he was recommended by the princes of the house of Este, directed his anatomical enquiries, and from him he received, at his first introduction, a valuable lesson on the presumption of those physicians, who boast of a specific for every disease. The learned and experienced Malpighi, confined to his bed by illness, declared that he was unable to cure his own disorder. A candid confession, which then astonished his hearer; but of the truth of which Vallisneri declared himself subsequently more and more convinced by his own practice of physic, when he found the most boasted specifics daily deceiving his expectations.

The father of the young Vallisneri, himself a doctor of laws, offered his son a choice between law and physic; but his earliest inclinations and inquiries were too much allied to the latter profession to allow of hesitation. An anatomist of animals from his youth, he devoted himself so assiduously to dissections, in the instructive and flourishing school of Bologna, that his health became a sacrifice to his curiosity, and Malpighi was obliged to check the dangerous ardour of his promising pupil. Vallisneri would doubtless have graduated in this famous university, then in its meridian glory; but at the time when this should have taken place, the duke of Modena put forth an edict, prohibiting his subjects from taking degrees, except at Modena or Reggio. Vallisneri chose the latter, and took his doctor's degree in 1684; but in order to study with advantage the necessary sciences of chemistry and botany, as well as to improve himself in practical surgery and physic in the hospitals, he was obliged to return to Bologna; as our doctors of Cambridge or Oxford find it expedient to accomplish themselves in London and Edinburgh. He spent about three years more under the auspices of Malpighi, who at length dismissed this favourite pupil with the sound advice of studying nature, and communicating matters of fact. "Systems," said he, "are ideal and mutable. Observation and experience are solid and unchangeable."

The years 1687 and 1688 were usefully passed at Padua, Venice and Parma, and at length Vallisneri settled as a physician at Reggio. Here he planted a botanic garden, and employed his leisure hours in excursions among the neighbouring mountains; to collect herbs, minerals and petrifications; to observe the strata of the rocks, and the origin or nature of the various fountains; as well as to take the pleasures of the chase, of which he was very fond. The first particular object of investigation to which this ingenious philosopher devoted his attention, was the anatomy of the Silk-worm, by which he was led to the study of the metamorphoses and generation of other insects. Malpighi and Redi were his guides; but he soon found, in the intricacies to this new and recondite course of enquiry, that he was able to extend their information, and correct some of their remarks. He gave his discoveries to the world in the form of two Dialogues in Italian, supposed to take place between Pliny and Malpighi, on the arrival of the latter in another world. These brought great reputation to their author, both for the value of their contents, and the ele-

gance of their language and composition. They introduced him to the acquaintance and correspondence of several learned men, engaged in similar studies; amongst others to that of our distinguished Dr. Martin Litter. He was soon afterwards invited to Padua, where he rose successively from one medical professorship to another, till he obtained, in 1711, the first chair of the Theory of Medicine. When Vallisneri first took his place among the teachers of physic in this long-established university, he was well aware of the caution necessary in opening the eyes of the blind, and in teaching the lame to walk. He had already exercised his own powers, and was a proficient in the practical, or experimental, philosophy, of medicine, as well as of anatomy and physiology. But those accustomed to lean upon others, do not at once acquire, or even desire, the use of their own faculties. Established bodies naturally cling to established authorities, and it perhaps becomes them to be cautious of embracing, without due deliberation, any unauthorized novelty. To this duty, whatever others they may neglect, they must be allowed to be piously attentive. Nothing therefore could be more judicious than the subject of our new professor's first thesis, when he took the chair on the 14th of December, 1700; that "the Studies of the Moderns do not overturn, but confirm, the Medical knowledge of the Ancients." He pointed out in Hippocrates traces of the greatest discoveries, which the moderns by their superior opportunities had fully explained, such as the circulation of the blood; and thus without invalidating the merits of the latter, he dexterously confirmed the authority of the former, and flattered, instead of alarming, their disciples. He thus stimulated them to enlarge the sphere of their own knowledge, so that by improving the practical sciences of chemistry, anatomy, &c. they might further elucidate what the ancients had not fully understood or explained. In the progress of his lectures, however, Vallisneri was too judicious, and too honest, to sacrifice truth, to any ancient or modern authority. He attacked, without scruple, Avicenna's theory of fevers, and the erroneous practice founded thereon; as well as the doctrines of the putrescence of the humours, the sanguification of the liver, with many mechanical hypotheses of the old school. All this did not indeed pass without animadversion, especially the new doctrine of glandular secretion; but Vallisneri, supported by truth and experience, finally prevailed, and wrought a great change in the theoretic medicine of his day. Improvements in practice followed of course; and whenever the enlightened teacher met with any troublesome opposition, or, as usual, was attacked with misrepresentation and calumny, he found an able protector in Frederick Marcello, procurator of St. Mark, who being charmed with his earliest writings, had first recommended him to his appointments at Padua.

The intervals of his academical duties were often devoted by Vallisneri to rural excursions, for the improvement of his knowledge in natural history, as well as for the restoration of his bodily and mental powers, amid the wild and majestic, or the variously beautiful, scenes of nature, which lay so profusely within his reach. In the summer of 1704 he visited the recesses of the Apennines, and climbed their stupendous precipices. The scenery which inspired the genius of Salvator Rosa, enlarged the mind, and enriched the acquisitions, of our philosopher, and he descended, like a fertilizing river, to benefit the world below. The following year, he undertook a less laborious journey, to visit his literary friends at Lucca, Pisa, Leghorn and Florence, and was invited by prince Ferdinand of Tuscany to Pratolino, where he met with a most flattering reception, the prince's hospitality

hospitality being extended to the personal, as well as literary, accommodation of Vallisneri at Florence itself, where every door and cabinet were opened to him. From Leghorn he proceeded to Genoa, not without the usual adventure of a shipwreck of his wretched *felucca*, by which accident he had the advantage of seeing for the first time a noble Date Palm, in the open ground. He returned from Genoa to Padua by land. These and many similar excursions, in several following seasons, were productive of much information to a man, who could not pursue the most beaten track without picking up something. Indeed his line of study was new at that period. He contributed to open a new world to microscopic observers, and to direct their enquiries to advantage. He had by this time collected an ample museum, and choice library, both of them the more valuable and useful, for being collected by himself with some particular object.

His studies were not impeded nor embittered by domestic cares or chagrin; for though he married in 1692, and his wife brought him eighteen children, she was a woman of prudence and good sense; she directed his family in such a manner as to render his home comfortable and happy. Of the children, four only survived their infancy; a son who bore his father's name, and inherited his activity of disposition, and three daughters, two of whom became nuns at Padua. The third, named Claudia, a woman of rare talents, and the highest moral worth, remained unmarried at home.

In the beginning of 1728, Rinaldo I., duke of Modena, sent Vallisneri an unsolicited patent of knighthood, for himself, his son and their descendants. This honour was the more just, as he had, eight years before, declined an invitation from pope Clement XI. to become physician to his holiness in the place of the famous Lancisi. He had also refused to accept, from king Victor Amadeus, the appointment of first professor of physic, at Turin, with a very large stipend. Nor were academical honours wanting to his fame. He was associated with the Academy *Natura Curiosorum*, the Royal Society of London, and almost every learned body in Italy. Thus in the indefatigable pursuit of knowledge, and well-merited fame, he completed his sixty-eighth year. On the 12th of January, 1730, he was attacked with a sort of epidemic catarrh, accompanied with great debility, which, falling on his lungs, carried him off on the 18th. He was interred in the church of the Eremitani at Padua, where his son erected a monument to his memory with the following just and elegant inscription.

D. O. M.

Antonio Vallisnerio

Artis Medicæ assertori eximio

Naturalis Historiæ ac Philosophiæ

Restitutori celeberrimo

Summis honoribus undequaque aucto

Antonius filius mæ. p.

Obiit XV Kal. Feb. Anno Sal.

MDCCLXXX. Act. LXVIII. Mens. VIII.

The filial piety of the younger Vallisneri accomplished a more lasting memorial for his distinguished parent, in a complete and splendid edition of all his works, making three folio volumes, printed at Venice in 1733, and illustrated with plates, in one of which the fructification of the *Lemna* is exhibited. These writings, being frequently in the form of letters, are diffuse, but the Italian style of the author is esteemed by his countrymen. The whole work might be epitomized with advantage, and would be found rich in originality and acuteness. An ample life of Vallisneri is

prefixed to this publication, from whence we have extracted the above account. He is certainly entitled to rank with Redi, Malpighi, Reaumur, and Swammerdam, as an original observer of the intricate and obscure physiology of insects, and the lower tribes of the animal kingdom. He co-operated with those philosophers in clearing away the theory of equivocal generation, and other rubbish of the schools. In medicine his merit is of a very high order, and his name marks an epocha in the history of that science in Italy. Those who had so long slumbered over the musty folios of ancient lore, were by him turned unawares out of their dormitories and easy chairs, before they had time to awake, much less to defend their posts. He exalted the science from the study of books, to that of nature, and success was the natural result. In practice he had the good sense to promote the use of the Peruvian Bark, which, at that period, had much prejudice to contend with. His prescriptions were generally simple, and all his inquiries were free from credulity and prejudice. We cannot here enumerate the titles of all his various pieces. What relates to the theory of generation is most esteemed; and he had the courage to oppose the then famous vermicular hypothesis of Leeuwenhoek. The memory of Vallisneri has been preserved by his countryman Micheli, in the name of a very curious and interesting genus of plants. See the next article.

VALLISNERIA, in *Botany*, was dedicated by Micheli, to the honour of his distinguished countryman, of whom we have given an account in the preceding article. No genus could have been more fortunately selected, as its history is now, in the writings of Linnæus, identified with that of the generation of plants; of the theory of which, as taught by that illustrious botanist, it affords one of the most conclusive and celebrated proofs. Yet Micheli was ignorant of this striking fact; and has absolutely, as we shall find, described the two sexes as distinct genera. The male plant is his *Vallisneroides*. We can offer no apology for this oversight of so faithful an observer, but his attachment to Tournefort, who shut his eyes against the sexual doctrine, and Micheli durst not take the liberty of opening his own.—Mich. Gen. 12. t. 10. Linn. Gen. 513. Schreb. 673. Willd. Sp. Pl. v. 4. 650. Mart. Mill. Dict. v. 4. Brown Prodr. Nov. Holl. v. 1. 344. Pursh 602. Juss. 67. Lamarek Illustr. t. 799. (Vallisneroides; Mich. Nov. Gen. 13. t. 10.)—Class and order, *Dioclea Diandria*. Nat. Ord. *Palme*, Linn. *Hydrocharideæ*, Juss. Brown.

Gen. Ch. Male, *Cal.* Common Sheath of one leaf, in two deep, oblong, often cloven, reflexed segments, inclosing a conical, compressed Common Spadix, covered all over with sessile flowers forming a spike. *Cor.* of one petal, in three deep, obovate, widely spreading, or reflexed, segments, without a tube. *Stam.* Filaments two, erect, the length of the corolla; anthers roundish, simple.

Female, on a different plant, *Cal.* Sheath of one leaf, single-flowered, cylindrical, elongated, with two erect segments at the extremity. Perianth superior, in three deep, ovate, equal, spreading segments. *Cor.* of one petal, in three deep, linear, abrupt segments, shorter than the calyx. *Pist.* Germen inferior, cylindrical, longer than the sheath; style very short; stigma in three deep, oval, convex segments, downy on the upper side, cloven half way down, rather longer than the calyx, and bearing at the back a small oblong appendage. *Peric.* Capsule cylindrical, of one cell, not bursting. *Seeds* numerous, ovate, inserted in many rows into the sides of the capsule.

Ess. Ch. Male, Sheath in two deep segments. Spadix covered with flowers. Corolla in three deep segments.

Female,

Female, Sheath divided, single-flowered. Perianth in three deep segments, superior. Corolla in three deep linear segments. Stigmas three, cloven. Capsule cylindrical, of one cell, with many seeds.

Obf. Such is the original genus, of which Micheli's figure is more clear than his description. There can be no doubt that the part marked A, B, in the middle of his plate, below, represents the under side of the three stigmas. Linnæus, who never saw a living flower, mistook this point; but has corrected himself in manuscript. We have profited of this, and partly of Mr. Brown's definition. *V. octandra* of Roxburgh, if it be thought the same genus, must lead to some further correction of the generic characters.

1. *V. spiralis*. Spiral Vallisneria. Linn. Sp. Pl. 1441. Willd. n. 1. Brown n. 1. (*V. palustris*, algæ folio, italica, foliis in summitate denticulatis, flore purpurascens; Mich. Gen. 12. t. 10. f. 1, female. Vallisneroides palustre, algæ folio, italicum, foliis in summitate tenuissimè denticulatis, floribus albis, vix conspicuis; Mich. Gen. 13. t. 10. f. 2, male.)—Stalk of the female flower spiral. Leaves floating, linear, obtuse, finely serrated at the summit; tapering at the base.—In ditches in Italy, especially near Pisa. Communicated from near Arles, in Provence, by the late Dr. Broussonet, in 1784. Mr. Brown found, what he is almost certain of being the same species, in New South Wales, about Port Jackson. This plant is perennial, flowering in summer and autumn. The root consists of long fibres, and propagates itself very widely by means of runners, so that the canals, in which the *Vallisneria* grows, are choked up with its foliage, and rendered not navigable for boats. Stem none. Leaves all radical, very long, linear, flaccid, pellucid, ribbed, smooth, entire, except at the end. Stalks of the female flowers very long, thread-shaped, unbranched, naked, single-flowered, curiously spiral, but becoming more or less straight when the flower is ready to open, by which means the latter floats on the surface, and after impregnation, the stalk coils up again, and lodges the fruit at the bottom of the water. This fruit is three or four inches long, and judged by Mr. Brown to be rather of the nature of a berry than a capsule. The male flowers grow on a separate plant, on short, simple, straight, radical stalks. Each minute white flower separates from the common spadix, and rises closed, like a little bubble, to the surface of the water. Bursting there, these flowers float about in immense numbers, covering the water, and impregnating the females above described. Micheli has faithfully described the economy of this interesting plant, though blind to its physiology.

2. *V. americana*. American Vallisneria. Michaux Boreal.-Amer. v. 2. 220. Willd. n. 2. Pursh n. 1.—“Stalk of the female flower nearly straight. Leaves erect, linear.”—At the bottom of muddy and slow rivers in North America, flowering from August to October. Michaux observed it in the Mississippi and St. John's rivers, Florida; Pursh in the Delaware, near Philadelphia, and elsewhere. The latter doubts whether it be a distinct species from *V. spiralis*; for he found the stalks of the female flowers to be, in deep water, really spiral. Michaux remarks, that the leaves are erect, less elongated than in the foregoing, and not tapering at the base. These circumstances may all be owing to the shallowness and stillness of the water.

3. *V. nana*. Dwarf Vallisneria. Brown n. 2.—“Stalk of the female flower spiral, capillary. Leaves under water, linear, acute, entire.”—Observed by Mr. Brown, in the tropical part of New Holland.

4. *V. octandra*. Octandrous Vallisneria. Roxb. Coromand. v. 2. 34. t. 165. Willd. n. 3.—Stalk of the female

flower straight. Leaves linear, taper-pointed. Stamens eight.—Native of shallow, stagnant, sweet water, on the coast of Coromandel. Roxburgh. Roots annual, fibrous. Leaves radical, erect, flat, smooth, entire, gradually tapering to a point, from nine to twelve inches high. Stalks all radical, straight, cylindrical, erect, simple, much shorter than the leaves. Sheath of the male flowers near three inches long, tumid below, tapering upwards, containing many stalked flowers, which, by the elongation of their partial stalks, rise one by one out of the sheath. Each has a three-leaved calyx; three longer linear white petals, or segments of the corolla; eight unequal stamens, with oblong anthers; and an abortive germen, with three linear stigmas. The stalks of the female flowers, on a separate plant, are shorter than those of the males, single-flowered. Sheath as in the male, but the flower is elevated above it and the germen by a partial stalk, or receptacle. Calyx shorter than in the male; petals longer and narrower, white. Stigmas long, thread-shaped, white. Seeds roundish, stalked, ranged numerously along one side of the tapering capsule.

We have already hinted the affinity of this plant to Loureiro's *Physium*; see that article.

VALLISNEROIDES, Micheli's name for the male plant of his *Vallisneria*; see that article.

VALLOIRE, in *Geography*, a town of France, in the department of Mont Blanc; 9 miles S.S.E. of St. Jean de Maurienne.

VALLON, a town of France, in the department of the Sarthe; 10 miles W. of Le Mans.—Also, a town of France, in the department of the Ardèche; 9 miles N.E. of Pont St. Esprit.

VALLONISE, a town of France, in the department of the Higher Alps; 9 miles S.W. of Briançon.

VALLOR, VALLOW, or *Vale*, among country people, a hollow mould, in which a new-made cheese is pressed.

VALLOTTI, PADRE FRANCESCO ANTONIO, in *Biography*, an ecclesiastic, and maestro di capella of the church of St. Antonio at Padua in 1770, was born in Piedmont in 1705. He was esteemed one of the best composers for the church in Italy. Tartini speaks of him in his *Trattato di Musica*, p. 100, in the following manner: “Padre Vallotti was formerly a most excellent performer on the organ, and is now an admirable composer, and master of his art.” This good father was of so amiable a character, that it was impossible to know and not esteem him. He composed an anthem for the public funeral of Tartini, March 31, 1770; and in 1779 published at Padua the first book of a treatise entitled “Della Scienza Teorica e Prattica della moderna Musica.” This first book is purely theoretical. The author promised three other books, the publication of which has not arrived at our knowledge. Book the second was to contain the practical elements of music; the third, the precepts of counterpoint; and the fourth, rules of accompaniment. It is to be feared, that this venerable author did not live to complete his design, as we have been informed that he died in 1780, at the age of 75.

VALLS, in *Geography*, a town of Spain, in the province of Catalonia; 9 miles N. of Tarragona.

VALLUCE, a small island in the English Channel, near the coast of France. N. lat. 47° 26'. W. long. 2° 55'.

VALLUM, in *Roman Antiquity*, denote a kind of parapet with which they fortified their camps. In the vallum, some distinguish two parts; the *agger*, which was no more than the earth cast up to form the vallum; and the *fudes*, which were a fort of wooden stakes to secure and strengthen it.

VALLY CREEK, in *Geography*, a river of Pennsylvania,

which runs into the Schuylykyl, N. lat. $40^{\circ} 7'$. W. long. $75^{\circ} 30'$.

VALLY *Forge*, a place in Pennsylvania, near the union of Vally Creek with the Schuylykyl. Here general Washington lay encamped in the winter of 1777, 1778; 20 miles N.W. of Philadelphia.

VALMAROSSA, a town of Itria; 8 miles E.S.E. of Capo d'Itria.

VALMASEDA, a town of Spain, in the province of Biscay; 13 miles S.W. of Bilbao.

VALMIKI, in *Biography*, the name of a very celebrated Hindoo poet, author of that extraordinary poem in the Sanscrit language, entitled *Ramayana*, under which word we have given some account of its contents. Sir William Jones, in his ninth anniversary discourse to the Asiatic Society of Calcutta, delivered February 1792, gives his opinion that the Cush of Moses and Valmiki were the same personage. (See *RAMAYANA* and *TRIVENI*.) But we are not in possession of any biographical particulars respecting him. His great work, the *Ramayana*, is esteemed the earliest epic poem, and is cited as nearly equal in authority with the most sacred of the Hindoo books, such as the *Purana* and *Veda*, ascribed to Vyasa. See these articles.

VALMONT DE BOMARE, JAMES CHRISTOPHER, was born at Rouen, in September, 1731. He was intended for the bar, but his inclination to natural history induced him to devote himself entirely to that pursuit, and having obtained an order from the duke d'Argenson, the minister at war, to travel for the improvement of science, with sufficient funds for the purpose, he spent several years in visiting the principal cities of Europe, and examining the most famous collections in natural history. Mines and metallurgic establishments engaged his particular attention; having visited Lapland and Iceland, he described its volcanoes; and returned, with many curious objects, to Paris in July 1756. He then began a course of lectures on natural history, which were continued till the year 1788. These lectures contributed to establish his reputation, and he had many advantageous offers from the courts of Russia and Portugal, the acceptance of which he declined. His works are as follow: *viz.* "Catalogue d'un Cabinet d'Histoire Naturelle," 1758, 12mo.; "Extrait Nomenclature du System complet de Mineralogie," 1759, 12mo.; and "Nouvelle Exposition du Regne Mineral," 1761, 1762, 2 vols. 8vo. But his capital work was his "Dictionnaire raisonne Universel d'Histoire Naturelle," in 6 vols. 8vo. This has passed through several editions in 8vo. and 4to., and being the first of its kind, served as the basis of all the dictionaries of natural history that have appeared since that time. One of the latest editions appeared at Lyons in 1800, 15 vols. 8vo. This celebrated naturalist died at Paris, in August, 1807. Gen. Biog.

VALMONT, or *Vallemont*, in *Geography*, a town of France, in the department of the Lower Seine; 6 miles E. of Fécamp.

VALMONTONE, a town of the Popedom, in the Campagna di Roma; 6 miles S. of Palestrina.

VALNDORF, a town of Hungary; 5 miles S.W. of Szeben.

VALOE, an island of Sweden, in the bay of Christiania; 7 miles S.S.E. of Tonsberg.

VALOGNES, a town of France, and principal place of a district, in the department of the Channel. In 1346, it was pillaged by the English; $7\frac{1}{2}$ posts N. of Coutances. N. lat. $49^{\circ} 31'$. E. long. $1^{\circ} 23'$.

VALOIS, HENRY DE, or VALESIIUS, in *Biography*, born at Paris in 1603, and educated in the Jesuits' school, was admitted an advocate of the parliament of Paris, after having

previously studied the civil law at Bourges. Declining the prosecution of the law, he devoted himself to literature, and particularly to the study of Greek and Latin authors. The assiduity of his application impaired his sight, the imperfection of which was in some degree counterbalanced by the retentiveness of his memory. Besides some private pensions which were granted him, he was appointed, in 1660, historiographer of France, with a considerable salary. At the age of sixty-one he married a lady, by whom he had seven children; and died in 1676, at the age of seventy-three years. His temper was harsh and irritable; fond of praise, and sparing in bestowing it on others; impatient and querulous under bodily indisposition, but unfeeling to the sufferings of others. With many infirmities and failings, he was a learned, discriminating, and accurate critic. His principal publications were, an edition of the "Ecclesiastical History of Eusebius," with a Latin version and notes; the "Ecclesiastical Histories of Socrates and Sozomen," as well as of "Theodoret and Evagrius;" a valuable edition of "Ammianus Marcellinus;" "Remarks upon Harpocration;" "Emendationum Lib. V." with other pieces, printed after his death at Amsterdam, in 1740, under the care of Peter Burman. Moreri.

VALOIS, ADRIAN DE, brother of the preceding, was born at Paris in 1607, and studied in the Jesuits' college. Although he acquired a competent knowledge of the Greek and Latin languages, he attached himself principally to the study of French history; and in 1646 appeared the first volume in folio of his "Gesta Francorum," which was followed by two more in 1658. He began with the reign of the emperor Valerian, and traced the history of the Franks to the deposition of Childeric, and his work was generally admired. As a recompence, he was associated with his brother in the office of historiographer, and in the pension annexed to it. In 1675 he published "Notitiæ Gallorum," fol. comprising, in alphabetical order, an account of the geography, towns, monasteries, &c. of France, deduced from its early records and histories. He followed the example of his brother, with whom he lived on terms of intimate union, by marrying a young wife, who brought him two children. He published, besides the works already mentioned, an edition of two poems written in the middle ages, a second edition of his brother's "Ammianus Marcellinus," and some other pieces relating to antiquities. He died in 1692, at the age of eighty-five years. His son, CHARLES DE VALOIS DE LA MARE, was also a man of letters, and became a member of the Academy of Inscriptions and Belles Lettres, and antiquary to the king. He published a collection of critical, historical, and moral reflections, and Latin poems under the title of "Valesianæ," and edited two posthumous works of Vaillant the medallist, and wrote several papers for the Academy, of which he was a member. He died in 1747, aged seventy-six. Moreri.

VAL-OMBROSO gives its name to a congregation of Benedictine monks, founded in the Apennines by Gualbert of Florence, in the 11th century; who, in a short space of time, propagated their discipline in several parts of Italy.

VALON, in *Ancient Geography*, a river of Africa, in Mauritania Tingitana. Ptolemy.

VALONA, in *Geography*, a sea-port town of European Turkey, in Albania, on a gulf of the Adriatic, gained by the Turks from the Christians in the year 1464. In the year 1690, it was taken by the Venetians, but retaken by the Turks the year following; 68 miles S. of Durazzo. N. lat. $40^{\circ} 36'$. E. long. $19^{\circ} 28'$.

VALONGO, a town of Portugal, in the province of Beira; 21 miles S.E. of Lamego.

VALONIA, in *Botany*. See VELANIA.

VALOR BENEFICIORUM, in *Law*. See FIRST-FRUITS.

VALORE MARITAGII, *Value of Marriage*, a writ which anciently lay for the lord, after having proffered suitable marriage to an infant who refused the same: to recover the value of the marriage. See GUARDIAN.

VALORSINE, in *Geography*, a town of France, in the department of the Lemane; 15 miles S.E. of Nôtre Dame d'Abondance.

VALOVEK, a town of European Turkey, in Moldavia; 52 miles N. of Jassy.

VALPARAYSO, a town of Spain, in New Castile; 15 miles S. of Huete.

VALPARAYSO, a sea-port town of Chili, situated on a bay of the South Pacific ocean. This town was at first very mean, consisting only of a few warehouses, built by the inhabitants of St. Jago, for laying up their goods till shipped off for Callao, the harbour of Valparayso being the nearest port of that city, from which it is only 60 miles distant. The only inhabitants at that time were the few servants left by their respective masters for taking care of the warehouses, and managing their mercantile affairs. But in process of time, the merchants themselves, together with several other families, removed from St. Jago, in order to be more conveniently situated for trade; since which it has gradually increased, so that at present it is both large and populous; and would be still larger, were it not for its inconvenient situation, standing so near the foot of a mountain, that a great part of the houses are built on its acclivity, or in its breaches. Valparayso, besides its parish-church, has a convent of Franciscans, and another of Augustines; but very few religious, and the churches belonging to them small and mean. It is inhabited by families of Spaniards, and casts both of Mulattoes and Mestizos. Here is a military governor nominated by the king, who having the command of the garrisons in the several ports, and of the militia of the place and its dependencies, is to take care that they are properly disciplined. The proximity of this port to St. Jago, has drawn hither all the commerce formerly carried on at that city. To this it owes its foundation, increase, and present prosperity. All the Callao ships which carry on the commerce between the two kingdoms come hither. In this port they take in wheat, tallow, cordovan-leather, cordage, and dried fruits, and with these return to Callao; and a ship has been known to make three voyages in one summer between November and June. Valparayso is abundantly supplied with provisions from St. Jago and other places in its neighbourhood. Among the several kinds of game there is here such a plenty of partridges in their season, which begins at March and lasts several succeeding months, that the muleteers knock them down with sticks, without going out of the road, and bring great numbers of them to Valparayso. But few of these or any other birds are seen near the town. It is the same with regard to fish, very little being to be caught either in the harbour or along the coast, in comparison of what may be taken in the other parts. The harbour is every where free from rocks and shoals, except to the north-east of the breach De los Angeles, where, about a cable's length or two from the land, is a rock, which must be more carefully avoided, as it never appears above water, but sometimes has not a depth sufficient for a ship of any burden to pass over it; 225 miles N. of Conception. S. lat. 33° 3'. W. long. 72° 16'.

VALPERGA, a town of France, in the department of the Dora; 11 miles S.S.W. of Ivrea.

VALPERSCHWEIL, a town of Switzerland, in the canton of Berne; 10 miles N.W. of Berne.

VALPO. See WALPO.

VALPUESA, a town of Spain, in Old Castile; 10 miles N.N.E. of Frias.

VALREAS, a town of France, in the department of the Drôme; 18 miles N.N.E. of Orange.

VALS, a town of France, in the department of the Ardèche, celebrated for several medicinal springs in the neighbourhood; 12 miles S.W. of Privas.

VALSA, in *Botany*, Adanson Fam. v. 2. 9. Scop. Carn. v. 2. 397, an unexplained name, used by those authors for what is now the SPHERIA of botanists; see that article.

VALSALVA, ANTON-MARIA, in *Biography*, an eminent anatomist, physician, and surgeon, was born in 1666, at Imola, in Romagna. Having received the first elements of literature in the Jesuits' seminary, he was sent to the university of Bologna, and placed under the immediate tuition of the celebrated Malpighi, and here he pursued his various studies with an assiduity which impaired his health. He graduated at Bologna in 1687, and connecting surgery with physic, acquired high reputation. He simplified and improved surgical instruments, banished from Bologna the cruel practice of cauterizing the arteries after amputation, and in the cure of deafness employed manual operations. In 1697 he was chosen professor of anatomy in the university, and appropriate buildings were erected for his use at the anatomical theatre. The school of Bologna acquired celebrity under his direction, and some of his pupils became eminent in their profession. Of this number was Morgagni. In advanced years Valsalva grew corpulent and lethargic, and was carried off by an apopleptic stroke in February 1723, at the age of fifty-seven years; leaving a widow and three daughters. His anatomical museum was bequeathed to the Institute of Bologna, and his various apparatus of surgical instruments to the hospital for incurables. The principal of his works is a treatise "De Aure Humana," reprinted at Bologna in 1704, 4to. and again with Morgagni's Epistles, at Venice, 1740. After his death, Morgagni published three of his "Dissertations" on anatomical subjects, which had been read before the Institute. This great anatomist's work "De Sedibus et Causis Morborum," contains a number of dissections by Valsalva. Morgagni Vit. Valsalv. Haller. Gen. Biog.

VALSECA, in *Geography*, a town of Spain, in Old Castile; 11 miles N. of Segovia.

VALSTAGNO, a town of Italy, in the Vicentin; 18 miles N. of Vicentin.

VALTANAS, a town of Spain, in the province of Leon; 15 miles E. of Valencia.

VALTELINE, a lordship of Italy, at the foot of the Alps; bounded on the N. by the Grisons, on the E. by the county of Bormio and the Bressan, on the S. by the Bergamasco and the Milanese, and on the W. by the county of Chiavenna and the Milanese. This country, which is called by the Grisons *Vellin*, or *Veltin*, and by the inhabitants *Valle Tellina*, is a valley inclosed between two chains of lofty mountains, about fifty miles in length, and from eight to twenty in breadth. It is exceedingly fruitful, and throughout its whole extent watered by the Adda, which, after receiving all the streams issuing from the forest, discharges itself into the Como lake. In some parts the heat is intense, but in others more moderate, and on the hills and the greatest part of the adjacent valleys the air is mostly cool. Of this variation in its temperature, the necessary consequence is a variation in the products of the earth. The levels in this valley, through which the Adda pursues its course, and the breadth of which in some parts

is not less than a mile, exhibit a delightful variety of corn-fields, meadows, vineyards, and orchards of chefnuts and other fruits. The vineyards on the mountains towards the north produce the best wine in the whole country, and above them are corn-fields, meadows, and pasture-lands. The hills on the south side are covered with fine woods of chefnuts, fields, meadows, and rich pastures, in which graze numerous herds of cattle. This country abounds also in excellent red wine, of a most delicious flavour, and of so good a body that it will keep for a whole century, improving both in taste and wholesomeness, and gradually turning paler, till at length its redness totally disappears. Great quantities of this wine are exported. The apples and pears in most places are not much esteemed; but the peaches, apricots, figs, and melons, are exquisite. Here is likewise plenty of lemons, citrons, almonds, pomegranates, chefnuts, and other delicious fruits. Its soil also would produce all kinds of grain and pulse; but the levels being interspersed with swampy places, which have hitherto remained without culture, and the wine-trade chiefly engrossing the attention of the inhabitants, it does not yield a sufficiency for their consumption without importation. Some parts grow hemp, and in the levels, particularly on the higher grounds and the mountains, are fine pastures. Bees and silk-worms are bred here in vast numbers. The Adda yields plenty of fish, and is noted for its trout, which often weigh from fifty to sixty pounds. The whole of their mine-works here consist in a few iron-founderies.

The chief commerce of the Valteline is carried on with Milan and the Grisons. The principal exports are wine and silk, which turn the balance of trade in its favour; they enable the inhabitants to exist without any manufactures, and help to supply the money which is exacted by the governors.

The wine is sent into the Grisons, Germany, the Venetian states, Bormio, and occasionally to Milan. Upon a rough calculation, 73,000 foma, or horse-loads, are annually exported. The silk is sent to England, Zurich, and Basse. The district of Delebio and Talomara produces the finest silk, the neighbourhood of Sondrio the next in quality, and the district of Tirano supplies an inferior sort. Three thousand pounds of the finest sort, which is esteemed as good as the silk procured from Piedmont, is sent annually to England by way of Ostend. The greater part is wound in the Valteline, for which purpose there are silk-mills in the principal districts.

Besides these commodities, the Valteline exports planks, cheese, butter, and cattle. The inhabitants receive from Milan, corn, rice, salt, filken stuffs; from Germany and Switzerland, cloth and linen; from Genoa, spices, coffee, and sugar.

There are no manufactures in the Valteline, and almost all the menial trades are exercised by foreigners.

The population of the Valteline may be estimated from the following rough sketch:

	Souls.
Upper District - - - contains	20,000
Government of Teglio - - - -	8,000
Middle District - - - -	18,000
Lower District - - - -	16,000
Total - - - -	62,000

The cottages of the peasants, which are built of stone, are large, but gloomy, generally without glass windows; and exhibit an uniform appearance of filth and poverty.

Perhaps no part of Europe is more fruitful than the Valteline, and yet there is no country in which the people are more wretched. Many reasons may be assigned for the misery to which they are reduced. The first and principal cause is the form of government. The governors generally abuse the exorbitant authority entrusted to them by the laws; the peasants are imprisoned upon the slightest information; and as all transgressions are punished by fines, an accused person is seldom acquitted; so that a considerable number are annually ruined in the courts of justice.

Beside the individuals who are supposed to suffer for their own guilt, the parishes are subject to continual assessments, towards defraying the expences for the trial and imprisonment of the poor parishioners: if they are unable to pay the sum required, it is demanded from the parish to which the criminal belongs. In this case it frequently happens, that the assessments, instead of being laid upon the landholders, are imposed upon each hearth, by which means the chief burden falls upon the poor.

Another cause of wretchedness proceeds from the present state of property. Few of the peasants are landholders; as, from the continual oppression under which the people have groaned for above two centuries, the freeholds have gradually fallen into the hands of the nobles and Grisons, the latter of whom are supposed to possess half the estates in the Valteline. The tenants who take farms do not pay their rent in money, but in kind; a strong proof of general poverty. The peasant defrays the costs of cultivation, and delivers nearly half the produce to the landholder; the remaining portion would ill compensate his labour and expence, if he was not in some measure befriended by the fertility of the soil. The ground seldom lies fallow, and the richest parts of the valley produce two crops; the first is wheat, rye, or spelt, half of which is delivered to the proprietor; the second is generally millet, buck-wheat, maize, or Turkey corn, which is the principal nourishment of the common people: the chief part of this crop belongs to the peasant, and enables him in a plentiful year to support his family with some degree of comfort. Those who inhabit the districts which yield wine are the most wretched; for the trouble and charge of rearing vines, of gathering and pressing the grapes, is very considerable; and they are so apt to consume the share of liquor allotted to them, in intoxication, that, were it not for the grain intermixed with the vines, they and their families would be left almost destitute of subsistence.

Besides the business of agriculture, some of the peasants attend to the cultivation of silk; they receive the eggs from the landholder, rear the silk-worms, and are entitled to half the silk. This employment is not unprofitable; for although the rearing of the silk-worms is attended with much trouble, and requires great caution; yet as the occupation is generally entrusted to the women, it does not take the men from their labour. With all the advantages, however, derived from the fertility of the soil, and the variety of its productions, the peasants cannot, without the utmost difficulty, and constant exertion, maintain their families; and are always reduced to the greatest distress, whenever the season is unfavourable to agriculture.

To these causes of penury among the lower classes, may be added the natural indolence of the people, and their tendency to superstition, which takes them from their labour.

This country is without so much as one city, but has some considerable towns, with many thriving villages. Its language is a corrupt kind of Italian. The Roman Catholic is the only religion. Their clergy are under the jurisdiction

diction of the bishop of Como. They are not responsible to the ordinary courts, their immunities being so exorbitant as to render them almost independent of the civil authority; they are only amenable to the court of the bishop of Como. If a priest is guilty of any misdemeanour, his person cannot be secured without the concurrence of the bishop and governor of the district in which the crime was committed. It is therefore extremely difficult to bring an ecclesiastic to justice; as impunity is easily purchased, either by securing the favour of the bishop's vicar or of the magistrate. Nor are these pernicious privileges confined merely to the clergy, but extend to all persons wearing an ecclesiastical dress, with the permission of the bishop of Como.

All civil causes of the clergy, below the value of two hundred livres, are decided by the vicar of the bishop of Como: above that sum, they are brought before the bishop. An appeal from his decision lies to the pope's nuncio at Lucern, from him to the ecclesiastical tribunal at Aquileia, and from thence to Rome.

The whole country is divided into three districts or *terzeros*, called *Sopra*, *Mezzo*, and *Sotto*, or Upper, Middle, and Lower. Tirano is the capital of the first, Sondrio of the second, and Morbegno of the last. It is divided into five governments; *viz.* those of the upper district; of the middle district, called also the government of Sondrio; of Toglio, of Morbegno, and of Traona.

Each of these five governments is subject to a magistrate appointed by the Grisons, who is changed every two years. The magistrate over the middle district is called governor of the Valteline, and possesses in some respect a superior degree of authority to the others, who are styled *podestas*; he is also captain-general of the Valteline.

All public concerns, which do not fall under the jurisdiction of the Grisons, are discussed and determined by a council composed of five representatives, one from each district, which meets as occasion requires at Sondrio.

The Valteline, together with the counties of Chiavenna and Bormio, (which had long been the constant source of hostility between the bishops of Como and Coire,) came, in the year 1336, under the dominions of Azzo Visconti, sovereign of Milan, who quietly transmitted them to his successors. Upon the death of John Visconti, one of Azzo's successors, his territories were divided between his nephews Galeazzo and Barnabas. Upon the demise of Galeazzo, his son, John Galeazzo, secured the person of his uncle Barnabas, and having confined him in the castle of Trevio, until his death, which happened in 1395, annexed his dominions to his own, and became by this union the greatest and most powerful prince in Italy. Mastino, son of Barnabas, took shelter, upon his father's imprisonment, with Hartman, bishop of Coire, and died in exile, without recovering any share of his inheritance. Previous to his death, he formally ceded all his right and title over the Valteline, Chiavenna, and Bormio, to the bishop of Coire, as a mark of gratitude for his protection. To this cession, at that time of no avail, the Grisons owe the possession of these provinces. The claim lay dormant for above half a century, until some discontents arising in the Valteline, in 1487, the Grisons made an irruption into that country, in support of the bishop's rights, but their arms not being at that time attended with success, they purchased a peace by renouncing all pretensions to the Valteline. They renewed, however, their claim in 1512, when Ludovico, called *the Moor*, duke of Milan, was taken prisoner by Louis XII.; and the whole Milanese, comprising the Valteline, occupied by that monarch. Upon this revolution, the Grisons, in

conjunction with the bishop of Coire, entered the Valteline, and having expelled the French troops, took possession of the country: they were received with joy by the inhabitants, who did homage to their new sovereigns, and in return obtained from them the confirmation of all their privileges. A compromise was immediately entered into between the bishop of Coire and the three leagues to share between them the sovereignty of this country. In the following year, Maximilian Sforza, raised to the ducal throne of Milan upon the expulsion of the French, ceded in perpetuity the possession of the Valteline, Chiavenna, and Bormio, to the bishop of Coire, and the Grisons; and this cession was ratified by Francis I. in the treaty of peace which he concluded with the Swiss and their allies, the Grisons, in 1516, when he obtained possession of the Milanese. In 1530, the republic of the Grisons acquired the whole dominion of the Valteline, to the exclusion of the bishop of Coire, under pretence that the latter had not furnished his quota of men and money in the war with James of Medici, in defence of these ceded countries; accordingly they compelled the bishop to sell his share of the sovereignty over the Valteline, Chiavenna, and Bormio, for a yearly income of 575 florins, to be paid to the bishop and his successors out of the customs of Chiavenna. From that period, these provinces were possessed by the Grisons without molestation, until the rival interests of France and Spain, the intrigues of the pope, religious enthusiasm, the zeal of party, and the exactions of the Grison governors, kindled an insurrection, which commenced with a massacre of the Protestants, and raged for a series of years with the most savage and unremitting fury.

During the constant wars, which from the accession of Philip II. the restless ambition of the Spanish court entailed upon Europe, the German and Spanish branches of the House of Austria were inseparably united; and the councils of Vienna were directed by the cabinet of Madrid. Under these circumstances, the Valteline, which, by connecting the Tyrol and the Milanese, afforded the only secure passage for the junction of the Austrian and Spanish troops, became of signal importance.

The same reasons which rendered the Spaniards desirous to secure the Valteline, induced the French to obstruct their designs. The Spaniards, however, pursued their projects upon the Valteline without opposition, when they were freed from their most formidable rival, the count of Fuentes, governor of Milan, by assassination, and availed themselves of the domestic dissensions between the Grisons and the inhabitants. When all the Protestants were either destroyed or driven out of the country, the remaining inhabitants renounced their allegiance to the Grisons, and framing a new form of government, threw themselves under the protection of the king of Spain, who sent an army to their support. The people of Bormio followed the example of the Valteline, with this difference, that they did not massacre, but only expelled the Protestants. Having entered into an offensive and defensive alliance with the inhabitants of the Valteline, they also formed an independent commonwealth.

The Grisons, divided among themselves, were totally unequal to the chastisement of their revolted subjects. The Catholics were desirous of employing the mediation of Spain, for the purpose of recovering the Valteline; the Protestants, inclined to vigorous measures, proposed an application to the Swiss cantons, Venice, and France. After violent dissensions, which were not terminated without bloodshed, the Protestant interest prevailed, and a deputation was sent to those powers.

When

When cardinal Richelieu acquired ascendancy, and effected a revolution in the French politics, he perceived the importance of the Valteline, and adopted measures, which proved successful; so that in two campaigns the Spaniards were driven from the Valteline, Chiavenna, and Bormio. Under the administration of Richelieu, it was agreed, that the Valteline should again be restored to the Grisons, upon the following conditions: no other religion but the Roman Catholic to be tolerated; the inhabitants to elect their own governors and magistrates either from themselves or from the Grisons, but always from persons of the Roman Catholic persuasion; and the governors to be confirmed by the Grisons. In return for these privileges, it was stipulated that the inhabitants should pay an annual tribute, the amount of which was to be settled by mediation. In consequence of this treaty, concluded on the 5th of March 1626, the French resigned the forts of the Valteline into the hands of the pope, and evacuated the country.

When Richelieu had completed the reduction of the Hugonots by the capture of Rochelle, he turned the whole force of France against the House of Austria; and among other enterprises, directed his attention to the Valteline; but the Grisons, encouraged and aided by the Spaniards, drove the French from the country; the treaty of Milan produced a close alliance between the Spaniards and the Grisons; and the Valteline was restored.

This treaty, contracted in the year 1635, secured to the Spaniards the passage of the valley, which was the great object of the war, and restored the Valteline, Chiavenna, and Bormio, to the Grisons, under the following conditions: an act of oblivion; the immunities of the subject countries to be confirmed as they existed before the revolution of 1620; no religion but the Catholic to be tolerated; no person of any other persuasion to be permitted to reside, excepting the governors, during the two years they should continue in office, and the Protestants possessed of lands, who should not be allowed to remain in the country above three months in the year; the privileges of the ecclesiastics to be restored in their full latitude.

Since the pacification of 1637, no material change took place in the state of affairs. The sovereigns of Milan have always cultivated the friendship of the Grisons; and the inhabitants of the Valteline endured a regular course of tyranny under the government of a free state; confirming a fact notorious in the annals of ancient Greece, that no people are more oppressed than the subjects of a democracy.

During the progress of the French revolution, Bonaparte confirmed the union of the revolted provinces with the Cisalpine republic; so that after a period of nearly three centuries, the Valteline, Chiavenna, and Bormio, were again incorporated with the Milanese under a republican government; but the expulsion of the late French emperor has restored the ancient arrangements in Italy, and the Valteline returns to its former possessors. Coxe's Switzerland, vol. iii.

VALTERIE, LA, a town of Canada, on the St. Lawrence. N. lat. $45^{\circ} 54'$. W. long. $73^{\circ} 10'$.

VALTESCHAND, or **WALTESCHAND**, a town of Holland, in Overijssel; 12 miles N.E. of Covorden.

VALTIERRA, a town of Spain, in Navarre. Near it is a mine of sal gem; 10 miles from Tudela.

VALVA, in *Ancient Geography*, a mountain of Africa, being one of the most considerable in Mauritania Cæsariensis.

VALVA, in *Geography*, a town of Naples, in Abruzzo Citra, the see of a bishop; 18 miles S.S.W. of Civita di Chieti.

VALVANO, a town of Naples, in Principato Citra; 6 miles N. of Cangiario.

VALVASONE, a town of Italy, in Friuli, on the Tajamento; 14 miles W.S.W. of Udina.

VALVASOR, or **VALVASOUR**. See **VAVASOR**.

VALUATION of Land, in Agriculture and Rural Economy, the business of ascertaining its real worth. It is an undertaking which requires considerable knowledge of the nature and application of all sorts of landed property, as well as of the various improvements of which they are capable by cultivation and different other means.

It is necessary, before entering upon it, that the nature of the tenure, title, and other matters should be well understood. The writer of the work on "Landed Property," however, supposes, that the value of the fee-simple, or pure freehold tenure, being properly ascertained, that of any inferior sort of holding may readily be found from it, by means of the general rules of calculation: but that the fee-simple value of lands is liable to fluctuation, and become different, by general causes; and is influenced too, in many cases, in a much higher degree, by local circumstances. It is suggested, that lands of the self-same quality are of five-fold value in one situation, comparatively with what they are worth in another: not merely, though principally, on account of the rental value, or the current price they will let for to tenants in different situations; but through other less permanent causes: such as the quantity of land at market, the number and importance of the demands for it in the given district; as well as the spirit which prevails in it at the time, in regard to the temporary possession of landed property at the particular period.

These are circumstances that are constantly worthy of the attention of those whose views in the obtaining of land are not confined to any particular spot or district.

It is stated, that the usual method of coming at the fee-simple value of land, is first to ascertain the fair rental value or price by the year, and to multiply this by the number of years' purchase which the existing demand for land will bear, in the given situation, at the time. But that the number of years' purchase, or the ratio between the rent and the sale value of lands, varies greatly, as from 20 to 40, 25 to 30 being the more ordinary numbers. Consequently, a parcel of land, the fair rental value of which is 100*l.*, is, in common cases, worth from 2500*l.* to 3000*l.* But the real rental value, which is the only sure and firm groundwork to proceed upon, whether in the purchase or the management of landed property, cannot be easily obtained. Speaking generally of the lands of this country, it is, it is thought, what very few men are able to set down. It is true, that, in almost every district, or almost every township, there are persons who tolerably well know the rate at which the lands of their respective neighbourhoods are usually let. But reciprocally interchange them into each other's districts, and their errors would, it is said, be egregious. Nor can a mere provincialist, especially in a district which is unenlightened by modern improvements, be aware of the value even of his own farm, under the best course of management of which it may be capable: nor can he see, through the double veil of ignorance and prejudice, the more permanent improvements that may be made upon it, so evidently as one who has a more general knowledge of rural subjects and concerns, and is in the habit of discovering and prosecuting such improvements. It is consequently necessary to have different persons to accomplish the business in a complete manner in many instances.

The particular circumstances that require to be considered as giving value to land, are chiefly these: 1. The quantity

VALUATION OF LAND.

of the land, which is the ground-work of the calculation; though it has little weight in the scale of valuation. The fee-simple value of an acre of land may be less than twenty shillings, or it may be more than an hundred pounds. Nevertheless, it is on the quantity the rental value is calculated; and it is usual for the person who parts with it to exhibit a "particular" of the estate or property on its disposal; shewing, or which ought to shew, not only the aggregate quantity, but the number of acres that each piece or parcel contains, as well as other matters; and ought, most particularly, to specify the distinct quantities of the lands of different qualities; in order that their several rental values may be ascertained with greater ease and accuracy.

2. The intrinsic quality of the land, which is essential in forming the estimate. But even this, in a general view of the value of lands throughout the kingdom, is often, it is said, of secondary consideration: for, in many cases, their values are given by situation, rather than by soil and substrata. In some cases, as has been seen, the value of the situation may be a great many times more than that of the intrinsic value of land. But this excessive influence of situation is, however, limited in its effects, and is chiefly confined to the environs of large towns, and other extraordinary markets for produce of the farm-kind. A great majority of the lands of this country owe their values less to situation than to intrinsic quality; and to come at this with sufficient accuracy, is the most requisite, and, at the same time, the most difficult part of valuation; as it depends almost wholly on extemporary judgment, exercised on the frequently few data which rise to the eye in passing over the field of estimation. It is, therefore, almost needless to state, that to acquire the degree of judgment which is necessary to the execution of this difficult critical task, it is required to know and be perfectly acquainted with the nature and productiveness of lands of different appearances: a sort of knowledge which scarcely any thing but mature practice in the cultivation and use of lands of different qualities can sufficiently teach; though long habit may do much in ordinary cases towards hitting off the value of lands, without an extensive knowledge of the practice of agriculture.

There are cases, however, it is said, in which both of these qualifications are found insufficient to give any accuracy of judgment, even among provincial valuers of land. And a person who ventures to step forward as an universal valuer, should have either an extraordinary talent for the purpose, or should, after a suitable initiation, have had great experience in rural concerns in different parts of the kingdom.

3. The situation; which, although it has been already stated, that the value of the lands of this country, aggregate considered, depends less on situation than on intrinsic quality, yet in every part it has great influence. Thus, an acre of land, the intrinsic quality of which renders it, in an ordinary situation, in what regards locality merely, worth twenty shillings the acre, would not, it is observed, in some districts or places, be worth more than fifteen shillings, while in others it would bear to be estimated at twenty-five shillings, or even a higher price of rent, to a farmer on a large scale, and away from the immediate environs of a town, or any populous district of manufacture; for reasons that will be seen in examining the different particulars of situation. In the temperature of situation too, whether it be given by elevation, aspect, or exposure, a powerful influence is found, which is capable of altering exceedingly the value of lands. The same sort of soil and subsoil, it is said, which is not unfrequently seen on exposed mountains, and hanging to the north, and which in that

situation is not worth more than five shillings an acre, would, if situated in a sheltered vale tract, and lying well to the sun, be worth twenty shillings, or a greater rent. Even on climature, something considerable in this business, it is thought, depends. In the southern part of the country, the harvest is, in general, a month earlier than in those of the north; though it is not regulated exactly by the climate, or the latitude of the places: this is consequently a circumstance that requires to be attended to by those who estimate the values of estates or lands. For an early harvest is not only advantageous in itself, but gives time to till the ground, or to take an autumnal crop, which are advantages that a late harvest will not so well admit of being had. And another kind of temperature of situation has still, it is supposed, more influence on the value of lands, which is that of the moistness of the atmosphere. A moist situation not only gives an uncertain and often late harvest, but renders it difficult and hazardous; as is too frequently experienced on the western coast-sides of this island. Even in the turn of surface, exercise is found, it is said, for the judgment. Lands lying with too steep or too flat surfaces, particularly when of the arable kind, and retentive, are of less value than those which are greatly shelving, so as to give a sufficient discharge to surface-water, without their being difficult of cultivation. Steep-lying lands are not only troublesome and expensive under the operations of tillage, but in taking out manures, and getting off the produce. Lands lying with an easy descent, or on a gently billowy surface, may be worth more by many pounds an acre in the money they will bring, than others of the same intrinsic quality, hanging on a steep. Another consideration of the same weight in valuing an estate, or other landed property, is a supply of water for domestic purposes, for the uses of live-stock, and for the purpose of irrigation. There are situations, it is said, in which a copious stream of calcareous water would enhance the fee-simple value of a large estate some thousand pounds. Likewise a sufficient supply of manure, whether dung, lime, marl, or other melioration, being at a moderate price, and within a moderate distance of land-carriage, materially adds to the intrinsic value of lands. And the established practice of management of the district or county in which an estate or land lies, is capable of enhancing or depressing the value of it exceedingly. Even the single practical point of ploughing light and loamy lands with two oxen, or two active horses, instead of four heavy ones, is capable of making a difference, on good land which is kept alternately in herbage and corn-crops, of from five to ten shillings a year, on the acre; or ten pounds an acre in the money value which it is worth.

The price of labour is also stated as another regulator of the marketable value of land in a given district. It is always right, however, to compare this with the habits of exertion and industry which prevail among farm workmen, before the neat amount of labour can be safely set down. The price of living too, or expence of house-keeping, prevalent among farmers, has its share of influence on the value of lands. In the more reclusive parts of the north of this country, the farmers, especially of the lower and the more inferior classes, and their servants, are fed, clothed, and accommodated, at nearly half the expence of those of a similar degree in many parts of the more central and southern districts. In a county where frugality prevails too, lands of a given quality will ever, it is said, bear a higher rent than they will where a more profuse manner of living has gained a footing. Hence, likewise, the spirit of improvement, or the prejudice against it, which prevails in a district, is a circumstance of some value, it is supposed, in this intention. For

if the former be in a progressive state, especially if it be still in the more early stages of its advancement, a rapid increase of rent may, with a degree of certainty, be expected: whereas, under the leaden influence of the latter, half a century may, it is thought, pass away before the golden chariot of improvement can be profitably put in motion. And lastly, may be noticed, it is said, the attractive centre to which the labours of the husbandman will ever tend,—markets, in which, more than in any other circumstance, we are to look for the existing value of lands. Their influence is not confined to towns and populous places of manufacture, for in ports, and on quays, whether of inlets, estuaries, rivers, or canals, markets are met half way: even by good roads their distance from the farmstead may be said to be shortened.

In this detail of the particulars of situation in respect to the value of landed property, it is observed, the attention requisite to be employed by a valuer who is called upon to act in a county that is new to him is perceived. A provincial, or even a professional valuer, who acts in a district, the existing value of the lands of which he is sufficiently acquainted with, determines at sight, and according to the best of his judgment, on their respective values: for he knows, or ought to know, their current prices; what such and such lands let for in that neighbourhood; what he and his neighbours give, or would give, for lands of the same quality and state, without advertent to the particular circumstances of the situation, they being considered and given as the established amounts arising out of them; resting his judgment solely on the intrinsic quality and existing state of each field or parcel as it passes under his eye. But let his skill be what it may in a county or district in which he has acquired a habit of valuing lands, he will, in a distant part or district, the current market prices of the lands of which may be ten, twenty, or fifty *per cent.* above or below those which he has been accustomed to put upon lands of the same intrinsic qualities and existing states, find himself at a loss; until he has learnt the current prices of the place or county, or has well weighed and considered the circumstances of situation: to which, in every case, he must necessarily attend, before he can determine their value under an improved practice, or venture to lay down general rules for their improvement.

4. Another class of circumstances which influence the marketable value of lands still remains, it is said, to be enumerated and considered. These relate to their existing state, or the manner in which they lie at the time. Their state in respect to inclosure is a matter of great consideration. Open lands, though wholly appropriated, and lying well together, are of much less value, except for a sheep-walk, or a rabbit-warren, than the same lands would be in a state of suitable inclosure. If they be disjointed and intermixed in a state of common field, or common meadow, their value may be reduced one-third. If the common fields or meadows be what is often termed *Lanmas* land, and become common as soon as the crops are off, the depression of value may be set down at one-half of what they would be worth in well-fenced inclosures, and unincumbered with that ancient custom. The difference too in the value between lands which lie in a detached state, though within well-fenced inclosures, and those of the same quality that lie in a compact form, or, in the familiar phrase, within a ring-fence, is considerable. The disadvantages of a scattered estate are, it is said, similar to those of a scattered farm. Even the single point of a want of convenient access to detached fields and parcels is, on a farm, a serious evil. And it is on the value of farms that the value of an

estate or land is to be calculated. The state of the roads, whether public or private, within an estate, and from it to the neighbouring markets, or places of delivery of produce, is further an object of consideration. And in this view, the state of the water-courses, or sewers and ditches, within and below an estate, likewise requires to be examined into; as the expence of improvement or reparation will be more or less, according to their existing state at the time; or, perhaps, by reason of natural causes, or through the obliquity of a neighbour, and the defectiveness of the present laws of the country in this respect, the requisite improvements cannot be effected at any expence. The state of drainage of lands that lie out of the way of floods, or collected water, requires also to be taken into consideration. For although the art of draining be now pretty well understood, it cannot be practised on a large scale, without much cost. The state of the lands too, as to tillage and manure, is entitled to more regard than is generally bestowed on it, in valuing them. But even to a purchaser, and still more to a tenant for a term, their state in these respects demands a share of attention. Lands that are in a high state of tillage and condition, so as to be able to throw out a succession of full crops, may be worth five pounds of purchase-money an acre, more than those of the same properties, which are exhausted by repeated crops, and lie in a useless state of foulness; from which they cannot be raised, but at a great expence of manure and tillage. Their state, as to grafs or arable, is, it is thought, better understood, and generally more attended to. Lands in a state of profitable herbage, and which have lain long in that state, are not only valuable as bearing a high rent while they remain in that condition, but, after the herbage has begun to decline, will seldom fail to throw out a valuable succession of corn-crops. Hence the length of time which lands, under valuation, have lain in a state of herbage, especially if it has been kept under pasturage, is a matter of inquiry and estimation in the execution of business of this sort. And, lastly, the state of farm buildings and fences is, it is conceived, a thing of serious consideration. Buildings, yards, and inclosures, that are much let down, and gone to decay for want of timely reparation, incur a very great expence to raise them again to their proper state. And when great accuracy of valuation is called for, as where the purchase value of an estate is left to reference, and when the tenants are not bound, or if bound are not able, to put them in the required state, it becomes requisite to estimate the expence which each farm, in that predicament, will require to put it in sufficient repair, so as to bring the whole into a suitable state of occupation. This comes, however, more properly under the head of deductions, encumbrances, and outgoings, which are considered below. The same principle of valuation as the above holds good too in ordinary cases.

In speaking of encumbrances and deductions, it is said, that it appears, by a long lease, that the fee-simple value of an estate may be in effect annihilated. Even a lease for lives, with a mere conventional rent, may reduce it to nearly one-third of its fee-simple value. And every other kind of lease, if the rent payable be not equal to the fair rental value at the time of the disposal, is an encumbrance, even to a purchaser who has no other object in view than that of securing his property on land, and receiving interest in rent for the money laid out. If personal convenience be immediately wanted, or improvements required to be done, a lease, though the tenant pays a full rent, becomes an obstacle to the purchase, and is consequently to be considered in fixing the value. And an error, which is not unfrequently committed in estimating the encumbrance of a lease

VALUATION OF LAND.

For a term of years, is here, it is said, to be noticed. The difference between the lease rent and the full rental value, encumbered with the same outgoings and repairs as the lease rent, being ascertained, it is multiplied by the number of years unexpired, and the product in full deducted from the value of the land, free from such encumbrance. But from the product, thus found, ought to be deducted half the interest thereof, during the said number of years, together with that of one half-year over, if the rent be payable half-yearly, or of one year, if payable annually. For all that a purchaser has a right to expect is to receive the full rent for his land, during the continuance of the lease. The tenant pays him what the lease stipulates; and if the feller were to make up the remainder, at the end of every six or twelve months, whenever the tenant is to pay his part, the purchaser would receive the full rent, the same as if no encumbrance had existed. But if the feller pay down the whole sum in ready money, at the time of the sale, which in effect he does, he is certainly entitled to some discount for prompt payment. Thus, supposing the difference of rent, occasioned by the lease, to be ten pounds a year, and the length of the term to run to be ten years, the product would be one hundred pounds. And supposing, for the ease of calculation, the stipulated payments to be annual, the interest to be deducted would be the half of fifty pounds, (the interest of one hundred pounds for ten years, at 5 per cent.) with the half of five pounds (one year's interest), together amounting to twenty-seven pounds ten shillings; which being deducted from one hundred pounds, the gross product, leaves seventy-two pounds ten shillings, the clear sum to be deducted. And the truth of this rule of calculation may, it is thought, be familiarly proved: for if the feller were only to pay the deficiency of rent, as it should become due, he would, during the first year, hold the whole hundred pounds in his hands, the interest of which, at 5 per cent., is 5*l*.

The first year (as above) he would hold	£ 100	£ 5	0	0
The second ditto - - - -	90	4	10	0
The third ditto - - - -	80	4	0	0
The fourth ditto - - - -	70	3	10	0
The fifth ditto - - - -	60	3	0	0
The sixth ditto - - - -	50	2	10	0
The seventh ditto - - - -	40	2	0	0
The eighth ditto - - - -	30	1	10	0
The ninth ditto - - - -	20	1	0	0
The tenth ditto - - - -	10	0	10	0
		27	10	0

In respect to tithes, where in valuing lands they are considered as tithe-free, the tithe or modus, if any, requires to be deducted, as an encumbrance; and from the great variation in the values of tithes and moduses, according to custom, and plans of occupation, it is the plainest way of proceeding to value all lands as free of tithe, and afterwards to make an allowance for whatever they may be estimated to be worth. In regard to taxes, too, although it may be called the custom of the country for proprietors to pay the land-tax, and the occupier all the other taxes; yet this is not the universal practice; nor is it, in valuing an estate on sale, and to be let at will, a matter to be inquired into. The annual amount of payable taxes, and other outgoings, are the facts to be ascertained: for whosoever discharges them, they come as a burden upon the gross value of the lands, out of which they are payable. For if a tenant pay them, his rent is, or ought to be, estimated and fixed accordingly. But

if an estate on sale is already let under lease, for a term to come, it is highly requisite to ascertain what parts of the annual outgoings and repairs are discharged by the tenants, and what the proprietor will be liable to, during the term to run. The land-tax, where it still exists, is extremely uncertain as to its value; and the poor-tax is equally varying in different situations. The church, highways, and county rates are, taking them on a par of years, less liable to local uncertainty, and are consequently less entitled to inquiry by a valuer of lands. And the fixed payments, or rent charges, such as chief rents, quit-rents, annuities, endowments, schoolmasters' salaries, charitable donations, and others of the same kind, to which an estate is liable; also repairs of public works, buildings, roads, &c. incumbent on the estate, are subjects of inquiry and estimation; as well as the ordinary repairs. Further, too, the hazard or risk under valuation, as that of their being liable to be inundated in summer, or to be torn away by floods at any season, is entitled to mature consideration. For although these evils may generally be remedied by river-breaks and embankments, the erecting of them is mostly attended with great expence; and the estimated value of this becomes, in course, a fair deduction to be considered by the land-valuer. It is noticed that there are two practical methods of valuation, with respect to taxes and other outgoings, as in regard to tithes; namely, either to set down the gross value of the lands, and then to deduct the outgoings; or to view them under their encumbrances, and to estimate in a summary way their neat rental value. The latter is the more general, but the less accurate, manner of performing the business.

This, it is said, is what relates to the purchase value of the lands, but that, appurtenant to an extensive estate, there are generally other valuable considerations; as *minerals* and *fossils*, whether metals, fuels, calcareousities, or groffer earths; *waters*, whether they are valuable for fisheries, decoys, mills, domestic uses, or the irrigation of lands; and *timber*, as of woods and hedge-rows. Buildings, too, that are not let with the farms, but which bear rent, independent of the lands; which, when scattered over an estate, may well be considered as belonging to landed property. To these may be added, the estimated value of evident improvements: and, lastly, the abstract rights which arise out of appropriated lands, or their appurtenances, as the *right of commonage*, which is generally of some value, even when commons lie open, and may be of more, when they shall be inclosed; provided the cost of inclosure do not turn out to be more than the extra value of the appropriated lands, above that which naturally or fortuitously attends the lands of the common right in their open state. The *right of seigniority* to fee-farm rents, or other chief rents, payable to the possessor of lands on sale out of the lands of other proprietors. These rents, though small, are of certain value in themselves; and the idea of superiority, which they convey to the minds of some, may be worth more than the pecuniary value; which indeed, where the sums are very small, as is often the case, is much lowered by the expence of collecting them. The *rights of feudality*, or manorial rights, are at present, if not in their origin, very different from those last mentioned; and the value of which is to be estimated by the quit-rents, fines, heriots, escheats, and americiaments, which long custom and a train of circumstances have attached to the given court. And beside what relates to the appropriated lands of the manor, the lord has a profit arising from the commonable lands, if any lie within it, as lord of the soil; which cannot be broken without his permission: hence the minerals and fossils which it covers belong to him, as well as the timber which grows upon the waste, and the waters

waters that are connected with it. Moreover, in ordinary cases, he is lord of the game which inhabits or strays upon his manor. This being, however, a right of pleasure rather than profit, has no fixed standard of estimation. The *right of tithes*, when attached to an estate, is the most desirable of abstract rights arising out of landed property. For as far as the right extends, whether to a lay rectory or a vicarial impropriatorship, the lands which it covers become in effect title-free; as every judicious proprietor incorporates the rents of the tithe with those of the lands out of which it is payable: thus, if the right, as it generally is, be rectorial, freeing them wholly from the encumbrance of tithes, as a tax on improvements, and as an obstacle to the growth of grain. The *right of advowson*, or the privilege of appointing a pastor to propagate religion and morality upon an estate, properly enough belongs to its possessor; as no other individual is so intimately concerned in the moral conduct of its inhabitants. The *right of representation*, or election, or the appointment, in whole or in part, of a legislator to assist in promoting good order in the nation at large. And what class of the community, it is asked, can produce a fairer claim to this right than the proprietors of the country? The value of these rights is left for others to estimate and determine. See **TIMBER** and **TITHES**.

The chief circumstances to be considered having thus been pointed out, and their importance and influence explained, in concluding the subject it may be observed, that the difference between the particulars that give value to a landed estate, and the encumbrances to which it is liable, is the net value of the property under valuation.

VALUE, VALOR, in *Commerce*, the price or worth of any thing.

VALUE, Intrinsic, denotes the proper, real, and effective worth of any thing; and is used chiefly with regard to money: the popular value of which may be raised and lowered at the pleasure of the prince; but its real or intrinsic value, depending wholly on its weight and fineness, is not at all affected by the stamp or impression thereon.

It is generally on the foot of this intrinsic value, that species are received in foreign countries; though in the places where they are coined, and where the sovereign power makes them current, they sometimes pass for much more.

It is, in good measure, on the difference of those two values, one of which is, as it were, arbitrary, and the other, in some sort, natural, that the difference of exchanges depends; and those still rising and falling, as the rate at which a species is current, comes nearer or farther off the just price of the metal of which it consists.

VALUE, in *Bills of Exchange*, is used to signify the nature of the thing (as ready money, merchandizes, bills, debts, &c.) which is given, as it were, in exchange for the sum specified in the bill.

From four different manners of expressing this value, some distinguished four kinds of bills of exchange. The first bears *value received*, simply and purely, which comprehends all kinds of value; the second, *valued received in money or merchandize*; the third, *value of myself*; and the fourth, *value understood*.

The first is dangerous, and the fourth but little used: accordingly, to have the value well expressed, and to prevent the ill consequences of oversights therein, it is well provided by the French ordonnance of 1673, that bills of exchange should contain the name of the person to whom the contained sum is to be paid; the time of payment: the name of him who has given the value; and whether it was received in money, merchandize, or other effects.

VALUE, Valor, or *Valentia*, in *Law*. West gives us a nice difference between *value* and *price*; the value (says he) of things in which offences are committed, is usually comprised in indictments; which seems necessary in theft, to make a difference from petty larceny; and in trespasses, to aggravate the fault and increase the fine.

But no price of things *feræ nature* may be expressed, as of deers, hares, &c. if they be not in parks or warrens. And where the number of things taken is to be expressed in the indictment, as of young doves in a dove-house, there must be said *pretii*, or *ad valentiam*: but of divers dead things, *ad valentiam*, and not *pretii*: of coin not current, it shall be said *pretii*; but of coin current, neither *pretii* nor *ad valentiam*; the price and value being certain.

VALVE, VALVULA, formed from *valva*, *folding-doors*, in *Hydraulics, Pneumatics*, &c. is a kind of lid, or cover, of a tube or vessel, so contrived as to open one way; but which, the more forcibly it is pressed the other way, the closer it shuts the aperture: so that it either admits the entrance of a fluid into the tube or vessel, and prevents its return; or admits it to escape, and prevents its re-entrance. For water, those valves are the best which intercept the passage least; and none appear to answer this purpose better than the common clack-valve of leather, which is generally within single, or divided into two parts; but it is sometimes composed of four parts, united so as to form a pyramid, nearly resembling the double and triple valves which are formed by nature in the hearts of animals. A board, or a round flat piece of metal, divided unequally by an axis on which it moves, makes also a very simple valve. Where a valve is intended for intercepting the passage of steam, it must be of metal: such a valve is generally a flat plate, with its edge ground somewhat conically, and guided in its motion by a wire or pin. For air, valves are commonly made of oiled silk, supported by a perforated plate or grating.

Valves are of great use in the air-pump and other wind-engines; in which they are ordinarily made of pieces of bladder, or oiled silk.

In hydraulic engines, as the emboli of pumps, they are frequently of leather; the figure round; and they are fitted to shut the apertures of the barrels or pipes.

Sometimes they are made of two round pieces of leather, inclosed between two others of brass; having divers perforations, which are covered with another piece of brass, moveable upwards and downwards, on a kind of axis, which goes through the middle of them all.

Sometimes they are made of brass, covered over with leather, and furnished with a fine spring, which gives way upon a force applied against it: but, upon the ceasing of that, returns the valve over the aperture. (See **PUMP**.) See also for the construction of different sorts of valves for the buckets of pumps, Defaguliers, Exp. Phil. vol. ii. p. 156, &c.; and for the description of a new valve by M. Belidor, *ibid.* p. 180.

VALVE, in *Anatomy*. See **VALVULA**.

Constantine Varolius, a Bolognese, and physician of Gregory XIII., who died in 1570, was the first that observed the valve in the colon. Bart. Eustachio, a native of San Severo, in Italy, discovered about the same time the valve at the orifice of the coronary vein; and that remarkable one at the orifice of the lower trunk of the vena cava, near the right auricle of the heart: though he did not take it for a valve, but merely for a membrane.

Sig. Lancisi, physician to pope Clement XI., who first published Eustachio's works, takes the use of this valve to be, to prevent the blood of the upper vena cava from

striking with too much violence against that of the lower : and Mr. Winslow, who has considered it very diligently in the *Memoirs of the Royal Academy of Sciences*, is much of the same opinion.

But as it gradually dwindles in children, and at length becomes quite lost in adults, still diminishing as the foramen ovale does, it should seem to have some other office, and that chiefly regarding the circulation of the blood in the fœtus.

In effect, by means of it, M. Winslow reconciles the two opposite systems of the circulation of the blood in the fœtus. See *Circulation of the BLOOD*, and *FÆTUS*.

VALVE, in *Gardening*, the divided parts of a seed-vessel, or properly the external division of a dry seed-vessel, such as a capsule or pod ; as in the pea, bean, vetch, and many others, which, when ripe, splits into two or more divisions, in order to throw out the contents, each of which divisions is denominated a valve. The valves of culinary vegetables are of several different kinds, according to the number of divisions, but principally of the univalve and bivalve kinds.

VALVERDE, or VAL VERDE, in *Geography*. See *IÇA*.

VALVERDE, a town of Spain, in New Castile ; 20 miles S. of Cuença.

VALVERDE *del Camino*, a town of Spain, in the province of Seville ; 17 miles N.E. of Moguer.

VALVERDE *de Fresno*, a town of Spain, in the province of Leon, on the borders of Portugal ; 24 miles N.N.W. of Coria.

VALUIKI, a town of Russia, in the government of Voronez ; 103 miles S.S.W. of Voronez. N. lat. 50° 2'. E. long. 37° 44'.

VALUNTOWN, a town of the state of Connecticut ; 10 miles N.N.E. of Norwich.

VALVULA, VALVE, in *Anatomy*, a name given to various parts in the body. See VALVE.

VALVULA *Coli*, or *Ilei*, the valve placed at the communication of the large and small intestines. See *INTESTINE*.

VALVULÆ *Conniventes*, folds of the mucous membrane of the small intestine. See *INTESTINE*.

VALVULA *Eustachii*, *Nobilis*, or *Reticulata*, a small fold at the entrance of the inferior vena cava into the right auricle. See *HEART*.

VALVULA *Magna Cerebri*, or *Vicussenii*, a part of the brain. See *BRAIN*.

VALVULA *Mitralis*, the valve of the left auriculo-ventricular orifice of the heart. See *HEART*.

VALVULA *Semilunares*, or *Sigmoidea*, valves placed at the entrance of the aorta and pulmonary artery. See *HEART*.

VALVULA *Tricuspidales*, or *Triglochina* ; the valve of the right auriculo-ventricular opening of the heart. See *HEART*.

VALVULÆ *Venarum*, folds of the internal membrane of the veins, preventing the reflux of the blood. See *HEART*.

VAMA, in *Ancient Geography*, one of the navigable rivers of India, which discharged itself into the Ganges. Pliny.—Also, a town of Spain, in Bœtica, belonging to the Bœtice-Celtici. Ptolemy.

VAMANA, in *Mythology*, a name or title of the Hindoo deity Vishnu. It means a *dwarf* ; and was applied in consequence of an incarnation of Vishnu in this humble form. See the next article.

VAMANAVATARA, one of the ten grand incarnations of Vishnu ; called, by way of pre-eminence, *dava-vatara*, or the *ten descents*, to distinguish them from others of the same deity of less importance. As noticed under the article *VISHNU*, this manifestation was the fifth of the ten ;

but the first that occurred after the golden or virtuous age of the Hindoos. It was followed by a less virtuous age, in the course of which Mahabeli, a monarch reasonably virtuous, became so elated, that he omitted the essential ceremonies to the gods ; and Vishnu, deeming it expedient to check the influence of such an example, resolved to punish the arrogant raja. He, therefore, condescended to become the son of Kasyapa and Aditi ; and, as the younger brother of Indra, was incarnated in the person of a wretched Brahman dwarf. (See *INDRA* and *KASYAPA*.) Appearing before the king, he asked a boon ; which being promised, he demanded as much as he could pace in three steps. Nor would he desire farther, though urged by Beli to demand something more worthy of the donor.

Mahabeli, it would appear, had resorted to some of these processes ; and the boon asked and yielded, was, as usual with mighty rajahs, the sovereignty of the universe ; which includes the three regions of the earth, heaven, and hell. To avert the effects of the abuse of this power, dangerous even to the gods, and to resume their sovereignty, Vishnu resorted to the artifice we are describing.

On obtaining the king's promise, the dwarf required a ratification of it ; which was done, as is still practised, by pouring water on the hand of the suppliant. This Beli proceeded to do, though warned of the consequences ; scorning not to ratify that for which his royal word stood pledged.

As the water fell into his hand, the dwarf's form expanded till it filled the world ; and Vishnu now manifesting himself, deprived Beli at two steps of heaven and earth ; but he being in some points a virtuous monarch, left Patala, or the lower regions, still in his dominion. (See *PATALA*.) In this character, Vishnu is sometimes called *Trivikrama*, or *Trivikera*, meaning the three-step-taker. Beli, as king of the infernal regions, seems to correspond with *Yama* ; which see. Sir William Jones deemed this king the same with the Belus of western history. See *BELUS*, and *MAHABELI*.

Writers of the sect of Vaishnava maintain, that the ratifying stream poured on the hand of Vishnu, was the origin or source of the river Ganga, or *Ganges* ; which falling from the hand of the miraculous dwarf, descended thence upon his, now Vishnu's, foot ; whence, expanding like its fount, it gushed a mighty river, and was received on the head of Siva. In pictures and casts of the latter deity, the goddess Ganga is frequently seen half concealed in the folds of his hair, and Siva is hence named *Gangadhara*, or *Ganges-bearer* : a name assumed also by a class of itinerants who sell that holy water through the streets of all Indian cities : it being among Hindoos equal, in sin-expelling potentiality, to the holy water of papacy. This mythological source of the blessing and blessed river is a favourite subject with Hindoo poets.

In the Hindoo Pantheon, whence this article is partly taken, are many legends connected with it.

In pictures of this avatara, the dwarf is usually represented receiving the water from the hand of Beli, through a spouted vessel ; sometimes accompanied by the evil counsellor Indra, or *Sakra*, who is represented either with only one eye, or holding his hand before the other. As the regent of the planet Jupiter, named *Vrihaspati*, is the counsellor or preceptor to the gods and Suras ; so *Sakra* is the adviser of the demons or *Asuras* ; and is constantly watchful in counteracting the divine beings, and their endeavours for the good of man ; and the pious endeavours likewise of holy men. To prevent the conserving power in this avatara from accomplishing the projected end, in the punish-

ment of impiety and arrogance, personified in Beli, Sakra apprized him of the deceit under which he was promising the universe away. But as the monarch had too much pride to recant his royal word, the evil counsellor assumed the form of a musquito; and insinuating himself into the spout of the vessel through which the ratifying stream was to pass, arrested its passage; when the dwarf, taking a straw to clear it, thrust out the eye of the gnat, a defect ever after retained by Sakra in all shapes. It is said to indicate the half enlightenment of evil counsellors: still, why the one-eyed admirer of ill should be the thousand-eyed god, has not been explained. Nor will it, perhaps, be deemed worth while to enter into any lengthened explanation of the apparently ridiculous fables mentioned in this article; though we believe they might be explained from a consideration that all Hindoo history, religion, arts, and science, are buried in a mass of mythological legends. We will just mention, that the fabulous source of the Ganges, whether from the head of Siva, or from the foot of Vishnu, the latter being the principle of humidity, the former of heat, is merely a physical dispute between what in Europe would be called Neptunists and Vulcanists, but what in India assumes the form of theological controversy. Whether the Ganges be of volcanic origin, or descends from the eternal snows of Nepaul, is perhaps the point here disputed between the Saivas and Vaishnavas. (See of this under the articles SAIVA and SIVA.) As to the musquito, Indra is the god of showers, regent of the firmament; closely allied to Vishnu, air being a form of humidity; and the musquito partakes, like Vishnu, of both its forms: it is born, or reposes, like the god, in water, and lives in air. But we shall pursue these mythological allegories no farther.

One of the eighteen sacred poems, called Purana, is named after this avatara, (see PURANA,) and details a great mass of poetical incident connected with it. The reader may perhaps smile in hearing that England is the supposed theatre of several of the incarnations of Vishnu, and of this of Vamana among them. On this point, we refer to the second article of the 11th volume of the Asiatic Researches.

VAMBA, in *Geography*, a river of Angola, which runs into the Coanza, near Cabelo.

VAMIGELA, in *Ancient Geography*, a town of Africa, in Mauritania Cæsariensis. Ptol.

VAM-KAPOSE, in *Geography*, a small island in the Chinese archipelago, where the celebrated St. F. Xavier was buried; 62 miles S.W. of Macao.

VAMPYRE, in *Mythology*, a name given to an imaginary demon, which, it is pretended, sucks the blood of persons during the night, and thereby destroys them. These vampyres were supposed to animate the bodies of dead persons, which when dug up were found fresh, florid, and full of blood. Those who were killed by vampyres were said to become vampyres themselves: the way to destroy them was to drive a stake through them, at which time they would give a horrid groan; and to burn the body to ashes. This species of superstition occasioned, some years ago, great disturbances in Hungary and other places.

VAMPYRE, in *Zoology*, the *Vespertilio vampyrus* of Linnæus, called also *ternate*, and by Buffon *la rouffette* and *la rougette*, is a species of bat with large canine teeth, four cutting-teeth above, and the same below; sharp black nose; large naked ears; tongue pointed, and terminated by sharp aculeated papillæ; exterior toe detached from the membrane; the claw strong and hooked; five toes on the hind-feet; talons very crooked, strong, and compressed sideways; no tail; the membrane divided behind quite to the rump; va-

rying in colour, some being entirely of a reddish-brown, and others dusky; and also in size, some having the extent from tip to tip of the wings four feet, others five feet four inches; and others extending farther than a man can reach with his extended arms. This animal inhabits Guinea, Madagascar, and all the islands from thence to the remotest in the Indian ocean. They are also found in New Holland, the Friendly Islands, the New Hebrides, and New Caledonia. They fly in flocks, obscuring the air with their numbers; beginning their flight from one neighbouring island to another, immediately on sun-set, and returning in clouds from the time it is light till sun-rise, and during the day lodging in hollow trees: they live on fruit, and are so fond of the juice of the palm-tree, that they will intoxicate themselves with it till they drop on the ground. In New Caledonia, the natives use their hair in ropes, and in the tassels of their clubs. The Indians eat them, and declare their flesh to be very good. The French who live in the Isle de Bourbon, boil them in their bouillon, to give it a relish. While they are eating, they make a great noise; their smell is rank; and their bite, resistance, and fierceness, very great when taken. The ancients had some knowledge of these animals, and M. de Buffon apprehends, that from the account of them the poets formed their fictions of harpies. Linnæus calls this species vampyre, conjecturing it to be the kind which draws blood from people in their sleep. The bat is so dexterous a bleeder, as to insinuate its aculeated tongue into the vein without being perceived, and then suck the blood till it is satiated; all the while fanning with its wings, or agitating the air so as to cast the sufferer into a still sounder sleep. In certain parts of America they have destroyed all the great cattle introduced there by the missionaries. Pennant's Hist. Quadrupeds, vol. ii. p. 548, &c.

VAMPYRE is also a name given by M. de Buffon to the *vespertilio spectrum* of Linnæus, or bat with a long nose, large teeth, long, broad, and upright ears; with a long, conic, erect membrane at the end of the nose, bending at the end, and flexible; hair on the body cinereous, and pretty long; wings full of ramified fibres; a membrane extending from one hind leg to the other; no tail, but three tendons extending from the rump, and terminating at the edge of the membrane. This animal inhabits South America, lives in the palm-trees, and grows very fat. Buffon supposes it to be the species that sucks human blood. Pennant. See ANDIRA.

VAN, VANT, or *Vaunt*, (of the French *avant*, or *avaunt*, before,) is a term used in composition with several words in our language. As,

VAN-Couriers, are light armed soldiers, sent before armies to beat the road, upon the approach of an enemy.

VAN-Fosse, a ditch dug without the counterescarp, and running all along the glacis; usually full of water.

VAN, *Vant*, or *Vaunt-Corps*. See CORPS.

VAN, or *Van-Guard*. See GUARD.

VAN-Lay. See VAUNT.

VAN, in *Agriculture*, a name sometimes used to signify an implement or contrivance for winnowing, or cleaning corn with. See WINNOWING Machine.

VAN, in *Sea Language*, denotes the foremost division of any naval armament, or that part which usually leads the way to battle, or advances first in the order of sailing. See ENGAGEMENT and FLEET.

VAN, in *Mining*. To make a van, is to take a handful of the ore or tin-stuff, and bruise, wash, and cleanse it on a shovel; then, by a peculiar motion of the shovel, to shake and throw forth upon the point of it almost all the ore that is freed from waste. This operation being repeated, the ore

is collected and reserved, and from thence they form an estimate how many tons of copper-ore, or how many hundred weight of block-tin, may be produced out of one hundred sacks of that stuff, of which the van is made. Pryce's Mineral. Com. p. 330. See TIN and VANNING-SBOVEL.

VAN, (*Artemita*), in *Geography*, a city of Armenia, situated two miles from a lake of the same name. It is surrounded with a good wall and deep ditch, and has four gates. On the N. is a castle, built on a high and perpendicular hill, which rises abruptly from the plain. This fortress can only be approached by one passage, so narrow as to admit only two persons abreast; it is always supplied with corn and military stores, and in the centre of the work stands the palace of the aga of the janizaries. This city is abundantly furnished with water and provisions; the houses are built of stone and tile; the streets are spacious and well paved, and the population is said to amount to 50,000 souls, of which number two-thirds are Turks, and the rest Curds and Armenians. The air is pure, and the environs of the city delightful. It is four days' journey from Bayazid, a city of one of the Turkish pachalics of Armenia, twelve from Erzeroom, another of them, five from Betlis, and about the same distance from Khoi.

The lake (*Arfsa* of Ptolemy) is about 168 miles in circumference; and although the water is more sweet than that of Urumea, it is so brackish as to be unfit for the common purposes of life, according to the common opinion, though some say it is very good. There are four islands in the lake, on one of which are an Armenian monastery, and 300 priests. The traffic of the surrounding country is carried on by about 20 or 30 small boats, N. lat. 58°. E. long. 43° 55'. On the N.W. side of the lake, three days' journey from Van, is Argish (the ancient Arzes), containing 6000 inhabitants. And in a westerly direction from Argish is Moosh, the ancient Moxoene, occupying a small eminence, washed by the Euphrates, over which is a bridge of 15 arches, badly built, and thinly inhabited, but situated in a country equally fertile and populous. The natives of this district, amounting to about 80,000 souls, of which 12,000 are Yezedis, are a base and degenerate race. Tobacco and manna are exported from hence in considerable quantities. M'Kinneir's Mem. of Persia.

VAN, a town of Norway, in the province of Aggerhus; 20 miles N. of Christiania.—Also, a river of South Wales, which runs into the Bristol Channel, about 5 miles below Cowbridge, in Glamorganshire.

VANAHON, a river of America, which runs into lake Michigan, N. lat. 42° 53'. W. long. 87° 10'.

VANAMALI, in *Mythology*, a name of the Hindoo god *Krishna*; which see. This name is said to be derived from a pendent garland of flowers, with which this frolicsome deity is usually decorated. In the following passage he contrasts his appearance, thus decorated, with that of Mahefa, or Siva. "I am not the terrible Mahefa: a garland of water lilies, with subtle threads, decks my shoulders; not serpents with twisted folds: the blue petals of the lotos glitter on my neck; not the azure gleam of poison: powdered sandal-wood is sprinkled on my limbs; not pale ashes." This is addressed to his enchanting mistress *Radha*, under which article a farther extract from the same "Song" will be found. The gleam of poison on his neck alludes to his having drunk the poison produced by the churning of the ocean, as described in our articles *KURMAVATARA* and *SHITAKOONTHA*; and being powdered with ashes, is noticed in the latter part of the article *SECTS of Hindoos*.

VANANCOUPAN, in *Geography*, a town of Hindoostan, in the Carnatic; 15 miles S.W. of Trivady.

VAN-BALEN, in *Biography*. See *BALEN*.

VANBRUGH, Sir JOHN, a dramatic writer and an architect, was a descendant of an ancient family in Cheshire, and was first known to the public as an officer in the army, being considered as a man of wit and a pleasant companion. The first play which he finished was "The Relapse;" and it was acted with great success in 1697. This was followed, in the succeeding year, by "The Provoked Wife;" and in the same year appeared his "Æsop," blending humour with satire and useful morality. In 1702 appeared his "False Friend;" and he was now knighted, and advanced to the post of Clarencieux king-at-arms. When a theatre was erected in the Haymarket, it was placed under the management of Vanbrugh and Congreve by Betterton and the other patentees; and it was opened in October, 1705, with a comedy by Vanbrugh, entitled "The Confederacy," which, though the best written, is the most licentious of this author's dramatic productions, besides three more pieces, imitated from the French; but finding the concern irksome, he disposed of his share. The popular comedy of "The Journey to London" was begun by him, but finished by Cibber. In speaking of Vanbrugh, Pope has blended praise with censure, when he says,

"How Van wants grace, who never wanted wit."

His taste and talents as an architect were first exhibited in the theatre in the Haymarket, for which he obtained subscriptions; and to him was committed the erection of the palace of Blenheim, voted by the nation to the duke of Marlborough. In 1716, king George II. appointed him surveyor of the buildings at Greenwich-hospital, comptroller-general of the royal works, and surveyor of the gardens and waters. On a visit to France, he employed himself in taking views of the fortifications in that kingdom, which caused him to be apprehended and committed to the Bastille; but when he was observed to amuse himself in prison by making sketches of comedies, he was liberated, as a harmless person, without any application from home in his favour. As an architect, he was engaged to build several great houses in England, besides Blenheim; but in this capacity he has unfortunately been transmitted to posterity rather as an object of ridicule than of admiration. Mr. Walpole has passed upon him a severe censure, when he says that "he wanted all ideas of proportion, convenience, and propriety. He undertook vast designs, and composed heaps of little-ness. The style of no age, no country, appears in his works; he broke through all rule, and compensated for it by no imagination. He seems to have hollowed quarries rather than to have built houses; and should his edifices, as they seem formed to do, outlast all record, what architecture will posterity think was that of their ancestors?" The following epigrammatic epitaph was written for Vanbrugh by Dr. Evans, and accords with the above character of his works:

"Lie heavy on him earth, for he
Laid many a heavy load on thee."

Notwithstanding the obloquy above cited, some modern amateurs have vindicated the character of Vanbrugh's architecture, particularly that of Blenheim, admiring its grandeur, and the magnificence of the whole, as well as the picturesque variety displayed in this and in other of his buildings.

In society Vanbrugh bore a respectable character, and had no personal enemies. Swift and Pope have expressed their wish, that they had not indulged their raillery against
one

one "who was a man of wit and of honour." He died of a quinsey, at his house in Whitehall, in the year 1726. Biog. Dram. Walpole's Anecdotes. Burney's Hist. Motic.

VAN-CAMPENS, in *Geography*, a town of the state of New Jersey; 32 miles N.W. of Morristown.

VAN-CHEAU, an island in the East Indian-sea. N. lat. 18° 50'. E. long. 110° 40'.

VANCOUVER'S FORT, a fort of Kentucky, at the union of the two branches of Sandy river.

VANDBANDA, in *Ancient Geography*, a country of Asia, in Sogdiana, between mounts Caucasus and Imaus. Ptolemy.

VANDALE, ANTONY, in *Biography*, was born in Holland in 1638, and though he manifested an inclination for study in his youth, his parents placed him in the department of commerce. At the age of 30, however, he resumed his literary pursuits, and graduated as a physician; and he was also for some time a preacher among the Menonites. His attachment to study prevailed at length over every other occupation, and his literary character was established by many valuable works. Of these the most noted was "Dissertationes duæ de Oraculis Ethnicorum," first printed in 1683, 12mo., and afterwards in 1700, 4to. His opinion was, that the heathen oracles were mere impostures, and that they did not cease at the coming of Christ; which at the time was a bold assertion, as it contradicted the sentiments of some of the fathers. Fontenelle abridged these dissertations in his "Histoire des Oracles." (See the article ORACLE.) In 1696 he published a work, "On the Origin and Progress of Idolatry," which contained "A Dissertation on true and false Prophecy;" "A Dissertation on the Narrative of Aristæus on the Seventy Interpreters;" "The History of Baptisms, Jewish and Christian;" "A Dissertation on Sanclioniatho;" and "Dissertations on some ancient Marbles." Some of these have been published separately. In all his writings, Vandale manifested solid erudition, united with sagacity and a spirit of free inquiry; but he wants method, and his style is obscure. He was allowed, even by those who differed from him in opinion, to be a man of great probity, of an agreeable disposition, and entertaining conversation. His lot was that, which has not been uncommon with persons of literature, namely, indigence; for he sold his books before his death, which happened at Haerlem in 1708. Moreri. Le Clerc.

VANDALS, in *Ancient Geography*, a people of no very high antiquity, who were originally a Gothic nation. (See GOTHS.) Pliny and Procopius concur in this account of their origin; and the latter writer, more especially, affirms in express terms, that the Goths and Vandals, though distinguished by name, were the same people, agreeing in their manners, and speaking the same language. They were called Vandals, from the Gothic word "Vandelen," which signifies to "wander," because they often changed their situation, migrating from one country to another. They are supposed to have come originally out of Scandinavia, with the other Goths, under the command of king Eric, and to have settled in the countries now known by the names of Mecklenburg and Brandenburg. When Berig, king of the Goths, several ages afterwards, brought with him a colony of Goths from Scandinavia, and settled in Pomerania, he subdued the Vandals, who inhabited those countries, and incorporated them with the new settlers. In the reign of Augustus, some of the Vandals, being frightened in their own country for want of room, took up their abode on the banks of the Rhine; but were driven from thence by Tiberius and Drusus, and compelled to return home. Their country being overstocked

with inhabitants, they soon afterwards pursued an eastern route, and driving out the Sclavi, who occupied the territory that lay between the Bosphorus Cimmerius and the Tanais, and taking possession of their country, assumed the appellation of the ancient inhabitants. Some of them, several ages after, in the reign of Mauritius, which began in 586, settled in Dalmatia and Illyricum, to which they gave the name of Sclavonia; and others migrated to the eastern parts of Dacia beyond the Danube, a province which comprehended the countries now denominated Transylvania, Moldavia, Walachia, and the eastern parts of Upper Hungary. From those who remained in Germany, the present Poles and Bohemians are generally said to have derived their origin; but the Vandals, who, under Godegisilus, their king, entered Gaul, and afterwards settled in Spain and Africa, came, as Procopius says, from Dacia and the vicinity of the Palus Mæotis. As the Vandals were a Gothic nation, they retained the customs, manners, religion, and form of government, that subsisted among the Goths. The first of their kings mentioned in history is Godegisilus, under whose command they entered Gaul in 406. He was succeeded by Gunderic, who passed, in 409, from Gaul into Spain, and settled in Galicia. His successor, Genferic, abandoned Spain in 428, and passed with his vassals into Africa, which the Vandals possessed till the year 533, when, under Gelimer, an end was put to their dominion by Belisarius, and Africa was reunited to the empire. Although the Vandals are said to have been inferior in power and courage to all the other barbarous nations, they nevertheless made themselves masters of the most fertile provinces of the empire. They became proselytes to Christianity at the same time with the Goths, embracing the sentiments of Arius, in common with the other Goths, and becoming irreconcilable enemies to the Catholic church. Salvianus extols their continence and chastity.

It was about the year 166 that they began to be troublesome to the Romans, in the reign of M. Aurelius and Lucius Verus; when forming an alliance with other barbarous nations, they invaded the empire, plundered several cities, and, having put to flight the Roman armies, committed every where unparalleled ravages. Having taken possession of Pannonia, they retained it till they were expelled in the year 170, by M. Aurelius. They afterwards entered into an alliance with the Romans; and in 180, it was one of the articles of peace concluded between the emperor Commodus and the Alemans, that they should not make war upon the Vandals. In the second year of Aurelian's reign, A.D. 271, the Vandals passed the Danube, laying waste the neighbouring provinces; but Aurelian compelled them to retire with great precipitation, and having overtaken them in their retreat, obliged them to sue for peace; which was granted, on condition of their delivering, as hostages, the sons of their two kings, and other persons of distinction. Two thousand of their best men were incorporated among Aurelian's own troops. After his death, they entered Gaul; but they were defeated by Probus in several battles, and obliged to withdraw themselves at the approach of the Roman army. Resenting the insults of the Roman soldiers, they made an attempt to recross the Rhine, but sustained a great defeat; and proving unfaithful to their engagements, after having obtained peace, Probus marched against them, put many to the sword, took a great number of prisoners, among whom was their king, and afterwards sent them into Britain, where they are supposed to have settled in the neighbourhood of Cambridge, giving name, as it has been said, to the village of Vandalsburg. Probus allowed several of them to settle in Thrace, which was almost depopulated.

The next mention of the Vandals that occurs is in the eighth year of the reign of Dioclesian, when they engaged in a war with the Goths. About the year 406, or the twelfth of Honorius's reign, they made an irruption into Gaul; but in attempting to cross the Rhine, they were slaughtered by the Franks; and being relieved by the Alans and Suevians, they obliged the Franks to retire, and actually entered Gaul. Having passed through Germania Prima and Gallia Belgica, they took possession of Aquitain, the most fertile and opulent province of Gaul; and advancing as far as the Pyrenæan mountains, they ravaged all the neighbouring provinces. Constantine, however, having been proclaimed emperor by the British legions, passed from Britain into Gaul with a powerful army, and defeated the Vandals and other barbarians in several battles, and at length granted them peace, without stipulating as a condition their leaving the country. The Vandals soon afterwards took up arms, and seized several cities of Gaul, under Maximus, who assumed the honour of being emperor, in opposition to Constantine, the son of Constantine. Finding themselves more vigorously opposed than they expected, they marched towards Spain, which was then in a distracted state, and in the year 409 entered the country; and before the end of the year 410, obliged Constantine to abandon it. After having reduced the provinces of Spain to a deplorable condition, they concurred with the Alans and Suevians in dividing the country between them, and devoted themselves to the operations of agriculture. In this partition, Galicia fell to the share of the Vandals and Suevians, and Bœtica to those Vandals that were called Silingians, who are supposed to have given to their portion the name of Vandalusia, afterwards changed into Andalusia. In the year 416, Vallia, king of the Goths in Gaul, having made peace with the Romans, undertook to drive the barbarians out of Spain; and in 422, Honorius, having heard of the reduced condition of the Vandals in Spain, in consequence of the conduct of Vallia, determined to recover the provinces which they possessed. But his attempts for this purpose were rendered ineffectual by a signal defeat. In consequence of this victory, the Vandals became powerful, established themselves in Andalusia, almost destroyed the city of Carthage, and extended their ravages to the Balearic islands. In the year 428 or 429, Genferic, the king of the Vandals, assembled them together, with their wives, children, and effects, and abandoning Spain, crossed the straits of Gibraltar, and landed in Africa. After their arrival, they gained several victories over the Romans, and so overran the country, that Cirta and Carthage were the only two strong places in Africa possessed by the Romans. At length, *viz.* A.D. 435, a peace was concluded between Valentinian and Genferic; but though the moderation of the Vandal sovereignty was highly extolled, he nevertheless seized Carthage, A.D. 439, whilst the Romans were engaged in a war with the Goths in Gaul; and thus the Vandals remained masters of the proconsular province of Byzacene, Gætulia, and part of Numidia. The capture of Carthage created an alarm in Italy; and preparations were vigorously made for putting Rome in a state of defence, and for inducing all ranks of people to take up arms for the preservation of the country. In the year 455, Genferic took and plundered Rome; and carried over with him into Africa the empress Eudoxia, and her two daughters Placidia and Eudocia, where he detained them till the year 462, marrying Eudocia to Hunneric, his eldest son, who had by her Hilderic, afterwards king of the Vandals in Africa. Upon his return to Africa, Genferic subdued the countries that were still in the hands of the Romans. The emperor Majorianus, being disappointed in his views and plans for the conquest of Africa, concluded a

peace with Genferic, who, after the death of the emperor in 461, sent a powerful fleet to pillage the coasts of Sicily and Italy, and even made himself master of Sardinia. He afterwards took occasion to ravage Peloponnesus and the Greek islands, whence were carried off many captives. Leo repented the affront offered by Genferic to the eastern empire, and prepared for revenge by carrying the war into Africa. In the progress of his powerful armament, Sardinia and Tripoli were recovered from the Vandals; but whilst Genferic solicited of the Roman admiral a truce of five days for settling the terms of his submission to Leo, he contrived to destroy the whole Roman fleet that was armed against him. In the year 475, he concluded a peace with Zeno, the successor of Leo, who, renouncing all claim to the provinces of Africa, yielded them for ever to Genferic and his descendants. Soon after this event, Genferic died, A.D. 477; but the peace was religiously observed by his successor, till the reign of Justinian, who, espousing the cause of Hilderic against his brother Gilimer, who had usurped the crown, drove the Vandals out of Africa, and reunited those provinces to the empire. (See BELISARIUS.) Africa had been their empire, it now became their prison; nor could they entertain a hope, or even a wish, of returning to the banks of the Elbe, where their brethren, of a spirit less adventurous, still wandered in their native forests. In the country between the Elbe and the Oder, several populous villages of Lusatia are inhabited by the Vandals: they still preserve their language, their customs, and the purity of their blood; support, with some impatience, the Saxon or Prussian yoke; and serve with secret and voluntary allegiance the descendant of their ancient kings, who in his garb and present fortune is confounded with the meanest of his vassals. The name and situation of this unhappy people might indicate their descent from one common stock with the conquerors of Africa; but the use of a Sclavonian dialect more clearly represents them as the last remnant of the new colonies, who succeeded to the genuine Vandals, already scattered or destroyed in the age of Procopius. *Anc. Un. Hist.* vol. xvii. *Gibbon's Hist. Rom. Emp.* vol. i. vi. vii.

VANDELEVILLE, in *Geography*, a town of France, in the department of the Meurte; 9 miles N.W. of Mirecourt.

VANDELLIA, in *Botany*, was so called by Linnæus, at the suggestion of Browne, after his correspondent Dr. Dominick Vandelli, who published at Padua, in 1761, a quarto volume in Latin, on the hot-baths of that neighbourhood, with notices of some cryptogamic plants inhabiting therein. Being afterwards appointed superintendent of the royal botanic garden at Lisbon, he published there, in 1771, a small *Fasciculus Plantarum*, dedicated to sir Joseph Banks, describing some supposed new genera, and several new species, with a few figures. Dr. Vandelli is also the author of one or two zoological tracts; and he wrote against Haller's doctrine of the insensibility of the tendons and membranes, to the great displeasure of that illustrious physiologist. This veteran in botanic science visited London, in 1815, at a very advanced age, and, if we mistake not, is since dead.—*Linn. Mant.* 12. *Schreb. Gen.* 419. *Willd. Sp. Pl.* v. 3. 343. *Mart. Mill. Dict.* v. 4. *Juss.* 122. *Lamarck Illustr.* t. 522. (*Matourea*; *Aubl. Guian.* 641. *Juss.* 119.)—Class and order, *Didynamia Angiospermia*. *Nat. Ord.* *Personate*, *Linn. Scrophulariæ*, *Juss.*

Gen. Ch. *Cal.* Perianth inferior, of one leaf, tubular, in four deep, awl-shaped, equal segments, the uppermost sometimes divided, permanent. *Cor.* of six petal, ringent; tube as long as the calyx; limb small; its upper lip ovate, entire;

entire; lower dilated, two-lobed. *Stam.* Filaments four; two from the disk of the lower lip, curved upwards; two from the throat, higher up; anthers ovate, connected in pairs. *Pist.* Germen oblong; style thread-shaped, the length of the stamens; stigmas two, ovate, membranous, reflexed. *Peric.* Capsule oblong, of one cell. *Seeds* numerous.

Eff. Ch. Calyx four-cleft. Corolla ringent. Two exterior filaments from the disk of the lip of the corolla. Anthers connected in pairs. Capsule of one cell, with many seeds.

1. *V. diffusa.* Round-leaved Vandellia. Linn. Mant. 89. Willd. n. 1. "Vahl Eclog. v. 2. 47."—Leaves roundish, nearly sessile, smooth above.—Native of the West Indian islands of Montserrat and Santa Cruz. *Stem* herbaceous, square, cross-branched. *Leaves* roundish-ovate, bluntish, crenate, or bluntly serrated, opposite, on short stalks; smooth above; rather hairy beneath. *Flowers* axillary, opposite, solitary, on short stalks. The habit and size of the leaves resemble *Veronica serpyllifolia*.

2. *V. pratensis.* Oblong-leaved Vandellia. "Vahl Eclog. v. 2. 48." Willd. n. 2. (*Matourea pratensis*; Aubl. Guian. 642. t. 259. Tupeicava, five Scoparia; Pis. Braf. 246.)—Leaves stalked, elliptic-oblong, acute, finely downy on both sides.—Native of moist ground in Cayenne; about the borders of meadows near the town, flowering almost all the year. It is known by the name of Wild Basil (*Basilic sauvage*), and esteemed a good vulnerary. The stems are several, erect, two feet high, leafy, square, forked. *Young branches*, as well as the leaves, soft to the touch, clothed with fine short pubescence. *Flowers* blueish, axillary, mostly solitary. They are delineated in Aublet's figure as having the upper lip in two lobes, the lower in three, which does not agree with the Linnæan generic description, copied above from the *Mantissa*. Yet the other characters, and the habits of the plants, answer so well, that we are persuaded they must, as Schreber suspected, belong to one genus. This opinion is confirmed by Vahl, who mentions this second species as of very frequent occurrence, by the road-sides in South America, from Trinidad to Brazil. The root is annual. The same learned botanist had, no more than ourselves, any opportunity of examining the rare *Vandellia diffusa* alive, nor does it appear whence Linnæus took his description; except possibly from two or three very incomplete dried specimens, which are now scarcely sufficient to assist in forming an opinion on the subject.

VANDEPUT, CAPE, in *Geography*, a cape on the west coast of North America, and east point of Prince Frederick's sound. N. lat. 57° 5'. E. long. 227° 12'.

VANDER-CABEL, in *Biography*. See CABEL.

VANDER-DOES. See DOES.

VANDER-HELST. See HELST.

VANDER-HEYDEN. See HEYDEN.

VANDER-MEER. See MEER.

VANDER-MEULEN. See MEULEN.

VANDER-NEER. See NEER.

VANDERWERF, ADRIAN. This ingenious painter was born at Ambacht, near Rotterdam, in 1659, and received the principal part of his education under Eglon Vander Neer. At the age of 18, he left that master, and becoming acquainted with M. Fluk, who possessed an extensive collection of drawings by Italian masters, to which he had constant access, he, by this aid, and also by drawing after casts from antique figures, formed a style of design much more elevated and pure than that of his countryman and contemporaries.

At about the age of 37, his works attracted the notice of the elector palatine, on his visit into Holland; and he

commissioned him to paint for him a picture of the Judgment of Solomon, and also his own portrait, to be presented to the Florentine gallery of artists; and he invited him to bring the pictures to Dusseldorf. The following year he effected that object, and the elector was desirous of retaining him in his service; but to this Vanderwerf would not consent, but engaged to devote to him six months of the year, for which he received a liberal pension. In consequence, the gallery of Dusseldorf is the theatre of Vanderwerf's glory, and his pictures there are numerous; but they are not very uncommon in this country. The character of them is given by sir Joshua Reynolds, who, in his critical tour into the Netherlands, says, "they (the pictures by Vanderwerf at Dusseldorf) are twenty-four in number in one room, three of them as large as life; a Magdalen, whole length, and two portraits. His pictures, whether great or small, certainly afford but little pleasure; one of the principal causes appears to me, to be his having entertained an opinion that the light of his picture ought to be thrown solely on the figures, and little or none on the ground or sky. This gives great coldness to the effect, and is so contrary to nature, and the practice of those by whose works he was surrounded, that we cannot help wondering how he fell into the mistake. His naked figures appear to be of a substance much harder than flesh, though his outline is far from cutting, or the light not united with the shade, which are the most common causes of hardness; but it appears to me, that, in the present instance, the hardness of manner proceeds from the softness and union being too general; the light being every where equally lost in the ground, or its shadow, and thus producing the appearance of ivory or plaster, or some other hard substance." There is also a want of transparency in his colouring, and he has constantly the defect of Rembrandt, that of making his light only a single spot. However, to do him justice, his figures and his heads are generally well drawn, and his drapery is excellent. He died in 1727, aged 68.

He had a brother, *Peter Vanderwerf*, who copied his pictures, and imitated his manner. Though he occasionally painted history, yet his pictures more frequently represent domestic scenes; which, though not equal to his brother's, are very highly wrought, and have sometimes been mistaken for his. Peter died in 1718, aged 53.

VANDELDELDE, ADRIAN. This excellent painter was born at Amsterdam in 1639. He discovered, whilst he was yet at school, a decided disposition for painting, and covered the walls of his father's house with sketches of all kinds of animals, drawn with an intelligence very unusual at that early period of life, and which induced his father to place him under the tuition of J. Wynants, where he made a very extraordinary degree of progress. Wynants taught him the practice of drawing from nature, and studying in the open air. It was his constant custom to pass his days in the fields, designing every thing essential to his pursuits; and in this mode, infinitely more variety may be obtained than the most inventive genius can supply without it. Besides this useful mode of study, he also applied himself to draw from the human figure, and obtained a considerable degree of excellence. In this respect he very far surpassed his master, who afterwards constantly employed him, as he had previously done Wouermans and Lingelback, to decorate his landscapes with figures and animals; as also did Hackaert, Hobbma, Vander-Heyden, and others, thus giving an additional interest to their admirable performances.

The scenes which Adrian Vandevelde chose for the exercise of his art are in general very confined, and seldom above the ordinary appearance of common nature; but they are

are rendered with so much purity of colour, and fulness and perfection of execution, that they captivate, notwithstanding their simplicity. His animals, which are generally the subjects of his pictures, are designed with correctness, and painted to perfect imitation; particularly his cows, sheep, and goats; perhaps not with so much spirit as those of Paul Potter, but more soft and delicate. His pictures, which are generally small, are universally held in the highest admiration, and are sold at very high prices. Unhappily he died in the very prime of his life, at the age of 33; and yet his pictures are by no means scarce, as his industry was inconceivable, and his facility very great.

Though landscape and animals were his more regular objects of study, yet he felt himself qualified to undertake an historical picture for the Catholic church at Amsterdam; and the ability with which he executed a Descent from the Cross for the altar-piece there, still testifies the power with which he might have distinguished himself in history, had he more regularly pursued it. He died in 1672. There are about twenty etchings by him of cattle and landscapes.

VANDEVELDE, WILLIAM, the *Elder*, was born at Leyden in 1610, and early in life followed the occupation of a mariner. It is not known at what time he turned his thoughts to painting, or by whom he was instructed in the art; but before he was 20, he had acquired considerable reputation for painting marine subjects in black and white. His skill recommended him to the notice of the States General; and Descamp says, that he was furnished by them with accommodations in a small vessel, for the purpose of attending their fleets, and making sketches of their different manœuvres and actions. He was present at various engagements at sea, and frequently exposed himself to danger in the prosecution of his studies. He is said to have been present at the action between the duke of York and the Dutch admiral Opdam, in 1665; and at the more memorable one the following year, between the English and Dutch fleets, commanded by the duke of Albemarle and De Ruyter. King Charles II. invited him to England, where he came some time before 1675; as in that year the king settled a salary upon him of 100*l. per annum*. He continued in the same capacity under king James II., until his death in 1693. He was buried in St. James's church, where is a tomb-stone to his memory.

VANDEVELDE, WILLIAM, the *Younger*, the son of the preceding artist, was born at Amsterdam in 1633. He was initiated in the art of painting by his father, but obtained more knowledge of colouring and effect by studying under De Vlioger, an eminent marine painter; and at length arrived at a degree of perfection in the treatment of those subjects, which still remains unrivalled. After he had practised with great success for some time in Holland, and enriched many cabinets there with his works, his father prevailed upon him to come to England, where he was soon noticed by the king, and complimented with an engagement and a salary such as his father's, and had also apartments provided for him at Greenwich.

During the life of his father, as appears by an order of the privy seal, he was much employed in painting pictures from his sketches, but doubtless rendered more agreeable by his own better taste and feeling. The exercise of his talents, however, was not confined to the service of his majesty; he was constantly employed by various persons, and his pictures are, therefore, to be found in almost every collection which has any pretence to admiration. One of his grandest compositions for chiaro-scuro is in the gallery of the marquis of Stafford, where the majestic forms of the clouds, the motion of the waves and of the vessels, and the

truth and imposing quality of the tone of colour, contend for pre-eminence.

The compositions of the younger Vandevelde are distinguished by a more tasteful arrangement of forms and objects, than is to be found in those of any other marine painter. His vessels are correctly drawn, and the sails, the cordage, and rigging, finished with a delicacy perfectly astonishing, and with unexampled freedom. No one ever surpassed the purity and truth of his tints: whether he represent the serenity of the calm, or the majestic obscurity of the storm, an undeviating correctness and fulness adorn his canvas, and render his works precious in the eyes of all beholders. He died in 1707, at the age of 74.

VAN-DIEMEN'S LAND, in *Geography*. See DIEMEN'S Land.

VAN-DIEMEN'S Road, an anchoring place in the South Pacific ocean, on the coast of Tongataboo, one of the Friendly islands. S. lat. 21° 4'. E. long. 185° 4'.

VAN-DIEST, in *Biography*. See DIEST.

VANDORF, in *Geography*, a town of Germany, in the county of Henneberg, on the Werra; 6 miles E.S.E. of Meiningen.

VANDOSIA, in *Ichthyology*, a name by which some authors have called the *leuciscus*, the common dace.

VANDSHELLING ISLANDS, in *Geography*, a cluster of small islands in a bay of the Pacific ocean, on the north coast of New Guinea. S. lat. 3° 32'. E. long. 136° 15'.

VANDSIA, a town of Norway, in the province of Christianland; 43 miles W. of Christiansand.

VANDUARA, in *Ancient Geography*, a town of Britain, belonging to the Damii; which being considerably to the north-west of Colonia, was most probably at or near Paisley, where Mr. Horsley places it.

VANDY, in *Geography*, a town of France, in the department of the Ardennes; 3 miles N. of Vouziers.

VANDYCK, Sir ANTHONY, in *Biography*. This most justly admired painter was born at Antwerp in 1599, and, according to Houbraken, was the son of a painter on glass, who first instructed him in the elements of the art of painting, but afterwards trusted him for further tuition to the care of Henry Van-Balen, a painter of considerable reputation. He had made a rapid progress under that master, when the increasing fame of Rubens, and the beauty of his works, inspired him with a desire of becoming a disciple of so able an instructor; and his wishes were soon crowned with success. Rubens soon beheld with pleasure the value of the talents brought by Vandyck into his school, and found in him an able and useful assistant in forwarding his larger works from the sketches he himself had prepared; and it was not long ere an incident established Vandyck's superiority above his fellow pupils, and rendered him at once an object of interest and of envy. Whilst Rubens was employed upon his renowned picture of the Descent from the Cross, his pupils were anxious to see it in its progress, and procured admission to his study during their master's absence. One of them, in the wantonness of youth, pushed Diepenbeck, and he fell against the picture, and effaced an essential part of it, on the face of the Virgin, and the arm of the Mary Magdalen, which Rubens had just been painting. Consternation and alarm seized every one present; and to prevent, if possible, the discovery of the accident, John Van-Hoeck proposed that Vandyck should endeavour to restore the picture to the state in which they found it. He did so; and the next morning, when Rubens came into his room, on regarding the picture, he is said to have remarked, "there is a head and an arm which are by no means the worst of what I did yesterday;" and though

afterwards he might have discovered the mischief, he did not change the painting.

It has been asserted by D'Argenville and others, that this circumstance, and the growing ability of Vandyck, alarmed the jealousy of Rubens, and that, in consequence of it, he advised his pupil to renounce historical painting, and adhere to portraiture. But this calumny must be regarded as refuted, by the mere consideration of Rubens having advised Vandyck to go to Italy, where he himself had reaped so much benefit, and where history would be the more sure to rivet the attention of a student. Had he, however, advised him to adhere to portrait painting, it is but a farther proof of his clear perception of the native turn of mind of Vandyck, and a liberal hint how to employ his talents to most advantage, not originating in the mean passion to which it has been ascribed, but in judgment and good-will. That they did not separate upon unfriendly terms is evident, by Vandyck acting upon his advice, as to going to Italy; and presenting his master, previous to his departure, with two historical pictures, and a portrait of his second wife Helen Forman; and receiving from Rubens in return a present of one of his finest horses.

In 1619, when he was 20 years old, Vandyck left his native city for a residence in Italy, and first visited that emporium of colour, Venice, where he copied and studied with great attention, and imbibed the real spirit, of the works of Titian. At Petworth, the seat of the earl of Egremont, are two portraits of sir James and lady Shirley, (who was a Persian lady,) in Persian costume, which exhibit, in the freedom and fullness of colour with which they are painted, the perfect understanding he had of the style of that great Venetian master. From Venice he went to Genoa, where his power was recognised, and his pencil employed, by the principal nobility in their portraits, as well as by several churches and convents, for which he painted historical pictures; and nothing is more astonishing in the history of the art, than the rapidity and facility with which so great a number of works was produced by this extraordinary artist. He is reported to have hung up in his study, on his return from Italy, forty copies made by himself from pictures by Titian, though he was much engaged in original works during his residence there. After some stay at Genoa, he went to Rome, and was there introduced to that patron of elegant literature, the cardinal Bentivoglio, who had been nuncio from the pope in Flanders, and to whom, of course, his talents must have been already known. From this celebrated character he painted that prince of portraits, which for several years was an ornament of the gallery of the Louvre, but now is returned to its original station, the museum at Florence. Nothing in painting has ever surpassed the life and vigour of the head in this surprising and agreeable picture. He painted some historical subjects for the cardinal, and also several portraits of distinguished persons; but not uniting with his countrymen, then at Rome, in the Bentivoglio society, they rendered his residence there unpleasant to him, and he returned to Genoa, where he was caressed and honoured, and met with constant employment. Whilst there, he was invited to Palermo, to paint the portrait of Philibert, prince of Savoy, the viceroy of Sicily, and was engaged in several commissions for the court; but the plague breaking out, obliged him to leave that place, and he soon after returned to Flanders.

The reputation of his growing talents had led his countrymen to an anxious desire of witnessing his power, and several religious communities advanced to employ his pencil. His first public work was his celebrated picture painted for the church of the Augustines at Antwerp. For a time it

adorned the walls of the Louvre, but is now restored to the church whence it was taken. The subject is St. Augustine in Ecstasy, supported by angels, with other faints; of which there is a print by De Jode. Of this performance, which procured him great reputation, Rubens was one of the most zealous admirers; but sir Joshua Reynolds observes, "that in some measure it disappointed his expectation: that it has no effect from the want of a large mass of light." In justice to both painter and critic, it must be observed, that as it was originally painted by Vandyck, St. Augustine was dressed in white, and with the two angels that support him, formed a principal mass of light; but that the monks insisted upon their patron being dressed in black, and would not pay for the picture till it was so done.

Commissions now came fast upon him, and most of the principal public edifices of Antwerp, Brussels, Ghent, and Mechlin, were embellished with the productions of his pencil. About this time he painted that beautiful series of small portraits of the eminent artists of his time, which, for character, for variety, and exquisite execution, remain unequalled. Several of them he etched himself, and the rest have been engraved by the best engravers of that day. One of his most excellent historical productions was painted for the church of the Recollects at Mechlin, which also paid a visit to the Louvre, but was returned with the rest of the spoil from Flanders. Its subject is the Crucifixion, and sir Joshua says of it, that, "upon the whole, it may be considered as the finest of Vandyck's works, and establishes his fame to the title of an historical painter."

The taste and ability thus displayed by this great artist did not insure him from ill treatment by his contemporaries, by whom he was accused of tameness and insipidity; and in addition to this, he endured a great mortification from the canons of the collegiate church at Courtray, for whom he painted the Elevation of the Cross, bestowing upon it all the power of his art. The picture being completed, it was sent to the place of its destination, when, instead of receiving the due meed of praise for its extraordinary merit, it was pronounced by the chapter to be a detestable performance, and they treated the author of it as a miserable artist; and with difficulty he could procure payment for his picture. It was not till the picture had been seen and commended by several artists and connoisseurs, that they became sensible of their error; and then, to atone for such foolish and infensible conduct, they resolved to commission him to paint two more pictures for their church; but Vandyck, with becoming indignation, refused to waste his talents upon men so unworthy of regard, and so little capable to judge of works of art.

Soon after this, he accepted an invitation from Frederic, prince of Orange, to visit the Hague; and there he painted the portrait of that prince, and those of his family, with many of the principal personages of the court.

The patronage which it was understood was to be found at the English court, where Charles I. then reigned, induced Vandyck to visit England in 1629, when he lodged with his friend Geldorp, the painter; but had not the good fortune to attract the notice of his majesty. Disappointed, he returned to Antwerp, with intent to pass the remainder of his life there, when a portrait of sir Kenelm Digby, which he had painted, was shewn to Charles, and he immediately gave orders for an invitation being sent to the painter to return; and accordingly in 1631 he did so, and was most graciously received by the king.

On this second arrival, he was lodged at Blackfriars, at the king's expence; and his majesty was so much delighted with his performances, that he often went by water to visit

visit him, and see him paint; frequently sitting to him for his portrait, having others of his wife and children; and on the 5th July, 1632, conferred upon him the honour of knighthood, and soon afterwards granted him an annuity of 200*l.* a-year for his life.

Popularity and occupation now flowed in full tide upon him, and the rapidity of even his pencil could scarcely keep pace with the commissions he received, for portraits especially. There are few houses of the old nobility of the country wherein there are not to be found some pictures by Vandyck. In the king's palaces, the portraits of Charles and his queen and family are numerous. One of a very fine quality adorns the Louvre. At lord Digby's in Warwickshire, is a great number of his portraits. At Petworth, besides the two pictures mentioned above, painted at Venice, are eleven portraits by him, all of the Percy family, or their immediate friends. At Warwick Castle is the like number; and in each are works of the first-rate quality. At Wilton, the grandest of his pictures painted here adorns a magnificent apartment: it is of William, earl of Pembroke, and his family. The style in which it is executed is large and grand, and of a much higher quality than his later productions exhibit, which, in comparison, have only delicacy to compete with the boldness and breadth of this. There are here also many others of his hand; but it would be an almost endless and a needless task to enumerate the pictures which he painted during the sixteen years he resided here, the greater part of which comprehended those of a large size. The prices he was paid confined them to the higher class, and for them only he wrought. For a half length he had 40*l.*, and for a whole length 60*l.* This, which at that time was a large sum, and the facility of his execution, together with his pension, enabled him to indulge a natural taste for splendour and luxury. He kept a splendid table, and often detained those who sat to him to dinner, both for society, and the opportunity of studying their countenances, and for retouching their pictures after dinner. He was, however, indefatigable, as appears from the number of his works, which, though he died so young, are scarcely surpassed in number by those of Rubens. His practice was peculiar. Sir Peter Lely told Mrs. Beale, that Lanier the painter assured him, that he had sat seven entire days, morning and evening, to Vandyck, for his portrait; and that he would not let him look at the picture, till he was himself satisfied with it. He was addicted to pleasure, was fond of music, and treated musicians with liberality; was a generous patron of all ingenious men, and painted the portraits of many gratuitously. But he paid dear for his indulgence; his luxurious and sedentary life brought on the gout, and hurt his fortune; and he unwisely could not, like his master, resist the temptation of the time, the pursuit of the philosopher's stone; in which perhaps, as Mr. Walpole says, he might have been encouraged by his friend sir Kenelm Digby. Towards the close of his life, the king bestowed on him the daughter of the unfortunate lord Gowry (Maria Ruthven) for a wife; with whom he acquired only honour and beauty, and by whom he left one daughter, afterwards married to Mr. Stepney, who was an officer of the horse-guards on the re-establishment of the royal family.

Soon after his marriage he revisited his native city, and from thence went to Paris, hoping to be employed in the decoration of the gallery of the Louvre; but was disappointed, in finding the commission given to Poussin, who had been brought from Rome expressly for this purpose. Vandyck then returned to England, and still emulous of his great master's renown, was ambitious of being employed upon some great national work; and proposed to the king; by sir K. Digby,

to paint the walls of the banquetting-house (of which the ceiling had already been adorned by Rubens) with the history and procession of the order of the Garter, for which he asked 8000*l.*; a proposal far more agreeable to the taste than to the purse of the king: and if it had been accepted, two events which soon after occurred, would have totally prevented its completion, *viz.* the double triumph of death over the patron and the artist. The former indeed lived some years after the decease of the latter; but his political demise followed shortly upon that event, which occurred on the 9th December 1641, when he had only attained the age of 42.

Though Vandyck produced many valuable works, as we have seen, in historical painting, yet it by no means appears to have been his forte; as he seldom exhibited much expression, but a tame sweetness of effect reigns in them. It is doubtless in portraiture that he stands most decidedly conspicuous, and he may be placed at least alongside of Titian: for if the palm of superiority be given to the latter for his heads, the former must have equal praise for every other part of his pictures, and particularly for the ordonnance of the whole. His better compositions are conspicuous for their unity and propriety; but his great quality is his perfect understanding of the nature of all the parts, the head, the hands, drapery, skies, &c. and the delightful union of tone and beauty of execution, which he never failed to give. In identity of character he was not often conspicuous: perhaps the cardinal Bentivoglio is the most perfect exemplar; but sir Joshua Reynolds has superadded that invaluable quality to all that he might have acquired from the works of Vandyck or of Titian.

VANDYCK, PHILIP, known by the name of the little Vandyck, was born at Amsterdam in 1680, of a different family to that of sir Anthony, and was a disciple of Boonen, under whose tuition he remained till he had become almost capable of teaching his instructor. He painted small portraits, and from them obtained his cognomen; but was more successfully employed in painting conversation pieces, ladies at their toilettes, gay assemblies, &c. which he composed and painted ingeniously. He died at the Hague in 1752.

VANDYKE'S ISLANDS, in *Geography*, two islands, Great and Little, in the West Indies, situated to the north-west of Tortola.

VANE, Sir HENRY, in *Biography*, a person of peculiar talents and disposition, who exhibited a conspicuous character during the period of the English Commonwealth, was the eldest son of sir Henry Vane, of Hadlow in Kent, and Raby castle in Durham, secretary and treasurer of the household to Charles I. He was born about the year 1612, educated at Westminster school, and at the age of sixteen admitted as a gentleman-commoner at Magdalen college, Oxford. Here he remained for some time without matriculation, of which he disapproved; and having visited France and Geneva, he returned with an avowed disaffection to the liturgy and government of the English church, which no efforts of bishop Laud were sufficient to overcome, although he was employed by the king for this purpose. In the year 1634 he joined a number of persons, who being made uneasy by the measures that were pursued at home, emigrated to New England; and being favourably received in that colony on account of his rank and talents, he was soon appointed governor of the province of Massachusetts. Here he incurred odium by his patronage of Antinomianism; and having taken an active part in disseminating those sentiments with regard to religion that occasioned contentions very injurious to the colony, he was excluded from his high office, and

and in consequence of this degradation, he returned privately to England in the year 1639.

Experience having taught him wisdom, and having produced a change in his principles and temper, he married a lady of good family, and occupied the place of joint-treasurer of the navy with sir William Ruffel. Devoting himself to business, he was chosen representative for Hull in the parliament of April 1640, and the subsequent Long parliament. He was also so much in favour with the royal party, that he was knighted by the king. His public conduct seems at this time to have justified the character given of him by lord Clarendon, who says, "he was a man of extraordinary parts, a pleasant wit, a great understanding, which pierced into and discerned the purposes of other men with wonderful sagacity, whilst he had himself *vultum clausum*, that no man could make a guess of what he intended. He was of a temper not to be moved, and of rare dissimulation, and could comply when it was not reasonable to contradict, without losing ground by the concession." A crisis, however, was approaching, which required his taking a decided part; and accordingly he enlisted with those who were adverse to the court. On occasion of the trial of lord Strafford, he produced from his father's papers evidence against him, which served in no small degree to produce his condemnation. He also carried up to the lords, the articles of archbishop Laud's impeachment. In 1643, he was nominated one of the Assembly of Divines for the settling of church government: and he was appointed in the same year one of the parliamentary commissioners for negotiating a treaty with the Scotch. His persuasion induced the signature at Edinburgh of the Solemn League and Covenant; and in accomplishing this object, he overreached the Presbyterians of that country by an article which established the existing form of religion in Scotland, but left ambiguous the nature of the reform in the two other countries. About this time he became sole treasurer of the navy, but without any view to his own emolument: for he gave up his own patent for life from the king, and for an agent whom he substituted in his own place, he obtained a salary of 2000*l. per annum*, the residue being brought to the public account. Of his religious principles and character at this time, lord Clarendon speaks in the following terms: "Vane was a man not to be described by any character of religion, in which he had swallowed some of the fancies and extravagancies of every sect or faction; and was become (which cannot be expressed by any other language than was peculiar to that time) a *man above ordinances*, unlimited or unrestrained by any rules or bounds prescribed to other men, by reason of his perfection. He was a perfect enthusiast, and without doubt did believe himself inspired, which so far corrupted his reason and understanding, that he did at some time believe he was the person deputed to reign over the saints upon earth for 1000 years." In connection with the party denominated Independents he opposed terms of peace, when he acted as one of the parliament's commissioners at the treaty of Uxbridge in 1645, and when he negotiated in the Isle of Wight in 1648. Although he had from artifice or feeling no concern in the king's death, he was one of the council of state invested with supreme power after that event. He was a steady adherent to the republican government, under which he occupied an important station; and in 1641 he was one of the commissioners sent into Scotland for introducing the English government there, and for effecting an union between the two countries.

On this occasion he is represented by Burnet as having fomented the division prevailing between two parties in the

kirk, and as having discouraged all attempts to unite them, with a view of maintaining over them more easily temporal authority, whilst they disagreed among themselves. To Cromwell, in all his attempts to assume the supreme power, he was a determined adversary; and on account of his efforts for this purpose, he was summoned before the council by Cromwell in 1656, and ordered to give security that he would not disturb the nation, and for his refusal he was for a short time imprisoned at Carisbrook castle; and though attempts were made to intimidate him by disputing his title to the Raby estate, he remained inflexible during the period of the Usurpation. In Richard's parliament of 1659, he was a representative of the borough of Whitechurch in Hampshire, and was active in his endeavours for restoring the republican government, and his spirited speech for this purpose, on record, is said to have had no small effect in subverting the new phantom of single authority. After the revival of the Long parliament, he was nominated one of the committee of safety, and proposed a new model of government, of which it was a fundamental principle, that in the delegation of the supreme power from the people to their trustees, there were some points which could not be assumed by the latter; and of these he specified the admission of any king or single person to the legislative or executive power, and the exercise of compulsion in matters of faith and worship. Baxter asserts, that Vane's model was that of a "fanatic democracy;" and his notions have been as much reproached by Presbyterian writers as by Episcopalians.

Vane maintained his adhesion to the republican cause, and prosecuted his efforts for supporting it, till the contest was terminated by the Restoration. His conduct on this occasion, though he was not one of the regicides, caused his name to be inserted in the list of those who were excluded from the act of indemnity. Apprehending no personal danger, he continued in his house at Hampstead, till he was taken into custody and committed to the Tower, as a person whom it was hazardous to permit to be at large. A petition, however, was presented to the king by the Convention parliament in favour of him and Lambert, that they should be pardoned as to their lives, to which was returned a gracious answer. Nevertheless in July 1661, in the succeeding parliament, an order was issued by the house of commons, that both Vane and Lambert should be proceeded against according to law. Upon this order Vane was brought from his prison in the isle of Scilly, and committed to the Tower for trial. For his conduct after the death of Charles I., comprehending his active efforts in opposition to the present king, as a member of the council of state and a person in office, he was indicted of high-treason. In June 1662 he was put to the bar, and is said to have defended himself with ability and resolution, or, as his enemies say, with arrogance and insolence. Among other pleas, he urged that treason could only be committed against a king *de facto*, and not *de jure*, which was the situation of Charles II. till the Restoration; and that he had in all changes adhered to the commons, as the fountain of all regal authority: a principle for which he had exposed himself to the tyranny of Cromwell, and for which he was now ready to undergo all the rigour of perverted law and justice. Nevertheless he was found guilty, and sentenced to suffer the whole penalty adjudged to high-treason, which, however, was commuted for beheading. It has been not unreasonably suggested, that though the king could not easily be defended for breach of his promise to the former parliament on this occasion, his death was a retaliation for the part he had acted on the impeachment of lord Strafford. On the 14th of June he was brought to the scaffold on Tower-hill, and though considered

dered as a person possessing little natural courage, he behaved with wonderful composure and firmness. In his addresses to the spectators, whilst he justified himself on certain points that were construed to reflect upon the government and judges, he was rudely interrupted by the lieutenant of the Tower, who repeatedly ordered the trumpets to sound that his voice might not be heard. He died about the 50th year of his age, and left one son. His writings, chiefly on religious topics, were confused and obscure. Bishop Burnet says of him, "that though he set up a form of religion of his own, yet it consisted rather in a withdrawing from all other forms, than in any new or particular opinions or forms, from which he and his party were called 'Seekers,' and seemed to wait for some new and clearer manifestations. In these meetings he preached and prayed often himself, but with so peculiar a darkness, that though I have sometimes taken pains to see if I could find out a meaning in his words, yet I could never reach it. His friends told me he leaned to Origen's notion of an universal salvation of all, both of devils and the damned, and to the doctrine of pre-existence."

As to his political conduct, it is observed by one of his biographers, that "though he employed craft and dissimulation as his means, there seems no reason to doubt of his sincerity as to his ends, which appear to have been those of a visionary, but not of a selfish statesman. His enemies fearfully charge him with mercenary views, and his friends represent him as a real, though mistaken, lover of his country." Clarendon. Ludl. Mem. Biog. Brit. Hume. Gen. Biog.

VANE, in a *Ship*, is a thin slip of hunting hung to the mast-head, or some other conspicuous place, to shew the direction of the wind. It is commonly sewed upon a wooden frame, called the stock, which contains two holes, by which to slip over the spindle, upon which it turns about as the wind changes.

VANE, *Dog*, in *Sea Language*, is a small light vane, formed of a piece of packthread of about two feet in length, upon which are fixed five or six thin slices of cork stuck full of light feathers. It is usually fastened to the top of a staff, two yards high, which is placed on the top of the ship's side, on the quarter-deck, in order to shew the direction of the wind to the helmsman, particularly in a dark night, or when the wind is extremely feeble. Falconer.

VANES, or *Mathematical Instruments*, are sights made to move and slide upon cross-staves, fore-staves, quadrants, &c.

VANES, or *Fanes*, of *Feathers*. See FEATHER.

VANES, *Weather*. See WEATHER.

VANES of *Windmills*. See WINDMILL.

VANEERING. See VENEERING.

VAN-EFFEN, JUSTUS, in *Biography*, was born at Utrecht in 1685, and losing his father during the course of his academical studies, he commenced the profession of an author for a subsistence. His first work, published in 1711, was entitled "Le Misanthrope," written after the model of the English Spectator, which he continued till it amounted to two vols. 8vo. To the "Literary Journal," established by a society of young persons at the Hague in 1713, he was a liberal contributor; and the profits were assigned to him. The contributions to this Journal were examined by the whole society, so that every article was sanctioned by the judgment of the whole body. This was continued till the year 1718, when Van-Effen engaged in a new periodical paper, entitled "Bagatelle, ou Discours Ironiques," designed to ridicule the vices and follies of the time. This publication failed of success. The author afterwards engaged in various literary undertakings, and agreed to continue the "Nouvelles Littéraires," when the prince of Hesse

Philipsstahl, in 1719, took him as a companion in a journey to Sweden. Of this tour he published an account in 1726, in a second edition of his "Misanthrope." He afterwards occupied himself in translations, chiefly from the English; and at Leyden, where in 1724 he superintended the education of a young man at the university, he undertook to translate from Dutch to French Gerard Van Loon's "Medallic History of the United Provinces;" but a dispute occurring between him and the bookellers, he finished only two volumes. In 1725 he commenced a new periodical work, under the title of "Nouveau Spectateur François," of which twenty-nine sheets appeared. In 1727 he accompanied the count of Welderen, ambassador from the States to the court of London, as his secretary, when he wrote an ode in French on the coronation of George II. In 1731 he began a work, entitled the "Dutch Spectator," and continued it till the whole amounted to 12 vols. 8vo. Van-Effen died in September, 1731, at Bois-le-Duc, where he had for some years occupied the post of inspector of the magazines. He sustained the character of an ingenious and worthy man. Moreri. Gen. Biog.

VANELLOE, in *Botany*. See VANILLA.

VANELLUS, in *Ornithology*, a name given by many to the lapwing, more commonly known by the name *capella*.

VANETTI, CLEMENTINO, in *Biography*, knight of the holy Roman empire, and lord of Villanova, was born at Roveredo in 1755; and being educated under the care of his uncle, after the death of his father, he became, by incessantly reading Plautus and Terence, so good a Latin scholar, that, in his 16th year, he wrote a Latin comedy, entitled "Lampadaria;" and, in the following year, recited an inaugural oration in the Academy degli Agiati at Roveredo, in the true language of Plautus. Before the age of 22, he was elected secretary of this Academy, and he had improved his taste by a familiar acquaintance with the works of Cicero. In 1776 he defended Tiraboschi against the attack of the Spaniard Serrano, for his censure of some passages in the epigrams of Martial; and the letter he published on this occasion, considered as the production of a young man 23 years of age, was much admired. Upon the death of his intimate friend, the abbé Zorzi of Venice in 1779, he paid an honourable tribute of respect to his memory by publishing his life, and a collection of letters that had passed between them, and also an examination of a question suggested by d'Alembert, whether any one at present should venture to write Latin, which he decided in the affirmative. But Vanetti's most humorous writing, in the Latin language, was a bitter satire on Cagliostro, who deluded the people at Roveredo, in 1788, by his pretended prophecies and miracles. Vanetti, in order to expose this juggler, wrote a small work in the manner of the book of Chronicles, and in the Latin style of the Vulgate, entitled "Liber Memorialis de Cagliostro." Encouraged by Betinelli and others, he became a classical writer in his native language, beginning with a well-written life of the younger Pliny. But his chief fame was derived from his "Observations on the Poems of Horace, with Imitations of that Poet," which, with respect to matter and language, are said to exceed any thing of the kind in Italian. He also published fourteen dialogues in the manner of Lucian; and having tried his talents in various kinds of poetry, his "Sermoni" in the true Horatian spirit are pre-eminent, and hence he obtained the name of the Italian Horace. Besides the reputation which he acquired as a poet, he also excelled in crayon painting. To the noise and bustle of the world he preferred the tranquillity of domestic life on his estate, which he compared to the Sabine farm of Horace, and never travelled farther from home than Verona, Mantua,

Mantua, or Venice; and he died, univerſally lamented, in his native city, of an inflammation of the lungs, in the 40th year of his age. The abbé Lorenzi published at Roveredo, in 1795, "Commentarium de Vita et Scriptis Clementini Vanetti," from which the preceding account of him has been extracted. Gen. Biog.

VAN-EYCK. See EYCK.

VANGAC, in *Geography*, a river of the iſland of Luçon, which runs into the Chineſe ſea, N. lat. 18° 45'.

VANGEN, a town of France, in the department of the Lower Rhine; 9 miles S.E. of Saverne.—Alſo, a town of Switzerland, in the canton of Berne; 4 miles E. of Soleure.

VANGIONES, in *Ancient Geography*, a people of Belgic Gaul, and originally of Germany. According to Cluvier, they were bounded on the north and eaſt by the Rhine, on the ſouth by the Nemetæ, and on the weſt by the Mediomatriciæ.

VANGOLE, in *Geography*, a town of Hindooſtan, in Coimbatore; 5 miles N. of Aravacourchy.

VAN-GOYEN, in *Biography*. See GOYEN.

VANGS, in *Sea Language*, are a ſort of braces to ſupport the mlzen-gaff, and keep it ſteady. They are fixed on the outer end or peek, and reach downwards to the aftmoſt part of the ſhip's ſide, where they are hooked and drawn tight, ſo as to be ſlackened when the wind is fair; and drawn in to windward, when it becomes unfavourable to the ſhip's courſe. Falconer.

VANG-TCHOUANG, in *Geography*, a town of China, in Kiang-nan, on the river Hoang; 15 miles W.N.W. of Fong-yang.

VANGUERIA, in *Botany*, a barbarous and intolerable name, made by Commerſon out of the Madagaſcar appellation of this plant, *Voa-vanguier*. Von Rohr called the ſame genus *Vavanga*; which Vahl has unwillingly adopted, expreſſing at the ſame time a wiſh, that he could have dedicated the genus to profeſſor Wittmann. We ſhould now have taken advantage of this wiſh, had there not already been a *VITMANNIA*, which will appear in its proper place. Thus circumſtanced, and without meaning, on this or any other occaſion, to uphold ſuch names, except for reprobation, we for the preſent here introduce *Vangueria*.—Juſſ. Gen. 206. Willd. Sp. Pl. v. 1. 976. Poir. in Lamarck Dict. v. 8. 331. Lamarck Illuſtr. t. 159. Venten. Tabl. 586. Jacq. Hort. Schoenbr. v. 1. 20. (*Vavanga*; Vahl Tr. of the Nat. Hiſt. Soc. of Copenhagen, v. 2. part 1. 207.)—Clasſ and order, *Pentandria Monogynia*. Nat. Ord. *Rubiacea*, Juſſ.

Gen. Ch. *Cal.* Perianth ſuperior, of one leaf, with five ſpreading, ſomewhat reflexed, permanent teeth. *Cor.* of one petal; tube bell-shaped, twice the length of the calyx, cloſed at the upper part with erect hairs; limb in five deep, ovate, acute, equal, ſpreading, at length reflexed, ſegments, rather ſhorter than the tube. *Stam.* Filaments five, awl-shaped, very ſhort, inſerted between the ſegments of the corolla; anthers heart-shaped, pointed, incumbent. *Piſt.* Germen inferior, turbinate; ſtyle awl-shaped, rather longer than the tube, inclining to one ſide; ſigma thick, obtuſe, furrowed, two-lipped. *Peric.* Berry globoſe, coriaceous, with a ſcar at the top, containing four or five ſeeds, imbedded in pulp. *Seeds* elliptical, compressed, with a lateral ſcar, and a ſmall incomplete tunic, of two membranous, lanceolate, falcate valves, attached to the ſcar.

Eſſ. Ch. Corolla bell-shaped, five-cleft, hairy within. Stigma two-lipped, furrowed. Berry inferior, coriaceous. Seeds four or five, each with a lateral bivalve tunic.

1. *V. edulis*. Madagaſcar Mediæ. Willd. n. 1. Vahl Symb. v. 3. 36. (*V. Commerſonii*; Jacq. Hort. Schoenbr.

v. 1. 20. t. 44. *Vavanga edulis*; Vahl Tr. of Nat. Hiſt. Soc. of Copenh. v. 2. pt. 1. 208. t. 7.)—Gathered in the iſle of Bourbon, by Commerſon, whoſe ſpecimens are before us. Cultivated in Guadaloupe and Santa Cruz, for the ſake of its eatable fruit. Von Rohr, who communicated this plant to profeſſor Vahl, thought it a native of China, but Commerſon was told it came from Madagaſcar, and was there called *Voa-vanguier*, or *Voa-wangi*. Jacquin mentions it as flowering every year in the ſtove at Schoenbrun, but never ripening fruit. The ſtem is ſhrubby, ſix feet, or more, in height, with round, ſmooth, oppoſite branches, ſlightly quadrangular when young. *Leaves* oppoſite, on ſhort ſtalks, deciduous, elliptical, acute, entire, ſmooth, five or ſix inches long, and two or three broad, with one central rib, and many tranſverſe ones connected by reticulated veins; paler beneath. *Stipulas* intrafoliaceous, triangular, pointed, in pairs connected at the baſe, embracing the branch above the footſtalks, and much reſembling thoſe of *Strychnos*. *Panicles* lateral, oppoſite, cymoſe, many-flowered, downy, much ſhorter than the leaves, ſpringing from between the inſertion of laſt-year's footſtalks. *Flowers* greeniſh-yellow, ſmaller than lily of the valley, frequently four-cleft. *Fruit* the ſize of a large gooſeberry, with a leathery, or ſomewhat woody, coat.

VANHALL, JOHN, in *Biography*, an inſtrumental compoſer of great and original genius, was born at Vienna in 1740. We know not what he had published previous to his ſymphonies, which were compoſed in 1767, and ſoon circulated in M.S. all over Europe. The duke of Dorſet, we believe, firſt brought them to England about the year 1771. Several excellent ſymphonies of the Manheim ſchool had been previously published by Bremner, which introduced us very agreeably to the new ſtyle of German ſymphony founded by the elder Stamitz; but till we were acquainted with the ſymphonies of Haydn, the ſpirited, natural, and unaffected ſtyle of Vanhall excited more attention at our concerts than any foreign muſic which we had imported for a long time. They were admirably played at the Pantheon concerts, when led by La Motte, Giardini, and the elder Cramer. He compoſed too much perhaps, and for too great a variety of inſtruments; but his ſymphonies, quartets, and other productions for violins, certainly deſerve a place among the firſt productions, in which unity of melody, pleaſing harmony, and a free and manly ſtyle are preferred.

VAN-HUYSUM. See HUYSUM.

VANI, a name of the Hindoo goddeſs *Saraswati*; which ſee. This name is alſo given to Agni or Pavaka, regent of fire; when, however, it is uſually written *Vahni*.

VANI, *Cape*, in *Geography*, a cape on the N. coaſt of the iſland of Milo. N. lat. 36° 46'. E. long. 24° 20'.

VANIAMBADDY, a town of Hindooſtan, in Myſore; 112 miles E. of Seringapatam. N. lat. 12° 41'. E. long. 78° 45'.

VANJEMSOAR, a town of Hindooſtan, in Golconda; 21 miles S.W. of Damapetta.

VANIERE, JAMES, in *Biography*, a learned Jeſuit, was born in 1664, at Cauſſes, in the dioceſe of Beziers, Languedoc, and having ſtudied at the Jeſuits' college at Beziers, entered into the ſociety in 1680. His poetic talents were exhibited by two pieces, one entitled "Stagna," during his regency at the college of Tournon; and another entitled "Columbæ," at Toulouſe; and his character as a poet was eſtabliſhed by his "Prædium Ruſticum," in fifteen books, on the ſubject of a farm, in imitation of Virgil's *Georgics*. The moſt complete edition of this work is that of Paris, in 1756. Vaniere was ſucceſſively profeſſor and rector in the ſchools of his order at Montpelier, Toulouſe, and

and Auch, and died at Touloufe in 1739. His other works were a volume of "Opufcula," confifting of eulogies on moral topics, epiftles, odes, epigrams, &c.; a "Dictionary of Poetry," in Latin, quarto, a work in high estimation, and abridged for the ufe of ftudents; and a "Dictionary, Latin and French," which he began, but did not live to finifh. For his encouragement in his ftudies, the king allowed him a penfion. Moreri. Nouv. Dict. Hift. Gen. Biog.

VANIERIA, in *Botany*, received its name from Loureiro, in memory of father James Vanière, a French Jefuit, who was born in 1664, and died in 1739; celebrated for a poem on rural life, in which various plants are beautifully defcribed.—Loureir. Cochinch. 564.—Clafs and order, *Monocia Pentandria*. Nat. Ord. *Urtica*, Juff.

Gen. Ch. Male, *Cal.* Perianth in four deep, ovate, flefhy, erect, converging fegments. *Cor.* none. *Stam.* Filaments fcarcely any; anthers five, inferted into the calyx below its middle, of two kidney-shaped, compressed, pellucid lobes.

Female, on the fame common receptacle, *Cal.* as in the male. *Cor.* none. *Pift.* Germen fuperior, roundifh, compressed; fyle capillary, very flender, the length of the calyx; ftigma fimple. *Peric.* none, except the permanent juicy calyx. *Seed* folitary, lenticular, fmoth, tipped with the permanent fyle. *Common Receptacle* ovate, bearing from ten to twenty flowers, crowding each other into an angular fhape, and mofly confluent, forming a roundifh, compound, flefhy berry, tubercular externally, with fmall intermediate fpaces.

Eff. Ch. Male, Common Receptacle many-flowered. Calyx flefhy, in four deep fegments. Corolla none.

Female, on the fame receptacle. Calyx like the male. Style one. Seed one, enveloped in the pulpy calyx.

1. *V. cochinchinensis*. *Cây vang lô* of the Cochinchinefe.—Stem prickly. Leaves alternate.—Native of thickets in Cochinchina; in which country it ferves for the fmall kinds of fences. *Stems* fhrubby, erect, numerous, branched, round, fmoth, three feet high, befet with many long ftraight prickles. *Leaves* ovato-lanceolate, entire, fmoth. *Fruit* roundifh, about eight lines in diameter, very red, fweet, eatable, on fimple axillary twin ftalks.

2. *V. chinensis*. *Hàng bông Xiông* of the Chinefe.—Stem without prickles. Leaves tufted.—Native of bufhy places about Canton. A *fhrub* fifteen inches high, erect, branched. *Leaves* lanceolate, entire, fmoth, collected into tufts. *Flower* a round head, on a long, fimple, folitary, erect, axillary ftalk. *Common Receptacle* fealy. Loureiro never met with any female flowers, and therefore conceived that this fpecies might be dioecious. We have no acquaintance with any thing anfwerable to the above defcriptions. The genus feems very near *Morus*.

VANIESSA, or *Devil's Key*, in *Geography*, a fmall ifland in the Spanifh Main, near the Mofquito fhore. N. lat. 14° 5'. W. long. 82° 35'.

VANILLA, in *Botany*, a name of Spanifh origin, or at leaft very common among the Spaniards in South America, adopted by Plumier as generic. Though barbarous, it may for its found be tolerated; and we have little doubt that writers of the Auguftan age would have adopted fuch, had they, like Cæfar, met with them in defcribing any new country. However this may be, we merely yield unwillingly to the example of writers of the firft botanical authority, who have now eftablished this name, and we fhould greatly have preferred Mr. Salifbury's appellation of *Myrobroma*.—Plum. Gen. 25. t. 28. Juff. 66. Swartz Ind. Occ. 1513. Aët. Nov. Upfal. v. 6. 66. t. 5. f. 1. Schrad. Journ. v. 2. 208. t. 1. f. 1. Schrad. Neues Journ. v. 1. 82.

Willd. Sp. Pl. v. 4. 121. Brown in Ait. Hort. Kew. v. 5. 219.—Clafs and order, *Gynandria Monandria*. Nat. Ord. *Orthideæ*.

Gen. Ch. *Cal.* Perianth fuperior, of three nearly direct, lanceolate, equal, coloured leaves, deciduous. *Cor.* Petals two, lanceolate, of the fize and colour of the calyx. Nectary a lip, proceeding from the lower part of the fyle, convoluted at the bafe, dilated at the margin, without a fpur, falling off with the petals. *Stam.* Anther a hemifpherical, moveable, terminal, deciduous lid, of two cells, attached by its posterior edge to the top of the fyle; mafes of pollen globular, granulated. *Pift.* Germen inferior, elongated, nearly cylindrical; fyle erect, femicylindrical; ftigma convex, towards the top of the fyle, in front. *Peric.* Capfule elongated, flightly triangular, flefhy, of one cell. *Seeds* very numerous, lenticular, deftitute of a tunic, imbedded in pulp.

Eff. Ch. Calyx-leaves direct, flightly fpreading. Lip convoluted at the bafe, without a fpur; fpreading at the border. Anther a terminal deciduous lid. Capfule linear-oblong, flefhy. Seeds imbedded in pulp, without a tunic.

1. *V. aromatica*. Aromatic Vanilla, Vainilla, or Vanelloe. Willd. n. 1. Ait. n. 1. (*V. flore viridi et albo, fructu nigricante*; Plum. Ic. 183. t. 188. *V. maxima*; Merian Surin. t. 25. Epidendrum Vanilla; Linn. Sp. Pl. 1347.)—Leaves ovate-oblong, ribbed. Calyx and petals undulated. Lip acute. Capfule nearly cylindrical, very long.—Native of South America. *Stem* paraftitcal, climbing by means of fimple, flefhy, fibrous, folitary radicles from each joint. *Leaves* a fpan long, fucculent, as thick as thofe of houfeleek. *Flowers* large, variegated with green and white. *Fruit* eight or ten inches long, acquiring, after it is gathered, a peculiar and delicious fragrance, like the flowers of *Orcis nigra*, and fome others of that family; on which account the *Vanilla* is ufed to perfume chocolate, and becomes a valuable article of commerce.

2. *V. angustifolia*. Narrow-leaved Japan Vanilla. Willd. n. 2. (*Epidendrum Vanilla β*; Linn. Sp. Pl. 1348. Angurèk Warnà; Kämpf. Amoen. 867. t. 869. f. 2.)—Leaves linear-lanceolate. Calyx and petals flat. Lip acute.—Native of Japan. By Kämpfer's account this is a paraftitcal climber like the laft, and agrees with that in the colours of its *flower*, except being dotted with purple. Nothing is faid concerning the fruit.

3. *V. claviculata*. Tendril-bearing Vanilla. Swartz Ind. Occ. 1515. Willd. n. 3. (*Cereo affinis scandens planta aphylla, &c.*; Sloane Jam. v. 2. 160. t. 224. f. 3, 4.)—Leaves lanceolate, acute, concave, rigid, recurved. Calyx and petals flat. Capfules fometimes triangular.—Native of woods, on a very dry calcareous foil, in the mountainous inland parts of Jamaica, Hispaniola, &c. flowering in July. It is vulgarly called Green-with, and the negroes ufe a decoction of the whole plant for fyphilitic complaints. The *flem* climbs to the height of twenty or thirty feet, and is fwelled, as if jointed, at the infertion of each leaf, and tendril-like *radicle*. *Leaves* feffile, an inch long. *Flowers* large, white, in axillary clufters. *Fruit* long and large, flefhy, with black fhining *feeds*. Swartz. The figure of the flower in Swartz's plate belongs to this fpecies.

4. *V. planifolia*. Fragrant Vanilla. Ait. n. 2. Andr. Repof. t. 538. (*Myrobroma fragrans*; Salifb. Parad. t. 82.)—Leaves oblong-lanceolate, flat, flightly ftriated. Calyx and petals even. Lip fringed, abrupt.—Native of the Weft Indies, faid to have been introduced into our ftoves by the prefent duke of Marlborough. In fize this rivals the firft fpecies, but the *leaves* are not fo thick; the *calyx* and *petals* are not undulated, nor the *lip* pointed. We have no account

account of the fruit. The flowers are said to be very fragrant, especially at night. Mr. Salibury is erroneously charged, in Andrews's work, with having confounded this and the *V. aromatica*.

The species of this genus are far from being all known or understood.

The plant which produces the fruit called *vanilla* or *banilla* by the Spaniards, or the *epidendrum vanilla* of Linnæus, has a trailing stem, somewhat like the common ivy, but not so woody, which fastens itself to any tree that grows near it by small fibres or roots produced at every joint; these attach themselves to the bark of the tree; and by them the plants are often nourished, when they are cut or broken off, from the root, at a considerable height from the ground, as is the case with the ivy in England. The leaves are as large as those of the common laurel, and are produced alternately at every joint. It rises to the height of eighteen or twenty feet, and the flowers are of a greenish-yellow mixed with white, which, when fallen, are succeeded by the fruit, which is eight or ten inches long.

The sort which is manufactured, grows not only in the bay of Campeachy, but also at Carthagenæ, at the Caraccas, Hoaduras, Darien, and Cayan, at all which places the fruit is gathered and preserved; but it is rarely found in any of the English settlements, though it might be easily propagated in them: for the shoots are so full of juice, that they will continue fresh, out of the ground, for several months.

When these plants are intended for propagation in the warm parts of America, nothing more is required than to make cuttings of three or four joints in length, which should be planted close to the stems of trees in low marshy places, and the ground about them kept clear of weeds.

The method used to preserve the fruit is, when it turns of a yellow colour, and begins to open, to gather it, and lay it in small heaps to ferment two or three days, in the same manner as is practised for the cocoa pods; then they spread them in the sun to dry, and when they are about half dried, they flat them with their hands, and afterwards rub them over with the oil of palma Christi, or of the cocoa; then they expose them to the sun again to dry, and afterwards they rub them over with oil a second time; then they put them in small bundles, covering them with the leaves of the Indian reed to preserve them. These plants produce but one crop of fruit in a year, which is commonly ripe in May, fit for gathering, for they do not let them remain on the plants to be perfectly mature. When they are about half changed yellow, they esteem them better for keeping than when thoroughly ripe; at which time the fruit splits. While the fruit is green it affords no remarkable scent, but as it ripens it diffuses a most grateful aromatic smell; but when it begins to open, the birds attack them, and devour the seeds greedily.

The fruit which is brought to Europe is of a dark-brown colour; wrinkled on the outside, and full of a vast number of black seeds, like grains of sand, of a pleasant smell, like balsam of Peru.

This fruit is only used in England as an ingredient in chocolate, to which it gives an agreeable flavour to some palates, though it is disagreeable to others; but the Spanish physicians use it in medicine, and esteem it grateful to the stomach and brain, good for expelling wind, for provoking urine, resisting poison, and curing the bite of venomous animals. Miller's Gard. Dict.

The *vanillas*, or *vanilloes*, have an unctuous aromatic taste, and a fragrant smell, like that of some of the finer balsams heightened with musk. They are used chiefly in perfumes: scarcely ever among us in any medical intention: though

they should seem to deserve a place among the principal medicines of the nervous class. By distillation, they impregnate water strongly with their fragrance, but give over little or nothing with pure spirit. By digestion, spirit totally extracts their smell and taste; and in great measure covers or suppresses the smell.

VANINI, LUCILIO, in *Biography*, a reputed atheist, was born about the year 1585, at Taurofano, in the district of Otranto, and kingdom of Naples. He studied philosophy and theology at Rome, where he changed his baptismal name for "Julio Cesare," and completed his education at Naples and Padua, comprehending medicine, law, and astronomy. Possessing himself unfortunately of the works of Cardan and Pomponazzi, he imbibed their reveries; which, with the philosophy of Aristotle and Averroës, and the delusions of astrology, contributed to complete what may be called the confusion of his mind. Having entered into orders, and began to preach, his discourses were a medley of singular notions, which neither he nor any one else could understand. With a view of propagating his opinions, he travelled into Germany, the Netherlands, France, and England, in which latter country he was for a short time imprisoned, on account of his theological disputations. At Geneva, where he set up a school of philosophy, he was suspected of unsound and dubious faith, and therefore removed to France, passing some years at Lyons and at Paris. At this time, he was so far from being willing to acknowledge his desertion of the Catholic faith, that he proposed to the apostolic nuncio at Paris to write an apology for the council of Trent. In 1615 he published at Lyons his "*Amphitheatrum æternæ Providentiæ, Divino-magicum, Christiano-physicum, Astrologico-catholicum, adversus veteres Philosophos, Atheos, Epicureos, Peripateticos et Stoicos*," which was not suspected of atheism, and which indeed contains every thing incompatible with atheistical principles. In the following year he published at Paris another work, entitled "*De admirandis Naturæ Reginæ Deæque Mortalium Arcanis*," which was printed with a privilege; but on a closer examination of its tendency, it was publicly burnt by a decree of the Sorbonne. As the author of this work ascribes to his gods, Nature, attributes which belong only to the Supreme Being, he is chargeable with the same kind of atheism, that was maintained by some ancient sects of philosophers. He was likewise accused of stating arguments against religion, to which his replies were so unsatisfactory, as to furnish ground for suspicion that he designed to favour the cause of infidelity. Being under a necessity of quitting Paris, he withdrew in 1617 to Toulouse, where he taught medicine, philosophy, and theology; but there it was discovered, that he availed himself of his opportunities for general instruction to disseminate his impious and atheistical opinions; he was tried, and being found guilty, was condemned to have his tongue cut out, and then to be burnt alive. It is said, that on his examination, when he was asked if he believed in God, he took up a straw, and replied, "this is sufficient to convince me of the existence of a Creator," and that he afterwards made a long discourse on Providence. However, after his condemnation, he is said to have thrown off the mask, and to have uttered horrid impieties. He suffered death in 1619, (in 1629, according to Mosheim,) at the age of 34, and on his memory has been entailed every kind of reproach which could have been suggested by a detestation of his doctrines. But Mosheim says, "that several learned and respectable writers consider this unhappy man rather as a victim to bigotry and envy, than as a martyr to impiety and atheism; and maintain that neither his life nor

his writings were so absurd or blasphemous as to entitle him to the character of a despiser of God and religion." An Apology for Vanini was published in Holland in 1712, by Peter Frederick Arp, a learned lawyer. Moreri. Mosheim, vol. v.

VANISHING FRACTIONS, are fractions in which, by giving a certain value to the variable quantity or quantities entering into them, both numerator and denominator become zero, and consequently the fraction itself is then $\frac{0}{0}$.

The idea of fractions of this kind first originated about the year 1702, in a contest between Varignon and Rolle, two French mathematicians of some eminence, concerning the principles of the differential calculus, of which the latter was a strenuous opposer; and amongst other arguments against the truth of the doctrine which had then been recently introduced, he proposed an example of drawing a tangent to a certain curve, at the point where the two branches intersect each other; and as the fractional expression for the subtangent, according to that method, had both its numerator and denominator equal to zero, or 0, he regarded such a result as absurd, and adduced it as a proof of the fallacy of this mode of solution. But the mystery was soon after explained by John Bernouilli; and upon a renewal of the dispute, still farther by Saurin, who shewed that the fraction in the case here mentioned had a real value. These fractions were also the cause of a violent controversy between Waring and Powell in 1760, when these gentlemen were candidates for the mathematical professorship at Cambridge: Waring maintaining that the fraction

$\frac{x^5 - x}{x - 1}$, when x is 1, is equal to 4; and Powell, or rather

Maferes, who is commonly supposed to have conducted the dispute on the part of the latter, that it was equal to 0, or indeed that it could have no value whatever: and it must be acknowledged that the same difference of opinion relative to this kind of fractions still exists in all its force. Woodhouse, in his "Principles of Analytical Calculation," in treating of these quantities, after assuming the simple case of

$\frac{x^2 - a^2}{x - a}$ to find the value of it, when $x = a$, observes, that

the signification of this expression is, that $x^2 - a^2$, is to be divided by $x - a$, and the result of that division is $x + a$, or putting $x = a$, it becomes $a + a$, or $2a$. This result, however, he remarks, is no direct and natural consequence arising from the principles of calculation, but, on the contrary, it is a result arbitrarily obtained, by extending a rule, and observing a certain order in the process of calculation.

To the question, what does $\frac{x^2 - a^2}{x - a}$ become when $x = a$;

the obvious and logical answer is $\frac{a^2 - a^2}{a - a}$, and the question

is, whether in this form it will admit of any further reduction. It is true, if we operate upon this quantity according to the rules laid down in other apparently similar cases,

we obtain $\frac{a^2 - a^2}{a - a} = a + a = 2a$; but here is evidently an

extension given to a rule beyond what was first intended; for this rule was instituted for operating on real quantities, whereas in this case we have employed it on quantities having no value whatever, being in fact the division of 0 by 0, for which abstractedly no rule can be given. This, however, is not a case peculiar to these fractions. It is to the

same source we must attribute the introduction of the negative symbol, and all the mysteries attendant upon it, as well as to every kind of imaginary quantity.

In vol. i. p. 219, of Bonnycastle's Treatise of Algebra, we have the following rule for finding the value of vanishing fractions.

1. If both the terms of the given fraction be rational, divide each of them by their greatest common measure; then, if the hypothesis which is found to reduce the original expression to the form $\frac{0}{0}$ be applied to the result, it will give the true value of the fraction under consideration.

2. When any part of the fraction is irrational, observe what the unknown quantity is equal to, when the numerator and denominator both vanish, and put it equal to that quantity + and - i ; then if this be substituted for the unknown quantity, and the roots of the surds be extracted to a sufficient number of places, the result, when i is put equal to 0, will give the true value of the fraction. From which rule the author obtains the following results; viz.

$$1. \frac{x^2 - a^2}{x - a} = 2a, \text{ when } x = a.$$

$$2. \frac{x - x^5}{1 - x} = 4, \text{ when } x = 1.$$

$$3. \frac{b(x - \sqrt{ax})}{x - a} = \frac{1}{2}b, \text{ when } x = a.$$

$$4. \frac{x^m - a^m}{x - a} = ma^{m-1}, \text{ when } x = a.$$

See Bonnycastle's Algebra, Woodhouse's Principles of Analytical Calculation, and Barlow's Dictionary.

VANISI, in *Geography*, a town of Turkish Armenia; 21 miles W. of Akalzike.

VAN-LAER, in *Biography*. See BAMBACCIO.

VANLOO, CARLO, was the son of an artist little known, and was born at Nice in 1705. For some time he resided at Rome, and studied under Benedetto Luti. In 1723 he went to Paris, where he gained the first prize for an historical painting, and was employed with his elder brother, John Baptiste Vanloo, in repairing the paintings of Primaticcio, at Fontainebleau. In 1727 he again visited Italy, and afterwards passed some time at the court of Turin, where he painted a series of pictures from Tasso. On his return to his native country in 1734, he was admitted into the academy, the king conferred upon him the order of St. Michael, and appointed him his principal painter; and he repaid these compliments by his assiduity and his ability. He had acquired by his studies in Italy more correctness than his countrymen generally possessed, and he certainly prevented the French school from running farther into the affected style of Coypel and De Troyes, and yet his style can only be called loose and mechanical, with little relish of the higher beauties of art. He died in 1765, at the age of sixty.

VANLOO, Mad., the daughter of Somis, the great violinist of Turin, concert-master to the king of Sardinia, and wife to the celebrated painter Vanloo of Paris, was born in 1710, and in 1726 she was thought the best singer of her time. We have seen a beautiful print of Mad. Somis, from a painting of Vanloo previous to her marriage. After her nuptials, she settled at Paris, and was living there in 1754. The first wife of the elder Cramer, the excellent performer on the violin, and leader of a band, was a daughter by this marriage; which accounts for her good taste and captivating manner of singing to her own accompaniment on the pedal harp. She was a most accomplished

complished and elegant woman, and we never heard any thing more pleasing than her performance.

VAN-MALDER, concert-master and chamber-musician to prince Charles at Brussels, and leader of the band at that theatre; a composer of spirited and pleasing symphonies, which were long in favour at our national theatres. He composed a comic opera, "La Bagarre," 1754, for the Italian theatre at Paris, and died at Brussels in 1771.

VAN-MANDER, a painter and author, was born at Meulebeke, near Courtray, in 1548, of a noble family, and received an education suited to his rank. His talents developed themselves at an early period of his life, and particularly a disposition to painting; and he was placed under the tuition of Lucas de Heere; afterwards he became a disciple of Peter Vlerick, an historical painter of some eminence at Courtray, and finished his education in art by a journey to Italy, where he studied for three years. From thence, after painting several pictures, he went to Vienna, accompanied by Spranger, whose friendship he had cultivated, and there received a pressing invitation to enter the service of the emperor; but love for his native country prevailed, and thither he returned. He then experienced much encouragement, and was in possession of full employment, when the wars in the Low Countries prevented his enjoyment of it. He took refuge in Haerlem, and there with Goltzius founded an academy. Van-Mander united with the talents of a painter that of a poet, and composed tragedies and comedies, several of which were acted with success, with decorations painted by himself; and we are indebted to him for a very useful history of the painters of antiquity and of his own country. He died at Amsterdam, in 1606.

VANNÆUS, Lat., VANNEO, STEFFANO, Ital., the name of an Augustine monk, born at Ricanati, a small town in the March of Ancona and Ecclesiastical State, was music director at Ascoli, who published at Rome in 1553, small folio, a most ample treatise on music, in which he has inserted all that preceding books on the subject contained. There is nothing that was new in this at the time of its publication; but no one book then published contains half its contents. Walther has given a long list of the divisions and subdivisions of this work, which is written in Latin, and which, perhaps, is all that will ever be read by those who may obtain possession of the book, which is now become very scarce.

VANNE, in *Geography*, a river of France, which runs into the Yonne, near Sens.

VANNEN, a small island in the North sea, on the coast of Norway. N. lat. 70° 10'. E. long. 19° 44'.

VANNES, a sea-port town of France, and capital of the department of the Morbihan, at the union of two small rivers, which form a harbour in the lake Morbihan; before the revolution, the see of a bishop. The principal commerce is in corn, bar-iron, and fish. It has two suburbs, one of which is larger than the town itself. In 1800, the royalists, under Georges, were defeated by the republicans, under Brune; 13 posts N.W. of Nantes. N. lat. 47° 39'. W. long. 2° 40'.

VANNES, *La*, a town of France, in the department of the Ardèche; 6 miles S.W. of Joyeuse.

VANNI, FRANCESCO, *Cavaliere*, in *Biography*, was the son of a painter of little celebrity at Vienna, who died whilst he was very young, and was born in 1563. He went to Rome when he was about sixteen, and entered the school of Giovanni de Vecchi, and became an imitator of Baroccio. He also went to Parma to draw from the same fount as Baroccio, *viz.* the works of Corregio and Parme-

giano. He was invited to Rome to assist in adorning St. Peter's, and there he painted his Simon Magus, which yet, though much injured, attests his capacity. For this performance Clement VIII. conferred upon him the order of Christ. He also painted several other pictures for public edifices in that city; but his best performances are at Sienna, as his Marriage of St. Catharine, in the church of Il Refugio; and S. Raimondo walking on the Sea, in the Dominicans; which is considered the finest work in the city. He died at Sienna in 1610, at the age of forty-seven, leaving a son, Raffaele Vanni, then only thirteen, who afterwards became a painter, and imitated the works of Pietro Cortona. He became a member of the academy of St. Luke in 1655.

VANNICUM REGNUM, in *Ancient Geography*, a kingdom of European Sarmatia, according to Pliny. Tacitus reports that it was the kingdom of Vannius, which Drusus assigned as a portion to the Suevans, when he fixed their abode on the Danube, between Marus and Cusus.

VANNING-*Shovel*, among *Miners*, an instrument used for washing the ores of any metal, after being reduced to powder, by which to discover the richness and other qualities of the ore. See SHOAD, TIN, and VAN.

VANNUCCI, in *Biography*. See *Andrea del SARTE*, and PERUGINO.

VAN-OORT. See OORT.

VAN-OOST. See OOST.

VAN-ORLAY. See ORLAY.

VAN-OSTADE. See OSTADE.

VANQUISH, a disease in sheep, which has often the titles of *pinning* and *daising* given to it by shepherds.

It is described as most severe among young sheep by some, and as, in a great measure, confined to some particular districts in the western portion of the north part of the island, where the land is very coarse, hard, dry, and heathery. It is said that it constantly fixes on the best of the flock, and that although they continue to feed most greedily, they daily pine away to a mere skeleton. But that it is fortunately not a disease that is attended with great danger, as on removing them to soft grassy pastures, especially such as have been recently limed, they almost immediately recover, and never fail, in future, to become excellent and remarkably healthy sheep:—that although, in regard to the gradual wasting of the animal, this disease has some resemblance to the rot in its nature and cause, it is directly the reverse:—that it arises from an excess of moisture, is a disease of debility, and is characterized by extreme thinness of the blood; while in this, or the vanquish, on the contrary, the condition of the animal is too high, its blood too thick, and its pasture too arid, dry, and parched.

Others, however, describe it in so different a manner, that it scarcely appears to be the same disease. On peat-moss lands much exposed to the north-east, in cold moist seasons, where sheep-farmers have not the command of drier sounder pastures, on which the sheep can be turned in the autumn and winter months, the young sheep are liable to be attacked by the vanquish, which consumes them entirely away. This malady has its seat, as is supposed by practical shepherds, chiefly in the blood and bones: but it seems, in a little time, to spread over the whole system, which becomes debilitated and emaciated. Cold and moisture are said to assist in bringing it on, and also to aggravate the appearances; but the principal fault must, it is believed, be in the mossy land. The mosses become the earliest common pastures for sheep in these places in the spring season, but some part of the food they supply is dry, wiry, and unpalatable, and the heath less kindly and grateful

grateful to the sheep than that on dry moory land on gravel, being often scanty, woody, and rigid. The excess of moisture, too, in them may probably, it is thought, affect the qualities and healthiness of the heath, as food for sheep. Besides, there is in such mosses a greater proportion of the cross-leaved sort than is found on dry sheep-walks; and it is thought by many that sheep do not relish it so well as the common kind, when the shoots are young.

From these accounts, it would seem that the true nature of the complaint is not yet well understood, but it is probably some defect in the lacteal organs, by which a due supply of nourishment is prevented from being taken up, the consequence of which is a state of atrophy and emaciation in the animal.

The remedies which have been chiefly depended upon in these cases by sheep-farmers, are those of either removing the sheep into fresh grassy lands, or the change of them from the peaty pasture to one that is sweet and dry, during the autumn and winter. The latter, it is said, not only proves a cure of the disease, but wholly prevents it. In some cases, medicines of the mild stimulating balsamic kind might perhaps be used with benefit.

VANRHEEDIA, in *Botany*, Plum. Gen. 45. t. 18. See **RHEEDIA**.

VANS *les Dames*, or *Vanaut*, in *Geography*, a town of France, in the department of the Marne; 12 miles N.E. of Vitry le Français.

VANSIRE, in *Zoology*, a species of weasel with short ears; the hair brown at the roots, barred above with black, and ferruginous; the tail of the same colour; the length from nine to about fourteen inches, and the tail nearly ten. This animal inhabits Madagascar.

VANSOMER, PAUL, in *Biography*, a portrait painter, born at Antwerp in 1576: he for a while resided at Amsterdam, and with his brother Bernard practised his art there with success. About 1605 or 1606, he visited England, and was very much employed here; as many of his portraits are to be found in the houses of our nobility. He had the honour to be employed to paint king James I., and his queen, Anne of Denmark. He died at about the age of 45, and was buried in St. Martin's, as appears by the register, January 5, 1621.

VANSTOWN, in *Geography*, a town of the Cherokees, on the river Alabama.

VAN-SWIETEN, in *Biography*. See **SWIETEN**.

VANT, or **VAUNT**. See **VAN**.

VANTANEA, in *Botany*, Juss. 434, a name of Aublet's, which Schreber, according to correct rule, could not retain. See **LEMNISCIA**.

VANT-CHIN, in *Geography*, a city of China, of the second rank, in Quang-si; 1147 miles S.S.W. of Peking. N. lat. 23° 1'. E. long. 106° 51'.

VAN-TIEN, a city of China, of the second rank, in Yun-nan; 1295 miles S.W. of Peking. N. lat. 24° 29'. E. long. 109° 14'.

VAN-UDEN, LUCAS, in *Biography*, a landscape painter, born at Antwerp in 1595. He was principally his own instructor, and cultivated his talents by an assiduous attention to nature, and studying the landscapes of Rubens, whom he imitated, and who employed him to paint on the back-grounds of his pictures; which he did with so much congeniality of style, that they appear to be the work of the same hand. He lived to the age of 65. He had a brother, Jacques Van-Uden, also a landscape painter, but inferior to him.

VANVEY, in *Geography*, a town of France, in the department of the Côte d'Or; 6 miles E.S.E. of Châtillon-sur-Seine.

VANZE, a town of Naples, in Basilicata; 10 miles S.E. of Venosa.

VAPINCUM, in *Ancient Geography*, *Gap*, a town of Gallia Narbonensis, between Caturigæ and Alabons.

VAPORARIUM, or **VAPOROSUM Balneum**, *Vapour-Bath*, in *Chemistry*, a term applied to a chemist's bath, or heat, in which a body is placed, so as to receive the fumes of boiling water.

The *balneum vaporosum* consists of two vessels, disposed over one another in such manner, as that the vapour raised from the water contained in the lower, heats the matter enclosed in the upper.

The vapour-bath is very commodious for the distilling of odoriferous waters, and the drawing of spirit of wine. On this subject, see **BATH**, in *Chemistry*.

We also use the term *vapour-bath*, when a sick person is made to receive the vapours arising from some liquid matter placed over a fire.

Many contrivances have been proposed for this purpose; and their expediency and utility are best known to those who are conversant in this business. See *Aqueous BATHS*.

VAPORATION, VAPORATIO, in *Chemistry*, a term applied to the action of a fume, or vapour.

VAPORATION is a kind of bathing, or rather of fomentation, by which the warmth, or humidity, of a vapour is made to act on some other body, that is to be warmed or moistened.

VAPOROSUM BALNEUM. See **VAPORARIUM**.

VAPOUR, VAPOR, in *Meteorology*, a thin vesicle of water, or other humid matter, filled or inflated with air; which, being rarefied to a certain degree by the action of heat, ascends to a certain height in the atmosphere, where it is suspended, till it returns in form of rain, snow, or the like. An assemblage of a number of particles, or vesicles of vapour, constitutes what we call a *cloud*.

Some use the term vapour indifferently, for all fumes emitted, either from moist bodies, as fluids of any kind; or from dry bodies, as sulphur, &c. But sir Isaac Newton, and other authors, better distinguished between humid and dry fumes, calling the latter *exhalations*.

For the manner in which vapours are raised, and again precipitated, see **CLOUD, DEW, RAIN, BAROMETER**, and particularly **EVAPORATION** and **METEOROLOGY**.

We shall here add, with respect to the principles of solution adopted to account for evaporation, that Dr. Halley, about the beginning of the last century, seems to have been acquainted with the solvent power of air on water; for, he says, that, supposing the earth to be covered with water, and the sun to move diurnally round it, the air would of itself imbibe a certain quantity of aqueous vapours, and retain them like salts dissolved in water; and that the air, warmed by the sun, would sustain a greater proportion of vapours, as warm water will hold more dissolved salts; which would be discharged in dews, analogous to the precipitation of salts on the cooling of liquors. Phil. Transf. Abr. vol. ii. p. 127.

Mr. Eeles, in 1755, endeavoured to account for the ascent of vapour and exhalation, and their suspension in the atmosphere, by means of the electric fire. The sun, he acknowledges, is the great agent in detaching vapour and exhalations from their masses, whether he acts immediately by himself; or by his rendering the electric fire more active in its vibrations: but their subsequent ascent he attributes entirely to their being rendered specifically lighter than the lower air, by their conjunction with electrical fire: each particle of vapour, with the electrical fluid that surrounds it, occupying a greater space than the same weight

weight of air. Mr. Eeles also endeavours to shew, that the ascent and descent of vapour, attended by this fire, are the cause of all our winds, and that they furnish a satisfactory solution of the general phenomena of the weather and barometer. (Phil. Transf. vol. xlix. p. 124, &c.) Dr. Darwin, in 1757, published remarks on the theory of Mr. Eeles, with a view of confuting it; and attempted to account for the ascent of vapours, by considering the power of expansion which the constituent parts of some bodies acquire by heat, and also that some bodies have a greater affinity to heat, *i. e.* acquire it sooner, and retain it longer than others. On these principles, he thinks, it is very intelligible how water, whose parts appear from the æolipile to be capable of immeasurable expansion, should by heat alone become specifically lighter than the common atmosphere. A small degree of heat is sufficient to detach or raise the vapour of water from the mass to which it belongs; and the rays of the sun communicate heat only to those bodies by which they are refracted, reflected, or obstructed, whence, by their impulse, a motion or vibration is caused in the parts of such bodies. Hence he infers, that the sphericles of vapour will, by refracting the solar rays, acquire a constant heat, though the surrounding atmosphere remain cold. If it be asked, how clouds are supported in the absence of the sun? it must be remembered, that large masses of vapour must for a considerable time retain much of the heat they have acquired in the day; at the same time reflecting, how small a quantity of heat was necessary to raise them, and that doubtless even a less will be sufficient to support them; as from the diminished pressure of the atmosphere at a given height, a less power may be able to continue them in their present state of rarefaction; and lastly, that clouds of particular shapes will be sustained or elevated by the motion they acquire from winds. Phil. Transf. vol. i. p. 246.

For the effect of vapour in the formation of springs, &c. see SPRING and RIVER.

The quantity of vapour raised from the sea by the warmth of the sun, is far greater than one would imagine. Dr. Halley has attempted to estimate it. The result of his estimate is contained in the following articles.

1. That water salted to about the same degree as salt-water, and exposed to a heat equal to that of a summer's day, did, from a circular surface of about eight inches diameter, evaporate at the rate of six ounces in twenty-four hours. Whence, by a calculus, he finds that the thickness of the pellicle or skin of water, evaporated in two hours, was the fifty-third part of an inch; but, for a round number, he supposes it only a sixtieth part; and argues thence, that if water as warm as the air in summer evaporates the thickness of one-sixtieth part of an inch in two hours, from its whole surface; in twelve hours it will evaporate the tenth of an inch; which quantity, he observes, will be found abundantly sufficient to furnish all the rains, springs, dews, &c.

In effect, on this principle, every ten square inches of the surface of the water yield in vapour *per diem* a cubic inch of water; and each square foot half a wine pint; every space of four feet square, a gallon; a mile square, 6914 tons; and a square degree of sixty-nine English miles will evaporate 33 millions of tons a day; and the whole Mediterranean, computed to contain 160 square degrees, at least 5280 millions of tons. Phil. Transf. N^o 189, or Abr. vol. ii. p. 108, &c. See RIVER.

2. A surface of eight square inches, evaporated purely by the natural warmth of the weather, without either wind or sun, in the course of a whole year, 16,292 grains of water,

or sixty-four cubic inches; consequently the depth of water thus evaporated in one year amounts to eight inches. But this being too little to answer the experiments of the French, who found that it rained nineteen inches of water in one year at Paris; or those of Mr. Townley, who found the annual quantity of rain in Lancashire above forty inches; he concludes that the sun and wind contribute more to evaporation than any internal heat or agitation of the water.

It has since been discovered, that there was a source of error in Mr. Townley's experiments, with which the world was not at that time acquainted: his rain-gauge was fixed ten yards above the surface of the earth; but Dr. Heberden has found, that a rain-gauge fixed below the top of a house, received above a fifth part more rain than another of the same size above the top of the same house; and that there fell upon Westminster Abbey not much above one-half of that which fell in the same space below the tops of the houses; and by several experiments made by Dr. Dobson of Liverpool, it appears, that the quantity of rain received in a vessel placed on the ground exceeded that received by another of the same dimensions eighteen yards higher more than one-third, and less than one-half. Phil. Transf. vol. lix. art. 47. and vol. lxxvii. art. 13. p. 256. See RAIN.

With regard to the cause of this difference, it may be observed, that as in chemical precipitations a greater portion of the precipitating substance will be received on the real bottom of a vessel containing the solution than on a supposed false bottom placed any where above it, and that in proportion to its height above the real bottom; so a greater quantity of water, considering rain as a precipitation of water before dissolved in air, ought, on parting with its former solvent, to fall on the surface of the earth than on an imaginary horizontal plane of the same dimensions above it; and though the cases are not exactly parallel, yet the drops of rain in their descent must be somewhat increased either in number or size; partly by successively impinging on the aqueous particles contained in the air through which they pass, and by attracting others in virtue of their being possessed of a different electricity; and partly by the spontaneous separation and precipitation of that moisture, which is known to be contained in considerable quantities in the air at all times, and the appearance of which, dripping down the walls of our houses, &c. is one of the popular signs of approaching rain. (Monthly Review, vol. xlv. p. 322.) Dr. Dobson states the annual evaporation at Liverpool, taking the medium of four years, at 36.78 inches. Dr. Halley fixes the annual evaporation of London at 48 inches. See Phil. Transf. vol. lxxvii. part i. p. 252.

3. The effect of the wind is very considerable, on a double account; for the same observations shew a very odd quality in the vapours of water, *viz.* that of adhering and hanging to the surface that exhaled them, which they clothe, as it were, with a fleece of vaporous air; which once investing the vapour, it thenceforward rises in much less quantity. Whence, the quantity of water lost in twenty-four hours, when the air was very still from wind, was very small, in proportion to what went away when there was a strong gale of wind abroad to dissipate the fleece, and make room for the emission of vapour; and this, even though the experiment was made in a place as close from the wind as could be contrived.

Add, that this fleece of water hanging on the surface of waters in still weather, is the occasion of very strange appearances, by the refraction of the vapour's differing from and exceeding that of common air; whence every thing appears raised,

raised, as houses like steeples, ships as on land above the water, the land raised, and as it were lifted, from the sea, &c.

4. The same experiments shew, that the evaporation in May, June, July, and August, which are nearly equal, are about three times as great as those in the months of November, December, January, and February. Phil. Transf. N° 212. or Abr. vol. ii. p. 110, &c.

Dr. Brownrigg, in his "Art of making Common Salt," p. 189, fixes the evaporation of some parts of England at 73.8 inches during the months of May, June, July, and August; and the evaporation of the whole year at more than 140 inches. The evaporation of the four summer months at Liverpool, on a medium of four years, was found to be only 18.88 inches. Dr. Hales calculates the greatest annual evaporation from the surface of the earth in England at 6.66 inches; and therefore the annual evaporation from a surface of water, is to the annual evaporation from the surface of the earth in Liverpool, as 36 to 6, or as 6 to 1. Phil. Transf. vol. lxvii. ubi supra.

VAPOURS, *Fiery, Halitus Ignei*, a term used by some to express those exhalations from the earth, which either take fire of themselves on their bursting forth into the air, or are readily inflammable on the bringing of a candle to them. See DAMP, GAS, HYDROGEN, METEOR, and VENTILATION.

Many of the supposed burning lakes are owing to these fumes bursting up through the water, and not to any quality of the water itself. Our famous burning-well at Wigan, in Lancashire, is of this kind. The common people affirm, that the water of this spring burns like oil; but there is nothing of truth in this. There bursts up a vapour through the earth in this place, which keeps the water bubbling, as if boiling over in the fire, though it is not warm; and the stream of this breath may be felt issuing up in these places like a strong wind. This breath alone is inflammable, and takes fire at the approach of a candle, burning with considerable violence for some time. There are coal-pits in the neighbourhood, and the air is certainly of the same kind with that inflammable vapour often met with in those places, and which may also be prepared from iron dissolved in a proper menstruum. The water itself, taken from the place, does not burn; and if the bottom be made dry, the vapour which ascends from it will burn as strongly as if the water were there. The flame is not discoloured like that of sulphureous bodies, nor has it any bad scent; and the fumes, as they are felt bursting out of the earth, by the hand held over the place, are hot. Phil. Transf. N° 20.

VAPOUR-Bath. See VAPORARIUM, and BATH.

VAPOURS, in *Medicine*, a disease popularly called the *hypo*, or the hypochondriac disease; and in men particularly the *spleen*. See HYPOCHONDRIASIS.

Vapours supposed to be emitted from the womb, in women, are what we otherwise call *hysteric affections*, or *suffocations*, or *fits of the mother*. See Hysteria.

VAPPA, a word used by the ancients to express dead wine, or wine deprived of all its spirituous part.

The word is also metaphorically applied to a peculiar state of the blood, when it is in a low, dispirited condition, as is the case even in healthy persons, when worn out with excessive labour, and in cachectic and scorbutic persons.

VAR, in *Geography*, one of the twelve departments of the S.E. region of France, formerly Lower Provence, a maritime territory in N. lat. 43° 30', bounded on the N. by the department of the Lower Alps, on the E. by the county of Nice, on the S. and S.E. by the Mediterranean, and on the W. by the department of the Mouths of the Rhone. Its territorial extent in kilometres is 7510, and in square

leagues 378; and its population consists of 269,142 inhabitants. It is divided into 4 circles or districts, 32 cantons, and 210 communes. The circles are, Brignoles, containing 66,034 inhabitants; Draguignan, 71,383; Grasse, 55,240; and Toulon, 76,485. According to Hassenfratz it is 30 French leagues in length, and 20 in breadth; its circles are 9, its cantons 80, and its population consists of 275,472 persons. Its capital is Draguignan. Its contributions in the eleventh year of the French era amounted to 2,258,028 francs; and its charges for administration, judiciary, and for public instruction, were 274,032 francs 28 centimes. The northern districts, covered with mountains, yield little grain; but throughout the department, grapes, fruits of all sorts, medicinal plants, forests and pastures abound. The plains of Brignoles and Toulon are planted with fruit-trees and vines. Here are mines of different metals, and quarries of marble.

VAR, a river which rises in the department of the Lower Alps, about 10 miles S. from Barcelonnette, crosses the county of Nice, and, in part, separates it from France, till it runs into the Mediterranean; 4 miles W. of Nice. It gives name to the department.

VARA, in *Ancient Geography*, an estuary of Britain, which is the firth of Tayne in Sutherland.

VARA, in *Commerce*, a long measure in Spain and Portugal. At Lisbon, the vara is 5 palmos (or spans), and the covado (another long measure) is 3: the palmo is 8 inches of Lisbon, or 8 $\frac{2}{3}$ English inches: the covado is 300 $\frac{1}{2}$ French lines, or 26 $\frac{1}{2}$ English inches. Goods not sold by the piece, are generally sold by the covado, except some sorts of coarse linens, which are sold by the vara. The Lisbon foot is half a covado, or 13 $\frac{1}{3}$ English inches; and 9 feet of Lisbon are = 10 English feet. At Oporto, the vara is always 5 palmos de craveira (see PALMO), or 40 Portuguese inches = 43 $\frac{1}{2}$ English inches; but the covado is 3 palmos de craveira avantejados (or good measure), and is = 24 $\frac{3}{4}$ inches of Portugal, or 26.73 English inches. The vara (as a brass or wooden measure) is sometimes divided on one side into 43 $\frac{1}{2}$ English inches, and on the other side it is marked at 26 $\frac{3}{4}$ English inches. Each of these measures is divided into 3 tercias, 4 quartas, 6 sexas, and 8 oitavas. In Spain, the vara, a measure for cloth, linen, and silk, is 3 feet, or 4 palmos; and is, therefore, 33 $\frac{1}{3}$ English inches; the palmo measuring 9 pulgadas, or 12 dedos, which equal 8 $\frac{1}{2}$ English inches; but the palmo de ribeira, used for measuring masts, &c. is only 3 inches. A braza or toesa is 2 varas, or 6 feet; i. e. 66 $\frac{2}{3}$ English inches: a paso or pace is 5 feet; an estadal, 12 feet, or 4 varas; and a cuerda, 8 $\frac{1}{2}$ varas. The distances in Spain, on roads made since the year 1766, are laid down at the rate of 8000 varas to the league, i. e. 7416 English yards; so that 5 such leagues are = 21 English miles nearly; but the juridical league is 5000 varas, or 4635 English yards; hence 8 of these are = 21 English miles. Kelly's Un. Camb. See *Tables of WEIGHTS and MEASURES*.

VARADA, in *Ancient Geography*, a town of Hispania Citerior, belonging to the Carpetani. Ptolemy.

VARADEH, in *Geography*, a town of Egypt, on the coast of the Mediterranean; 22 miles N.E. of Catieh.

VARADES, a town of France, in the department of the Lower Loire; 6 miles N.E. of Ancenis.

VARAGE, a town of France, in the department of the Var; 4 miles N.W. of Barjols.

VARAGGIO, a town of Genoa; 5 miles N.E. of Savona.

VARAGIANS, VARANGIANS, or *Varingians*, called also *Northmanni*, the name of a people who had a considerable

able share in founding the Russian state, and who were a northern tribe of Gothic descent and of warlike disposition and character. Their original country was probably Scandinavia; and they consisted of a combined multitude of Danes, Swedes, and Norwegians, who, perpetually in quest of adventures, established governments in the western and eastern parts of Europe, and produced revolutions, especially in the south, the consequences of which extended through one quarter of the globe. The first trace of their maritime expeditions is discoverable about the year 516; though it is thought probable that they carried on their piracies at an earlier period, and were generally comprehended under the name of Franks, who already appeared under the emperor Probus as enterprising mariners. In the year 795, they were first perceived in Ireland. About the year 813, they began their incursions by the Elbe into Friesland and Flanders; in process of time they advanced to Aquitain and along the Seine: about the year 840, they ravaged France; and in 857, made the conquest of Luna, and afterwards of Pisa, in Italy. In the year 862, Rurik founded the Russian monarchy, and became the father of a dynasty which reigned above 700 years. Accordingly, in the ninth century the Varangians conquered from the Russians, a kindred north-gothic people, the earliest mention of whose name is in the year 839, before Rurik's reception in Novgorod, the modern districts of Reval, St. Petersburg, and Archangel; and subjected the Slavonians, Krivitsches, Tschudes, Vessenians, and Mærenes, to a tribute. The Russians retired to Finland and Karelia; but the Slavonians, in conjunction with the rest of the forenamed nations, drove out the Varangians, and formed themselves at the lake Ilmen, near Novgorod, into a federative democratical republic. Although the Varangians composed the predominant, and under Rurik the most consequential part of the people, yet Slavonians and Russians were soon blended into one nation. As piracy was the exercise, the trade, the glory, and the virtue of the Scandinavian youth, the Baltic was the first scene of the naval achievements of the northern adventurers; they then visited the eastern shores, the select residence of Finnic and Slavonian tribes; and the primitive Russians of the lake Ladoga paid a tribute, the skins of white squirrels, to these strangers, whom they saluted with the title of Varangians, or corsairs. Their superiority in arms, discipline, and honour, commanded the fear and veneration of the natives. In their wars against the more inland savages, the Varangians condescended to serve as friends and auxiliaries, and gradually, by choice or conquest, obtained the dominion of a people, whom they were qualified to protect. At length Rurik appeared; his influence was extended by his brothers; the example of service and usurpation was imitated by his companions in the southern provinces of Russia; and their establishments, by the usual methods of war and assassination, were cemented into the fabric of a powerful monarchy.

As long as the descendants of Rurik were considered as aliens and conquerors, they ruled by the sword of the Varangians, distributed citates and subjects to their faithful captains, and supplied their numbers with fresh streams of adventurers from the Baltic coast. But when the Scandinavian chiefs had struck a deep and permanent root into the soil, they mingled with the Russians in blood, religion, and language, and the first Waladimir had the merit of delivering his country from these foreign mercenaries. They had seated him on the throne; his riches were insufficient to satisfy their demands; but they listened to his pleasing advice, that they should seek, not a more grateful, but a more wealthy master; that they should embark for

Greece, where, instead of the skins of squirrels, silk and gold would be the recompence of their service. At the same time the Russian prince admonished his Byzantine ally to disperse and employ, to recompense and restrain, these impetuous children of the north. - Contemporary writers have recorded the introduction, name, and character, of the Varangians: each day they rose in confidence and esteem; the whole body was assembled at Constantinople to perform the duty of guards; and their strength was recruited by a numerous band of their countrymen from the island of Thule. On this occasion, the vague appellation of Thule is applied to England; and the new Varangians were a colony of English and Danes who fled from the yoke of the Norman conqueror. The habits of pilgrimage and piracy had approximated the countries of the earth; these exiles were entertained in the Byzantine court; and they preserved, till the last age of the empire, the inheritance of spotless loyalty, and the use of the Danish or English tongue. With their broad and double-edged battle-axes on their shoulders, they attended the Greek emperor to the temple, the senate, and the hippodrome; he slept and feasted under their trusty guard; and the keys of the palace, the treasury, and the capital, were held by the firm and faithful hands of the Varangians.

About the time of Rurik, a Norman of a similar name, Rurich, became famous in the history of Holland. Soon after this, Oskold and Dir founded another sovereignty at Kief. In the tenth century Ragnvald reigned in Polotsk, from whose daughter, Rogned, the Russian annals derive the grand-dukes of Lithuania. About the year 1000, they took Apulia from the Greeks, and Sicily from the Arabians. They gave Normandy its name, after Rollo had wrested that country from the kings of France. Even the conquest of England by the Danes, in some degree formed a part of the history of these northern adventurers. Tooke's *Russ. vol. i.* Gibbon's *Rom. Emp. vol. x.* See **SLAVONIANS.**

VARAHA, in *Hindoo Mythology*, a name of the god Vishnu, meaning a *boar*; he having in one of his ten grand incarnations assumed that form, called *Varahavata*; which see.

VARHAVATARA, is one of the ten grand incarnations of their god Vishnu. In this the god assumed, as is commonly said, the form of a boar, Varaha; but is usually represented in pictures, with the head of that animal on the body of a man, four-armed, holding the attributes of Vishnu. On the elevated tusks of the boar rests a crescent, containing in its concavity an epitome of the earth, which had been submerged in the ocean, as a punishment for its iniquities. So that this avata, or incarnation, the third of Vishnu, seems to be a repetition of the story of the deluge, like the two former, which are named *Matsyavata* and *Kurmavata*, noticed under those articles. The second combines with it a portion of astronomical allegory, and none of the other ten avatars have any apparent reference to the general catastrophe, so pointedly indicated by the three first, which are understood to have occurred in the earliest ages of Hindoo history; if such a chaotic mass as their fabulous records may be dignified by such a title.

There are many fables accounting for the shape assumed on this occasion by Vishnu, which our limits will not allow us to recite.

VARALLO, in *Geography*, a town of Italy, in the department of the Gogna, on the Sefia; 24 miles N.N.W. of Novara. N. lat. 45° 49'. E. long. 8° 14'.

VARAMBON, or **VAREMBON**, a town of France, in the department of the Ain; 2 miles S.W. of Pont d'Ain.

VARAMUS,

VARAMUS, in *Ancient Geography*, a river of Italy, in Venetia, which discharges itself into the Anafus. Pliny.

VARANASI, the classical name for the city of Benares, in the East Indies. (See BENARES.) This name is said to comprise that of two rivers which form a junction near the city.

VARANGI. See ACOLUTHI.

VARANGUEBEC, in *Geography*, a town of France, in the department of the Channel; 10 miles W. of Carenton.

VARANIA, in *Ancient Geography*, a town of Servia, taken possession of in the year 1143 by Perigord, general of Manuel, emperor of Constantinople.

VARANO, in *Geography*, a lake of Naples, in Capitanata, which communicates with the Adriatic; 13 miles N.N.W. of Monte St. Angelo.

VARANO *de Marchesi*, a town of the duchy of Parma; 12 miles W.S.W. of Parma.

VARASDIN, a town of Croatia, on the S. side of the Drave, with a castle and citadel; near it is a warm bath; 186 miles N.W. of Belgrade. N. lat. $46^{\circ} 30'$. E. long. $16^{\circ} 25'$.

VARASELLYGUNGE, a town of Hindoostan, in Bahar; 14 miles S.S.E. of Bahar. N. lat. $25^{\circ} 2'$. E. long. $85^{\circ} 50'$.

VARBRESIE, a town of France, in the department of the Rhône and Loire; 9 miles N.W. of Lyons.

VARCES, a town of France, in the department of the Isère; 7 miles S. of Grenoble.

VARCHI, BENEDETTO, in *Biography*, was born at Florence in the year 1502, and destined to trade; but manifesting an inclination for literature, he was sent to the university of Padua. His progress in the belles lettres induced his father to educate him for the law at Pisa. But Benedetto, after the death of his father, devoted himself entirely to literature; and when the Strozzi, to whom he was attached, were obliged to quit Florence, he followed them, in 1534, first to Venice and then to Bologna. At Bologna, and also in Padua, he spent some years in study, and in cultivating an intercourse with learned men. At Padua he became a member of the Academy degli Infiammati, and read public lectures on morals, and several dissertations on the poems of Petrarch, Bembo, and others. Cosmo I. grand duke of Tuscany, apprized of his reputation, recalled him to Florence, and assigned to him the office of writing a history of the late revolution in that city, with a yearly stipend. Whilst he was thus employed, he was attacked in the night by several persons, who apprehended that his narrative would not be favourable to them, and inflicted on him many wounds. When he recovered, he declined, from motives of prudence or lenity, to inform against the perpetrators, though he knew them. In the Florentine academy, of which he was one year consul, he delivered lectures. Cosmo recompensed his services with the provostship of Monte Varchi, on which occasion he took holy orders; but before he could remove thither, he died of an apoplexy in 1565, at the age of sixty-three; and his eulogy was delivered, at his funeral, by Lionardo Salviati.

Varchi was a man of general literature. He wrote a Florentine history, comprising the period from 1527 to 1538, in which he was chargeable with gross adulation to the house of Medici. He also published several harangues, academical and funeral; poetical pieces, and a comedy in Italian. As a grammarian, he gained reputation by his dialogue "Ercolano," treating particularly of the Tuscan language. His translations of "Seneca on Benefits," and of the "Philosophical Consolation of Boethius," into Italian,

are deemed elegant. His "Lezioni lette nel Accademia Fiorentina" comprehends much various erudition. Upon the whole, Varchi ranked as a man of learning, to whom Italian literature was much indebted. Moreri. Tiraboschi. Gen. Biog.

VARCIA, in *Ancient Geography*, a town of Belgic Gaul, upon the route from Cambrai to Andematunum, between Vefontio and Andematunum, according to Antonine's Itinerary.

VARDANUS, COUBAN, a large river which discharges itself into the Euxine sea, and into the Palus Mæotis.

VARDAR, in *Geography*, a river of European Turkey, which rises near Kolumbatz, in Macedonia, and runs into the gulf of Saloniki; 16 miles W.S.W. of Saloniki.

VARDEGUS, a small island of Russia, in the Frozen ocean; 100 miles N.N.W. of Kola. N. lat. $70^{\circ} 25'$. E. long. $30^{\circ} 34'$.

VARDEN, or WARDAN, or *Quardan*, a town of Egypt, on the W. branch of the Nile, anciently called Latopolis. In modern times it has been famous or rather infamous for the abode of pirates, who robbed the vessels which navigated the Nile. These robbers were routed out, and dispersed by Ali Bey. Here Father Sicard burned heaps of ancient manuscripts, deposited in a dove-house, as books of magic; 18 miles N.N.W. of Cairo.

VARDHUYS. See WARDHUYS.

VARDLE, in *Rural Economy*, a term applied in some cases to the eye or thimble of a gate, which has a spike only. See GATE.

VARDON, in *Geography*, a town of Abascia, on the Black sea; 28 miles W.N.W. of Mamak.

VARDONES, in *Ancient Geography*, a people of Germany, who formed a branch of the Vandals.

VARDULI, a people of Hispania Citerior, upon the coast, between the Pyrenees to the E. and the Caristes to the W. Ptolemy has assigned to them the town of Menosca.

VARECA, in *Botany*, a bad and merely temporary name, taken from *Walwareka*, by which this fruit appears to be known in Ceylon. Gärtner received it, with that appellation, from the collection of feeds at the Leyden garden, and thought it might constitute a new genus. We shall give his description.—Gärtn. v. 1. 290. t. 60.—Class and order, as well as the Nat. Ord., unknown.

Gen. Ch. *Flower* unknown. *Peric.* Berry superior, of one cell, half an inch long, ovate, with six angles, tipped with a short point; supported at the base by a small round disk, having six slight notches. Coat coriaceous, thin. Pulp by age become spongy and membranous, divided into partial cells for the reception of the seeds. *Recept.* three prominent ribs, attached to the inner coat of the berry, into which the external seeds are inserted. *Seeds* numerous, rather large, nearly ovate, rendered variously angular by mutual pressure, their colour a smoky brown, all inclosed in separate partial cells; the outer seeds attached to the coat of the fruit; the inner imbedded in its pulp. *Integument* double; the outer thick, coriaceous; inner membranous, very thin. *Albumen* the shape of the seed, thick, white, of the substance of an almond. *Embryo* nearly the size of the albumen, compressed, pale yellow. *Cotyledons* ovate, or rounded, leafy, flat, very thin. *Radicle* long, nearly cylindrical, centrifugal, or indeterminate.

Ess. Ch. *Flower* . . . Berry superior, of one cell; pulp in many partial cells, appropriated to each seed. Seeds inserted into the coat of the berry.

Gärtner observes, that the structure of this fruit agrees, in many points, with that of the Gourd tribe, *Cucurbitacea*; but it differs from all hitherto known of that tribe, in being superior,

superior, and in having remarkably albuminous seeds, whereas the *Cucurbitaceæ* usually have no albumen. We would remark, with due deference to this justly celebrated carpologist, that the partial cells of the pulp appear to be merely what must occur, in the drying up of any such berry, and probably have no existence in a recent state of the fruit. They are therefore scarcely entitled to be mentioned in the essential character.

VAREILLES SOMMIERES, in *Geography*, a town of France, in the department of the Vienne; 7 miles N.N.E. of Civray.

VAREL, a town of Germany, in the county of Oldenburg; 22 miles N. of Oldenburg.

VARELLE, a small island in the Chinese sea, near the E. coast of Malacca. N. lat. $3^{\circ} 18'$. E. long. 104° .

VAREN, a town of France, in the department of the Aveyron; 18 miles N.N.W. of Alby.

VARENA, a town of Italy, on the lake of Como; 15 miles N.N.E. of Como.

VARENNE, a town of Canada, on the right bank of the St. Laurence. N. lat. $45^{\circ} 41'$. W. long. $73^{\circ} 10'$.—Also, a town of France, in the department of the Allier; 10 miles N. of Cuffet.—Also, a town of South Carolina; 20 miles S.E. of Queenborough.

VARENNE *le Grand*, a town of France, in the department of the Saône and Loire; 6 miles S. of Châlons.

VARENNES, a town of France, and seat of a tribunal, in the department of the Meuse. In this town the king and queen of France, with the dauphin, the princefs royal, and the princefs Elizabeth, were stopped in their journey to Montmedy, when they attempted to escape, in the month of June 1791; 7 miles N. of Clermont en Argonne. N. lat. $49^{\circ} 14'$. E. long. $5^{\circ} 7'$.—Also, a town of France, in the department of the Upper Marne; 6 miles S.W. of Bourbonne.

VARENTANUM, VARENTUM, in *Ancient Geography*, a town of Italy, in Etruria, according to the Itinerary of Antonine.

VARESA, in *Geography*, a town of Genoa; 10 miles N.N.W. of Brugnato.

VARESIANO, a town of Italy, capital of the department of the Verbano; 24 miles N.N.W. of Milan. N. lat. $45^{\circ} 50'$. E. long. $8^{\circ} 49'$.

VARGAS, LUIS DE, in *Biography*, a Spanish painter of celebrity, was born at Seville in 1528. He went to Italy to improve his talents, and passed seven years in Rome, where he principally directed his attention to Raffaele and P. Perugino's works. When he returned to Seville, he found a formidable rival in Pedro Campaña, and he therefore returned to Italy to cultivate his powers still farther; and on returning a second time to his native city, obtained reputation, and employment. He painted for the cathedral two pictures, *viz.* Christ bearing his Cross, and Adam and Eve; the latter of which is regarded as his master-piece. He executed several other works for the churches in Seville, both in oil and fresco; and he was no less distinguished for his skill in portraiture, particularly in his portrait of Donna Juana Cortes, duchess of Alcala. He died at Seville in 1590, aged 62.

VARGAS MEXIA, FRANCESCO DE, a Spanish lawyer, who occupied several posts in the judicature under Charles V., and became advocate-fiscal in the supreme council of Castile, was sent by Charles, in 1548, to Bologna, to protest against the translation of the council of Trent to that city. After the dissolution of this council, he spent seven or eight years in a public capacity at Venice. Being ordered by Philip II. to act as resident deputy to the Spanish am-

bassador at Rome, his known learning and integrity caused him to be much consulted by the cardinals on the subject of episcopal jurisdiction. On his return to Spain, he was nominated a counsellor of state; but at length retired from the world to the monastery of Cislos near Toledo. He was author of several works; particularly "De Episcoporum Jurisdictione, et Pontificis Maximi Autoritate," Venet. 4to. 1563; "Commentaries upon War against the Infidels," &c. &c. In 1700, Le Vassor published in French, at Amsterdam, "Letters and Memoirs of Vargas," relative to the council of Trent, which are said not to be very respectful to that assembly. Moreri.

VARGAS, in *Geography*, a town of Spain, in the province of Biscay; 11 miles S.S.W. of Santander.

VARGEL, or VARGULA, an ancient town of Germany, in the territory of Erfurt; 10 miles N.W. of Erfurt.

VARGO, a town of Spain, in Catalonia; 14 miles N. of Solsona.

VARHELY, a town of Transylvania, built on the ruins of Sarmizagethusa, the ancient capital of Dacia, afterwards named by Trajan, Ulpia Trajana; 60 miles E. of Temesvar.

VARI. Persons were formerly so termed, when their legs were deformed, and their toes turned in an unusual degree inwards.

VARI, in *Medicine*, hard, inflamed tubercles, occurring on the face and neck of young people, of both sexes, after the commencement of the period of puberty.

This eruption, which disfigures the countenance at that period of life when personal appearance is usually of the greatest importance in the estimation of the persons affected, has been therefore the object of medical attention from the earliest ages, though in itself but a trivial complaint. Celsus observes, that the Roman ladies in his time were so solicitous of maintaining their beauty, that he deemed it necessary to mention the remedies for this affection of the skin, which otherwise he considered as too trifling for the notice of the physician. "Pene ineptiæ sunt, curare varos et lentículas et ephelides (freckles and sun-spots); sed eripi tamen fœminis cura cultus sui non potest." (De Medicinâ, lib. vi. cap. 5.) The circumstance of this eruption occurring at the age of puberty has given rise to the appellations given to it by the Greek physicians, namely, *ionthos* and *acne*. The term *ionthos* signifying the *lanugo*, or first down of the beard, during which it begins; and *αχνη*, *quasi αχνη*, implying that it appears at the *acme*, or period of full growth and evolution of the body. (See Julius Pollux, *Onomasticon*, lib. iv. cap. 25. Aëtius, *Tetrabile* ii. ferm. iv. cap. 13, &c.) Under this term *acne*, Dr. Willan arranged the disease in the order of tubercles, and described four varieties of the eruption, with the epithets *simplex*, *punctata*, *indurata*, and *rosacea*. See Dr. Bateman's *Practical Synopsis of Cutaneous Diseases*, according to the Classification of Dr. Willan, p. 275.

The *acne*, then, consists of an eruption of these *vari*, or distinct, hard, inflamed tubercles, which are sometimes permanent for a considerable length of time, and sometimes suppurate very slowly and partially, forming only a little matter at the top. They usually appear on the face, especially on the forehead, temples, and chin, and not unfrequently on the neck, shoulders, and upper part of the breast, to the extent that might be covered by a tippet; but never descending to the lower parts of the trunk, or appearing on the extremities. This, however, does not depend on the parts being uncovered; for the limitation is the same in both sexes. As the progress of each tubercle is slow, and they appear in succession, they are generally seen at the same time in their various stages of growth and decline; and, in

the more violent cases, are intermixed also with the marks or vestiges of those which have subsided.

In different cases, the progress and appearance of the eruption vary considerably, which has given rise to the subdivision into species suggested by Dr. Willan. Thus in the *acne simplex*, the eruption consists of small *vari*, which appear singly, and are not very numerous, nor accompanied by much inflammation, nor by any intermediate affection of the skin. Many of the tubercles do not proceed to suppuration; but gradually rise, become moderately inflamed, and again slowly subside, in the course of eight or ten days, leaving a transient purplish-red mark behind. But others go on to a partial suppuration, the whole process of which occupies from a fortnight to three weeks. The tubercles are first felt in the skin like a small hard seed, about the size of a pin's head, and enlarge for three or four days, when they begin to inflame: about the sixth or seventh day they attain their greatest magnitude, are prominent, red, smooth, and shining, and hard and painful to the touch. After two or three days more, a small speck of yellow matter appears on the *apices* of some of the tubercles; and when these afterwards break, a thinner humour is secreted, which soon dries into a yellowish scab. The inflammation now gradually declines, the size and hardness of the tubercles diminish, and the small scab becomes loosened at the edges, and at length falls off at about the end of the third week. The individual tubercles, which rise and suppurate in succession, pass through a similar course.

In the *acne indurata*, the tubercles are larger, as well as more indurated and permanent, than in the former variety. They rise often in considerable numbers, of a conical, or oblong conoidal form, and are occasionally somewhat acuminated, as if tending to immediate suppuration, being at the same time of a bright roseate hue; yet many of them continue in a hard and elevated state for a great length of time, without any disposition to suppurate. Others, however, pass on very slowly to suppuration, the matter not being completely formed in them for several weeks, and then only a small part of the tubercles are removed by that process. Sometimes two or three coalesce, forming a large irregular tubercle, which occasionally suppurates at the separate apices, and sometimes only at the largest. In whatever mode they proceed, the vivid hue of the tubercles gradually becomes more purple or even livid, especially in those which shew no tendency to suppurate. Slight crusts form upon the suppurating tubercles, which after some time fall off, leaving small scars, surrounded by hard tumours of the same dark red colour; and these sometimes suppurate again at uncertain periods, and sometimes slowly subside and disappear, leaving a purple or livid discoloration, and occasionally a slight depression, which is long in wearing off.

The tubercles, even when they do not suppurate, but especially while they continue highly red, are always sore and tender to the touch; so that washing, shaving, the friction of the clothes, &c. are somewhat painful. In its most severe form, this eruption nearly covers the face, breast, shoulders, and top of the back, but does not descend lower than an ordinary tippet in dress: yet this limitation of the disorder is independent of the exposure of those parts; for it occurs equally in men and women. In a few instances in young men, an extensive eruption of *acne indurata* has been seen affecting these covered parts, while the face remained nearly free from it. By the successive rise and progress of the tumours, the whole surface, within the limits just mentioned, was spotted with the red and livid tubercles, intermixed with the purple discolorations and depressions left by those which had subsided, and variegated with yellow sup-

purating points and small crusts, so that very little of the natural skin appeared. Sometimes the black puncta of the sebaceous ducts were likewise mixed with the vari and their sequelæ.

Cure of Vari.—Vari being generally a local disease, the acne is to be treated chiefly by external applications. Except in females, indeed, this variety of the eruption seldom calls for the attention of medical men. The ancients agree in recommending a number of stimulant applications, with the view of discussing the "thick humours," which were supposed to constitute the vari. Lotions and liniments, containing vinegar and honey, sometimes combined with an emulsion of bitter almonds, and sometimes with turpentine, resin, myrrh, and other gums, or with alum, soap, and Cimolian earth, or the bruised roots of the lily, cyclamen, narcissus, &c. were the substances which they principally employed. They were doubtless correct as to the principle, as a gentle stimulus to the skin is the most safe and effectual remedy. The apprehensions, which have been strongly expressed by the humoral pathologists, of producing internal disorder by the sudden repulsion, as it has been called, of these cutaneous eruptions, are not altogether hypothetical. Head-ache, and affections of the stomach and bowels, have sometimes been thus produced, which have ceased on the reappearance of the eruption; but, on the whole, as far as our observation goes, this alternation of disease is less frequent and obvious in this form of acne, than in the pustular and crustose eruptions of the face and head.

The stimulant applications, which are most easily proportioned to the irritability of the tubercles, are lotions containing alcohol, which may be reduced or strengthened, according to circumstances, by the addition of any distilled water. It is not easy to describe the appearances of the eruption, which indicate any certain degree of strength in the lotion; but a little observation will teach this discrimination. If the tubercles are considerably inflamed, and a great number of them pustular, a dilute mixture will be requisite; containing, for example, equal parts of spiritus tenuior and of rose or elder-flower water. The effect of a very acrid lotion, under such circumstances, is to multiply the pustules, to render many of them confluent, and to produce the formation of a crust of some extent, as well as to excite an inflammatory redness in the adjoining skin. A slight increase of the inflammation, indeed, is sometimes occasioned by the first applications of a weak stimulus; but this is of short duration, and the skin soon bears an augmentation of the stimulant; until at length the pure spirit is borne with advantage, as the inflammatory disposition subsides. Under the latter circumstances, even a considerable additional stimulus is often useful; such as from half a grain to a grain or more of the muriate of mercury, in each ounce of the spirit; or a drachm or more of the liquor potassæ, or of the muriatic acid, in six ounces. Acetous acid, as recommended by the ancients, and the liquor ammoniæ acetatis, afford also an agreeable stimulant, in proper proportions. Sulphur yields a small portion of its substance to boiling water, poured upon it, and allowed to infuse for twelve or fourteen hours; a quart of water being added to about an ounce of broken sulphur. A lotion of this nature has been found advantageous in slight cases of *acne simplex*, and especially in removing the roughness and duskiness of the face connected with it.

Connected with the eruption of *vari*, and often giving rise to them, is that appearance of black points in the skin of the face and neck, surrounded by a raised border of cuticle, to which the appellation of *acne punctata* was given

by Dr. Willan. These are vulgarly considered as the extremities of small worms or grubs, because, when they are pressed out, a sort of worm-like appendage is found attached to them; but they are, in fact, only little plugs of concremented mucus or sebaceous matter, moulded in the small ducts of the cuticular glands into this vermicular form, the extremity of which is blackened by contact with the air. In consequence of this distention of their ducts, the glands themselves sometimes inflame, and form small tubercles, or *vari*, with the little black points upon their surface, which partially suppurate, as in the preceding species; but many of them remain stationary for a long period, without ever passing into the inflammatory state. Not unfrequently they are intermixed with a few *vari*, in which the *puncta* have not appeared.

These concretions may be extracted, by pressing on both sides of the specks with the nails, until the hardened mucus is sufficiently elevated to be taken hold of. A blunt curved forceps may be employed with advantage for this purpose; and such a one has been contrived by a surgeon's instrument-maker in London. When the plugs are removed, the disorder becomes *simple vari*, and requires the treatment above-mentioned. The formation of these concretions, indeed, seems to be in a considerable degree prevented, by increasing the tone of the skin, both by the use of the stimulant lotions before recommended, and by friction, using always a strong rough towel.

The preceding varieties of the eruption of *vari* occur only in young persons, of either sex, from the period of puberty to the age of thirty or thirty-five, and principally in those of the languine temperament, and they are generally accompanied by good health, and are totally unconnected with any disorder, or with habits of intemperance; but there is another variety of this eruption, which does not occur till after the age of forty, which is always, except from strong hereditary taint, sympathetic of some disease of the digestive organs, or viscera connected with them, and which therefore is not so easily cured, and is not even benefited by the same local means which are so efficacious in the former species. This variety of the disease is the *gutta rosea* of medical authors, and the *acne rosacea* of Dr. Willan.

This eruption of *vari*, indeed, differs in its appearance very essentially from the preceding species. In addition to the eruption of small suppurating tubercles, there is also a shining redness, and an irregular granulated appearance of the skin of that part of the face which is affected, which is not the part usually occupied by the former species. The redness commonly appears first at the end of the nose, and afterwards spreads from both sides of the nose to the cheeks; the whole of which, however, it very seldom covers. In the commencement the redness is not uniformly vivid; but is paler in the morning, and readily increased to an intense scarlet after dinner, or at any time if a glass of wine or spirits be taken; or if the patient be heated by exercise, or by sitting near a fire. After some continuance in this state, the texture of the cuticle becomes gradually thickened, and its surface uneven or granulated, and variegated by reticulations of enlarged cutaneous veins, with smaller red lines stretching across the cheeks, and sometimes by the intermixture of small suppurating *vari*, which successively arise on different parts of the face. Where there is a strong hereditary predisposition, or by the constant immoderate use of wine and spirituous liquors, this disease may affect the greater part of the face, even the forehead and skin; but the nose especially, in such cases, becomes tumid, and of a

fiery red colour: and, in advanced life, it sometimes enlarges to an immoderate size, the nostrils being distended and patulous, or the *ala* fissured, as it were, and divided into separate lobes.

Little can be done in way of cure for this species of *vari*, the visceral or constitutional malady being the root of the disease; against which, of course, the remedies, both moral and physical, must be directed.

VARI, in *Zoology*, a name given to the *maucuaço*, or *lemur catta* of Linnæus, with his tail marked with rings of black and white; it is about the size of a cat, and inhabits Madagascar and the neighbouring isles. The *vari* of Buffon is the ruffed *maucuaço* of Pennant, the black *maucuaço* of Edwards, and *lemur caudatus niger, collari barbato*, of Linnæus. It has orange-coloured irides; long hair round the sides of the head, standing out like a ruff; long tail; the colour wholly black, but sometimes white spotted with black; the feet black. It inhabits Madagascar; is very fierce in a wild state; and makes so violent a noise in the woods, that the noise of two may be easily mistaken for that of a hundred: when tamed, gentle and good-natured. Pennant.

VARI, in *Geography*, a town of Hindoostan, in Concan; 25 miles N. of Goa.

VARIA, in *Ancient Geography*, a town of Hispania Citerior, on the Iberus, N.W. of Calagaris.

VARIA, *Vico-Varo*, a town of Italy, in the Sabine territory, but belonging to the Latins; situated on the Valerian way; 8 miles from Tibur, and 27 from Rome. It was also called *Valeria*.

VARIA, in *Zoology*, a name by which some authors have called the leopard, or *pardalis*, from the beautiful variegations with which it is marked.

VARIABLE, in *Geometry* and *Analytics*, is a term applied by mathematicians to such quantities as either increase or diminish, according as some other quantity either increases or diminishes.

Thus, the semiordinates and abscissæ of an ellipsis, &c. are variable quantities; because, if the one increase, the others increase likewise.

They are thus called, in contradistinction to *constant*, or *given*, or *stable* quantities; which are always the same though others change: as the semidiameter of a circle, which remains the same, though the abscissæ and semiordinates increase.

Variable quantities are usually denoted by the last letters of the alphabet, *x, y, z*.

Some authors, instead of *variable* and *constant* quantities, use the terms *fluent* and *stable* quantities.

The infinitely small quantity by which a variable quantity is continually increasing or diminishing, is called the increment or decrement, or *difference*; and the velocity with which it increases or decreases at any given point, is called its *fluxion*; the calculation of which is the subject of the new *methodus differentialis*, or *doctrine of fluxions*.

VARIABLE Wind. See *WIND*.

VARIAM, in *Geography*, a town of Persia, in the province of Irak; 120 miles E. of Hamadan.

VARIANA, in *Ancient Geography*, a town of Lower Mœsia, upon the route from Viminacium to Nicomedia, between Augustæ and Valeriana. Anton. Itin.

VARIANÆ, a town of Pannonia, upon the route from Cœmona to Sirmium, between Siscia and Menneianæ. Anton. Itin.

VARIANCE, *VARIANTIA*, in *Law*, an alteration or change of condition in a person, or thing, after some former concern or transaction therewith.

Thus,

VARIATION.

Thus, if the commonalty of a town make a composition with a lord, and afterwards bailiffs be granted by the king to the same town, there, if the lord commence any suit for breach of the composition, he must *vary* from the word *commonalty*, used in the composition, and use *bailiffs* and *commonalty*.

VARIANCE is also used for an alteration of something formerly laid in a plea: or where the declaration in a cause differs from the writ, or from the deed upon which it is grounded.

VARIATION of Quantities, in Algebra. See CHANGES and COMBINATION.

VARIATION, in Astronomy. The *variation of the moon*, called by Bullialdus the *reflection of her light*, is the third inequality observed in the moon's motion; by which, when out of the quadratures, her true place differs from her place twice equated. See PLACE, EQUATION, &c.

Sir Isaac Newton takes the moon's variation to arise partly from the form of her orbit, which is an ellipsis; and partly from the inequality of the parts of space, which the moon describes in equal times, by a radius drawn to the earth.

To find the greatest variation, observe the moon's longitude in the octants; and, for the time of observation, compute the moon's place twice equated: the difference between the computed and the observed place is the greatest variation.

Tycho makes the greatest variation $40' 30''$; Kepler makes it $51' 49''$; sir Isaac Newton makes the greatest variation, at a mean distance, between the sun and the earth, to be $35' 10''$: at the other distances, the greatest variation is in a ratio compounded of the duplicate ratio of the time of the moon's synodical revolution directly, and the triplicate ratio of the distance of the sun from the earth inversely. And, therefore, in the sun's apogee, the greatest variation is $33' 14''$, and in his perigee, $37' 11''$; provided that the eccentricity of the sun be to the transverse semidiameter of the orbis magnus, as $16\frac{1}{6}$ to 1000. Or, taking the mean motions of the moon from the sun, as they are stated in Dr. Halley's tables, and the greatest variation at the mean distance of the earth from the sun will be $35' 7''$, in the apogee of the sun $33' 27''$, and in his perigee $36' 51''$. Phil. Nat. Princ. Math. prop. 29. lib. iii. apud Horsley's Newtoni Opera, vol. iii. p. 71.

VARIATION, in Geography, Navigation, &c. a term applied to the deviation of the magnetic needle, or compass, from the true north point, towards either east or west; called also the *declination*.

The variation, or declination, of the needle, is properly defined, the angle which a magnetic needle, suspended at liberty, makes with the meridian line on a horizontal plane; or an arc of the horizon, comprehended between the true and the magnetical meridian.

In sea-language, the variation is usually called *north-easting*, or *north-westing*.

All magnetic bodies, we find, range themselves, in some degree, to the meridian; but it is rare that they fall in precisely with it: in one place they decline from the north to the east, and from the south to the west; and in another place, on the contrary, from the north to the west, and from the south to the east; and that too differently at different times.

The variation of the compass could not be long a secret, after the invention of the compass itself: accordingly, Ferdinand, the son of Columbus, in his life written in Spanish, and printed in Italian at Venice in 1571, asserts, that his father observed it on the 14th of September, 1492: though others seem to attribute the discovery of it to Sebastian Cabot, a Venetian, employed in the service of our king

Henry VII. about the year 1500. And as this variation differs in different places, Gonzales d'Oviedi found there was none at the Azores; whence some geographers have thought fit in their maps to make their first meridian pass through one of these islands; it not being then known that the variation altered in time. See Gilbert de Magnete, Lond. 1600, p. 4, 5: or Purchas's Pilgrims, Lond. 1625, book ii. sect. 1. See *Variation of the MAGNET*.

Various are the hypotheses framed to account for this extraordinary phenomenon; of which we shall mention some of the later, and more probable, only premising, that Mr. Robert Norman, the inventor of the *dipping-needle* (which see), disputes against Cortes's notion, that the variation was caused by a point in the heavens, contending that it should be sought for in the earth, and proposes how to discover its place.

The first is that of Gilbert (De Magnete, lib. iv. p. 151, &c.) which is followed by Cabeus, &c.

This notion is, that it is the earth, or land, that draws the needle out of its meridian direction; and hence they argue, that the needle varied more or less, as it was more or less distant from any great continent; consequently, that if it were placed in the middle of an ocean, equally distant from equal tracts of land on each side, eastward and westward, it would not decline either to the one or the other, but point justly north and south. Thus they say, in the Azores islands, which are equally distant from Africa on the east, and America on the west, there is, in effect, found no variation: but as from the Azores you sail towards Africa, the needle begins to decline from the north to the east; and that still more and more, till you reach the shore.

If you still proceed eastward, the declination gradually diminishes again, by reason of the land left behind on the west, which continues to draw the needle.

The same holds till you arrive at a place where there are equal tracts of lands on each side; and there again there is no variation.

The observations of our mariners, in their first East India voyages, seemed to confirm this system; as they proceed towards the Cape of Good Hope the variation is still eastward; at length arriving at the Cape De las Aguillas, *q. d.* of the Needles, the meridian line, then dividing Africa into two equal parts, there is no variation at all; but as they proceed farther, and leave the African coast on the west, the variation becomes westward.

But the misfortune is, the law does not hold universally; in effect, a great number of observations of the variations, in various parts, made and collected by Dr. Halley, overturn the whole theory.

Some, therefore, have recourse to the frame and compasses of the earth, considered as interwoven with rocks and shelves, which being generally found to run towards the poles, the needle has been observed to have a general tendency that way; but which seldom going perfectly in the direction of the meridian, the needle, of consequence, has commonly a variation.

Others hold various parts of the earth to have various degrees of the magnetic virtue, as some are more intermixed with heterogeneous matters, which prevent the free action or effect of it, than others.

Others ascribe all to magnetic rocks and iron mines, which, affording more of the magnetic matter than other parts, draw the needle more.

Lastly, others imagine earthquakes, or high tides, to have disturbed and dislocated several considerable parts of the earth, and so changed the magnetic axis of the globe, which originally was the same with the axis of the globe itself.

VARIATION.

But still, that great phenomenon, the *variation of the variation*, i. e. the continual change of the declination in one and the same place, which the modern observations daily confirm, is not accountable for on any of these foundations, nor even is it consistent with them.

Dr. Hooke communicated to the Royal Society, in 1674, a theory of the variation, the substance of which is, that the magnet has its peculiar pole distant ten degrees from the pole of the earth, about which it moves, so as to make a revolution in 370 years; whence the variation (he adds) hath altered of late about ten or eleven minutes every year, and will probably so continue to do for some time, till it begins to become slower and slower, and will at length be stationary and retrograde, and in all probability may return. Birch's Hist. of the Royal Society, vol. iii. p. 131.

Dr. Halley, in the Philosophical Transactions, N° 148, invented a new theory, founded on a great number of observations, many of which were made expressly for the purpose by order of the government; but as they do not extend to a more recent date than about 1680, and as perpetual changes are going on in the variation of different places, the table of results of this learned philosopher is now of little use; we shall therefore avail ourselves of the history of these changes, as published in a recent work on the variation of the compass by W. Bain, master in the royal navy; which contains much important information on this subject, and is deserving of the particular attention of every one engaged in the management and navigation of vessels.

At London, in 1580, the quantity of variation was found to be $11^{\circ} 15'$ E.; in 1662, 6° E.; in 1634, $4^{\circ} 5'$ E.; and in 1657, the needle coincided with the true poles of the world; so that a period of 87 years elapsed in changing the $11^{\circ} 15'$ of easterly variation in that city to zero, or until the variation began to take a westerly direction. In 1672, the variation was $2^{\circ} 30'$ W.; in 1723, $14^{\circ} 17'$ W.; in 1747, $17^{\circ} 40'$ W.; in 1780, $22^{\circ} 41'$ W.; and in 1793, viz. 136 years after the time when the variation was zero, it was nearly $24\frac{1}{2}^{\circ}$ W.; and it is still nearly the same.

At Paris, in 1550, the variation was 8° E.; and in 1660, the needle pointed to the true poles of the world; in 1681, the variation was $2^{\circ} 2'$ W.; in 1760, $18^{\circ} 20'$ W.; in 1804, $22^{\circ} 20'$ W. Hence it follows, that whilst the variation was undergoing an annual change of $10' 4''$ during a period of 213 years in London, the yearly change at Paris during a term of 254 years was only $7' 10''$.

At Dublin, in 1657, the needle coincided with the true poles of the world; and in 1791, the variation was $27^{\circ} 23'$ W.; exceeding the variation observed at London by 3° or 4° ; and, consequently, the annual change during 134 years, must have been about $12' 10''$.

While the variation was undergoing this change at London, Paris, and Dublin; we find very nearly a corresponding change at Cape Agullas, and at the Cape of Good Hope.

At the former of these places there was no variation in 1600, and in 1692, it amounted to 11° W. And at the Cape of Good Hope, in 1700, the variation was nearly 10° W.; and in 1791, it had increased to $24^{\circ} 31' 52''$ W.; so that during a period of 91 years, the annual change in the variation at the latter place, must have been about $9' 15''$.

At St. Helena, the variation in 1600 was 8° E.; in 1692, 1° W.; in 1776, $13^{\circ} 15'$ W.; and in 1794, it was found to be $16^{\circ} 16'$ W.; consequently, the mean annual change in the variation at this place, during a period of 194 years, has been at the rate of $7' 52''$.

At Cape Comorin, in 1620, the variation was $14^{\circ} 20'$ W.; in 1688, $7^{\circ} 30'$; in 1756, $0^{\circ} 15'$ W.; and in 1816, there

was still no variation at this place; therefore, during a period of 137 years, the mean annual change was $6' 17''$; but this includes a term of 60 years, in which there appears to have been a very small change in the declination, viz. about $15''$ annually.

The phenomena presented by the variation at Cape Horn and its vicinity, are extremely different from those observed at the Cape of Good Hope, Paris, and London.

In 1683, in S. lat. $57^{\circ} 27'$. W. long. $57^{\circ} 28'$, the variation was found to be $23^{\circ} 10'$ E.: in 1775, in S. lat. $56^{\circ} 27'$. W. long. 54° , the variation was $24^{\circ} 23'$ E.: in 1786, in S. lat. 53° . W. long. $70\frac{1}{2}^{\circ}$, the variation was $22^{\circ} 47'$ E.: and in 1795, in S. lat. 57° . W. long. 67° , the variation was exactly 23° E. Hence it follows, that during a period of 112 years, the variation near Cape Horn has neither increased nor diminished in a perceptible manner.

At Cambridge, in Massachusetts, in 1708, the variation was found to be 9° W.; and since that period, it has been diminishing at the rate of $1\frac{3}{4}'$ annually; whilst at Jamaica, Barbadoes, and Lima, the variation has undergone no change during a period of 140 years. In the northern hemisphere, in the parallel of Spitzbergen, Davis's Straits, Hudson's Bay, &c. the same quantity of variation appears to have existed during the space of 150 years. The quantity or variation from Cape Comorin eastward, towards Nicobar islands, Java, Ceram, Amboyna, Timor, &c. is so very small, as seldom to induce navigators to advert to it in their calculations; and is subject to little or no change. It may, however, be worthy of remark, that 60 miles east from the coast of Coromandel, about the meridian of Madras, the variation changes from east to west; and the same local changes probably take place on the coasts of Chili, Peru, and Mexico. In 1704, from Valparayso to Acapulco, a distance of 50° of latitude, the variation was very inconsiderable; for from the former of these places to Lima, it never exceeds 3° E.; and from Lima to the latter place, never more than 4° W.

The greatest variation that the author, from whom the preceding abstract has been made, is acquainted with, is that which has been observed between Cape Farewell and Labrador, in Hudson's Straits and Baffin's Bay. In N. lat. 52° . W. long. 52° , it was found by the author above alluded to, to be $40^{\circ} 10' 53''$ W.; and as high as N. lat. 60° , in about the same longitude, it was found to be 50° or 52° ; but he expresses some doubt whether this great excess of variation might not have been partially produced by the effects of local attraction.

In 1616, in N. lat. 78° . W. long. 80° (Baffin's Bay), the variation was found to be 57° W.; and in 1757, N. lat. 62° . W. long. 65° , the variation was 41° W.; and in the same year, in N. lat. 63° . W. long. 79° , the variation was 43° W.: and in all these high latitudes, the variation still continues nearly the same.

On the west side of America, in the same parallel of latitude as Davis's Straits, Cape Farewell, &c. we perceive the variation assuming another character, and seldom exceeding half the quantity found at the above-mentioned places.

In 1786, in N. lat. 53° . W. long. $145^{\circ} 21'$ from Paris, the variation was from 23° to 24° E.; in the same year, in N. lat. $58\frac{1}{2}^{\circ}$. W. long. 138° , it was 25° E.; and in Port des François, in N. lat. $58^{\circ} 37'$. W. long. $137^{\circ} 30'$, the variation, as ascertained by the meridian line, amounted to 27° E. In 1793, in N. lat. 53° . W. long. 129° , the variation was only $20^{\circ} 41'$ E.; and in 1794, in N. lat. $61^{\circ} 17'$. W. long. $149^{\circ} 7'$, $29^{\circ} 30'$ easterly variation was found the greatest quantity observed by Vancouver while on that coast.

VARIATION.

But of all the places on the globe with which we are acquainted, none exhibit such wonderful phenomena in the variation as the coasts of China, Corea, Tartary, Japan, and Kamtschatka northward.

In 1787, from Macao to N. lat. 41° . E. long. 136° from Paris, the quantity of westerly variation never exceeded 2° ; and from this last point to N. lat. $51\frac{1}{2}^{\circ}$. E. long. $142\frac{1}{2}^{\circ}$, where the variation was only $53'$ E., the quantity never exceeded 3° .

In 1804, in N. lat. 52° . E. long. 143° from Paris, there was no variation; 16° farther to the E., and 4° to the S., $5^{\circ} 20'$ of westerly variation was observed; and in 1779, in N. lat. $69^{\circ} 55'$. E. long. $195^{\circ} 14'$ (Bhering's Straits), there was found $35^{\circ} 37'$ E. variation.

From observations made between 1700 and 1775, there appeared three places or points on the globe where the change in the variation was much greater than elsewhere.

These were, *first*, in the middle of the Indian ocean, from 10° to 15° S. lat., and from 64° to 69° E. long., where the change was 11° and $11^{\circ} 45'$; *secondly*, in the Ethiopian sea, from 5° N., to 20° or 25° S. lat., and from 10° to 15° or 20° E. long., the change in the variation was about 10° ; and *thirdly*, at 50° N. lat., and between 17° E. and 10° W. long., the change was nearly 11° . In these different places, the variation has since continued to increase at nearly the same rate.

During the same interval it was also ascertained, that there were four places or points on the globe where the variation has undergone no change.

These were, *first*, from the eastern point of Africa to the farthest of the Bermuda islands; *secondly*, the environs of the isle of Madagascar and part of Zanguebar; *thirdly*, that part of the ocean which is to the S. and S.E. of the Sunda islands, between them and New Holland; and *fourthly*, in the same sea, about 4° S. lat., and 97° E. long., that is, in the middle of the space comprised between the western angle of New Holland and the southern point of Africa. In all these places, the variation did not vary perceptibly during 56 years. And it may be remarked, that observations made since the above period, have not shewn any change worthy of notice in its quantity at the above-mentioned places.

Some intelligent sea-officers are of opinion, that in the western part of the English Channel, the westerly variation has begun to decline, whilst others assert, that the variation is still increasing in the Channel, and as far westward as W. long. 15° , in N. lat. 51° ; at which place they say the variation amounts to 30° W. Neither of these opinions, however, can, according to Mr. Bain, be relied on as correct, though each may have been deduced from observation. If the head of the ship is on the *east* point of the compass at the time of observation, from 20° to 23° of variation will be observed; but on the other hand, if the ship's head is at the *west* at the time, the observed variation will amount to 30° or 33° .

The circumstance above alluded to, of the apparent variation being so much influenced by the local attraction of the ship, is certainly of the highest importance; and the means which Mr. Bain has adopted of making it generally known are highly laudable: at the same time, we cannot but feel considerable doubt, after this fact is once pointed out, of the

accuracy of many of the observations stated in the preceding pages, as several of these were made by persons wholly unconscious of such an influence, which seems to have been entirely unknown till Mr. Wales, the astronomer, who sailed with Capt. Cook, first noticed the phenomenon; and his observations have been since confirmed by Capt. Flinders; and Mr. Bain, in the work we have above alluded to, has added many additional facts to those before known, and to which we shall have again occasion to refer; but in the first place, it will be proper to insert a general table of variations in different latitudes, as given in the Philosophical Transactions for 1757, with additional observations of the above author.

It may not be amiss to add here, as belonging to the history of this subject, that we owe the first variation chart to Dr. Halley. Previously to this period he had collected, and made, a multitude of observations on the variation of the needle in many parts of the world, and was enabled to draw on a Mercator's chart, lines shewing the variation of the compass in the places through which they passed. But as the deviation of the magnetic meridian from the true one was then, as now, subject to continual alteration, this chart was soon found useless.

However, in 1744, Mountain and Dobson published a new variation chart, adapted to that year; which being well received, they published a second, adapted to 1756; and a third in the following year: the last we know of.

Nicholson strongly recommends the employment of the variation as a means of finding the longitude at sea; but navigators are long since convinced of its inadequacy. Vancouver, speaking of this subject, says, "This very able seaman, Nicholson, still wedded to formerly-adopted opinions, strongly recommends the variation of the compass as a means for ascertaining the longitude at sea; yet, had we been no better provided, we might have searched for the Cape of Good Hope, agreeable to his propositions, to little effect; for when we were in lat. $35^{\circ} 7'$ S., with $20^{\circ} 16'$ W. variation, we had only reached the long. of $6^{\circ} 30'$ W.; and again, when in lat. $35^{\circ} 22'$ S., with $22^{\circ} 7'$ W. variation, we had only advanced to the long. of $11^{\circ} 25'$, instead of being, according to Mr. Nicholson's hypothesis, in the first instance, nearly under the meridian of the Cape of Good Hope, and in the second, under that of Cape Aguillas; and it was not until we had nearly 26° W. variation, that we approached the meridian of the Cape of Good Hope. The observations for the variation were made with the greatest care and attention; and though generally considered as correct, they differed from one to three, and sometimes to four degrees; not only when made by different compasses, placed in different situations on board, and the ships on different tacks, but by the same compass in the same situation, and at moderate intervals of time; the difference in the results of such observations, at the same time, not preserving the least degree of uniformity. Hence the assertion amounts nearly to an absurdity, which states, 'that with 20° to $20^{\circ} 10'$, or $20^{\circ} 30'$ westerly variation, you will be certain of such and such longitudes;' and it is greatly to be feared, that navigators who rely on such means for ascertaining their situation in the ocean, will render themselves liable to errors that may be attended with the most fatal consequences."

VARIATION.

A TABLE exhibiting the Changes of Variation from the Year 1700, in the most frequented Seas.

Lat.	Long.	Year.	Variation.	Year.	Variation.	Year.	Variation.	Lat.	Long.	Year.	Variation.	Year.	Variation.	Year.	Variation.
Deg.	Deg.		Deg.		Deg.		Deg.	Deg.	Deg.		Deg.		Deg.		Deg.
50 N.	5 W.	1700	7 $\frac{1}{4}$ W.	1756	19 $\frac{1}{4}$ W.	1814	27 $\frac{1}{2}$ W.	20 N.	60 E.	1700	12 $\frac{1}{2}$ W.	1757	6 W.		
50	10		7 $\frac{3}{4}$		19 $\frac{1}{2}$			20	70		9 $\frac{3}{4}$		2 $\frac{3}{4}$		
50	15		8 $\frac{1}{2}$		20			20	90		3 $\frac{3}{4}$		1 E.		
50	20		9		20			15	20 W.		1 $\frac{1}{4}$		9 W.	1772	11 W.
50	25		9 $\frac{3}{4}$		20			15	25		0 $\frac{1}{4}$ E.		6 $\frac{1}{2}$	1800	9 $\frac{3}{4}$
45	5		6		16 $\frac{1}{2}$	1776	25	15	35		1 $\frac{3}{4}$		3 $\frac{1}{2}$		
45	10		6 $\frac{1}{4}$		16 $\frac{1}{4}$		22 $\frac{3}{4}$	15	45		2 $\frac{1}{4}$		1 E.		
45	15		6 $\frac{3}{4}$		16			15	55		4		3 $\frac{3}{4}$		
45	20		7		16			15	60		5		5		
45	25		7 $\frac{1}{2}$		15 $\frac{3}{4}$			15	70		6		7		
45	30		8		15 $\frac{1}{4}$			15	80		7 $\frac{3}{4}$		8		
45	35		8 $\frac{3}{4}$		15			15	50 E.		15 $\frac{1}{4}$ W.		9 $\frac{3}{4}$		
45	40		9 $\frac{1}{2}$		15 $\frac{1}{2}$			15	55		14 $\frac{1}{2}$		7 $\frac{3}{4}$		
45	45		10		16			15	60		11 $\frac{1}{2}$		6		
45	50		11 $\frac{1}{4}$		17			15	65		9 $\frac{3}{4}$		4 $\frac{1}{2}$		
45	55		12		18	1813	23 $\frac{1}{2}$	15	70		8		2 $\frac{3}{4}$		
45	60		13 $\frac{3}{4}$		18 $\frac{1}{2}$		20 $\frac{1}{2}$	15	80		5 $\frac{3}{4}$		0		
40	10		5		15 $\frac{1}{2}$	1791	26 $\frac{1}{2}$	15	85		4 $\frac{1}{4}$		0 $\frac{3}{4}$		
40	20		5 $\frac{1}{4}$		13 $\frac{1}{2}$	1775	18 $\frac{3}{4}$	15	90		3 $\frac{3}{4}$		0 $\frac{1}{2}$		
40	30		5 $\frac{3}{4}$		11 $\frac{1}{4}$			15	95		2 $\frac{1}{4}$		0 $\frac{1}{2}$ W.		
40	40		5 $\frac{1}{2}$		10	1813	19	10	15 W.		1 $\frac{1}{4}$		10		
40	50		6		9 $\frac{1}{2}$			10	20		0 $\frac{1}{4}$		8	1772	9 $\frac{1}{2}$
40	60		6 $\frac{3}{4}$		11			10	25		0 $\frac{3}{4}$ E.		5 $\frac{1}{2}$	1800	7 $\frac{1}{2}$
40	70		7 $\frac{1}{4}$		12 $\frac{3}{4}$			10	30		1		3		
35	10		4		14 $\frac{1}{4}$	1800	18 $\frac{1}{2}$	10	35		1 $\frac{3}{4}$	1756	1 E.		
35	20		4		13			10	45		3 $\frac{1}{2}$		2 $\frac{1}{2}$		
35	30		3 $\frac{3}{4}$		10 $\frac{1}{2}$			10	55		5		5 $\frac{1}{2}$		
35	40		3 $\frac{1}{4}$		7 $\frac{3}{4}$	1775	10	10	60		6 $\frac{1}{2}$		6 $\frac{3}{4}$		
35	50		3 $\frac{1}{2}$		5 $\frac{1}{2}$			10	50 E.		16 $\frac{1}{2}$ W.		10 $\frac{1}{2}$ W.		
35	60		3 $\frac{3}{4}$		5 $\frac{3}{4}$			10	55		15		8		
35	70		2 $\frac{1}{2}$		6 $\frac{3}{4}$			10	60		13 $\frac{1}{2}$		6		
30	10		3 $\frac{1}{2}$		13 $\frac{3}{4}$			10	65		12		4 $\frac{1}{2}$		
30	15		3 $\frac{1}{4}$		12	1791	16 $\frac{1}{2}$	10	70		10		3		
30	25		2 $\frac{3}{4}$		9			10	75		8		1 E.		
30	35		2 $\frac{1}{4}$		7			10	80		5 $\frac{3}{4}$		0 $\frac{1}{4}$		
30	40		1 $\frac{1}{2}$		5 $\frac{1}{2}$	1775	8	10	90		3 $\frac{1}{2}$		0 $\frac{1}{2}$		
30	50		0 $\frac{1}{2}$	1757	3			10	95		2 $\frac{1}{2}$		0 $\frac{1}{2}$ W.		
30	60		0 $\frac{1}{4}$ E.		2 $\frac{1}{4}$			5	0		4 $\frac{3}{4}$		15 $\frac{1}{4}$		
30	70		1 $\frac{1}{4}$		1 $\frac{1}{4}$			5	10 W.		1 $\frac{3}{4}$		11 $\frac{1}{4}$	1772	13 $\frac{1}{2}$
30	80		2 $\frac{1}{4}$		0			5	20		0		7 $\frac{1}{4}$	1776	10 $\frac{1}{3}$
25	20		2		10 $\frac{1}{2}$	1800	15	5	25		1 E.		4 $\frac{1}{2}$	1800	9
25	30		1 $\frac{1}{4}$		7 $\frac{1}{4}$			5	35		2 $\frac{1}{2}$		0 $\frac{2}{2}$ E.		
25	40		0 $\frac{1}{2}$		3 $\frac{3}{4}$	1775	6	5	45		4 $\frac{1}{2}$		4		
25	50		0 $\frac{3}{4}$		1			5	55		6 $\frac{1}{2}$		6 $\frac{1}{2}$		
25	60		2		1 $\frac{1}{4}$ E.			5	5 E.		6 $\frac{1}{4}$ W.		16 $\frac{1}{2}$ W.		
25	70		3 $\frac{1}{2}$		2 $\frac{3}{4}$			5	10		7 $\frac{1}{4}$		17 $\frac{1}{2}$		
25	80		4 $\frac{1}{4}$		3			5	45		16 $\frac{3}{4}$		13 $\frac{3}{4}$		
25	60 E.		12 $\frac{3}{4}$ W.		6 W.			5	50		16 $\frac{1}{2}$		11		
25	70		10 $\frac{1}{2}$		2 $\frac{3}{4}$			5	55		15 $\frac{1}{2}$		8 $\frac{1}{4}$		
20	25 W.		1 $\frac{1}{2}$		8	1800	11	5	60		14 $\frac{1}{2}$		6		
20	35		0 $\frac{1}{4}$ E.		4			5	65		12 $\frac{3}{4}$		4 $\frac{1}{2}$		
20	45		1 $\frac{1}{2}$		0 $\frac{3}{4}$			5	70		10 $\frac{3}{4}$		2 $\frac{3}{4}$		
20	55		2 $\frac{3}{4}$		2 E.			5	75		8 $\frac{3}{4}$		0 $\frac{3}{4}$		
20	65		4 $\frac{1}{4}$		4			5	80		6 $\frac{1}{2}$		0 $\frac{1}{4}$ E.		
20	75		6 $\frac{3}{4}$		5 $\frac{1}{4}$			5	85		4 $\frac{3}{4}$		1 $\frac{1}{4}$		

VARIATION.

TABLE—continued.

Lat.	Long.	Year.	Variation.	Year.	Variation.	Year.	Variation.	Lat.	Long.	Year.	Variation.	Year.	Variation.	Year.	Variation.
Deg.	Deg.		Deg.		Deg.		Deg.	Deg.	Deg.		Deg.		Deg.		Deg.
5 N.	90 E.	1700	3 $\frac{3}{4}$ W.	1756	0 $\frac{1}{2}$ E.		Deg.	10 S.	25 W.	1700	3 E.	1756	2 W.		
5	95		2 $\frac{3}{4}$		11 $\frac{1}{2}$ W.			10	30		4		1	1791	8 $\frac{3}{4}$ W.
0	0		4 $\frac{1}{2}$		15 $\frac{1}{2}$			10	35		5 $\frac{1}{2}$		3 $\frac{1}{2}$	1800	2
0	5 W.		2 $\frac{3}{4}$		13 $\frac{3}{4}$			10	5 E.		5 $\frac{3}{4}$ W.		15 $\frac{3}{4}$ W.		
0	10		1 $\frac{1}{2}$		11	1772	14 $\frac{1}{4}$ W.	10	10		7 $\frac{1}{2}$		16 $\frac{3}{4}$		
0	15		0 $\frac{5}{8}$		9			10	15		9 $\frac{3}{4}$		17 $\frac{3}{4}$		
0	20		0 $\frac{3}{8}$ E.		9			10	40		18 $\frac{1}{4}$		19 $\frac{3}{4}$		
0	25		1 $\frac{1}{2}$		6 $\frac{1}{2}$			10	45		19 $\frac{1}{2}$		18		
0	30		2 $\frac{1}{4}$		4	1800	5 $\frac{1}{2}$	10	50		18 $\frac{5}{8}$		14 $\frac{1}{4}$		
0	35		3 $\frac{1}{4}$		0 $\frac{1}{2}$ E.			10	55		17		10 $\frac{1}{2}$		
0	40		4 $\frac{1}{4}$		3 $\frac{1}{2}$			10	60		15 $\frac{3}{4}$		7 $\frac{3}{4}$		
0	45		5 $\frac{1}{2}$		6 $\frac{1}{2}$ W.			10	65		14 $\frac{1}{2}$		5		
0	50		6 W.		16 $\frac{1}{2}$			10	70		12 $\frac{1}{2}$		3 $\frac{1}{2}$		
0	5 E.		7 $\frac{3}{4}$		17 $\frac{1}{4}$			10	75		10 $\frac{1}{2}$		2		
0	10		16 $\frac{1}{4}$		17 $\frac{3}{4}$			10	80		8 $\frac{1}{2}$		1		
0	40		17 $\frac{3}{4}$		14 $\frac{3}{4}$			10	85		6 $\frac{3}{4}$		0 $\frac{1}{4}$		
0	45		17 $\frac{1}{2}$		14 $\frac{1}{2}$			10	90		5		0 $\frac{1}{4}$		
0	50		17 $\frac{1}{2}$		11 $\frac{3}{4}$			10	95		3 $\frac{3}{4}$		1		
0	55		16 $\frac{1}{2}$		8 $\frac{3}{4}$			10	100		2 $\frac{3}{4}$		2		
0	60		15 $\frac{1}{2}$		6			10	105		2		2 $\frac{3}{4}$		
0	65		13 $\frac{1}{2}$		4 $\frac{1}{2}$			10	110		1		3 $\frac{3}{4}$		
0	70		11 $\frac{1}{2}$		3 $\frac{3}{4}$			15	0		3 $\frac{1}{2}$		14		
0	75		9 $\frac{1}{4}$		1			15	5 W.		1 $\frac{3}{4}$		12	1775	12 $\frac{1}{4}$
0	80		7 $\frac{3}{4}$		0 $\frac{1}{4}$ E.			15	10		0 $\frac{1}{4}$		9 $\frac{1}{2}$		
0	85		5 $\frac{1}{2}$		1 $\frac{1}{4}$			15	15		1 $\frac{1}{4}$ E.		7		
0	90		4 $\frac{1}{4}$		1	1780	0 $\frac{1}{2}$ E.	15	20		2 $\frac{1}{2}$		5	1772	4 $\frac{1}{4}$
0	95		3 $\frac{1}{4}$		0 $\frac{1}{2}$ W.			15	25		3 $\frac{3}{4}$		1		
0	100		2 $\frac{1}{2}$		1	1772	12 $\frac{1}{2}$ W.	15	30		6 $\frac{1}{2}$		2 E.	1791	9
5 S.	5 W.		2 $\frac{1}{2}$		13 $\frac{3}{4}$		12 $\frac{1}{4}$	15	35		7 $\frac{1}{2}$		4 $\frac{1}{2}$	1800	0 $\frac{3}{4}$
5	10		1		10 $\frac{3}{4}$			15	40		5 $\frac{1}{2}$ W.		6 $\frac{1}{2}$		
5	15		0		8 $\frac{1}{2}$	1775	6	15	5 E.		7 $\frac{1}{2}$		15 $\frac{1}{4}$ W.		
5	20		1 $\frac{1}{4}$ E.		6	1800	4 $\frac{1}{2}$	15	10		19 $\frac{1}{2}$		16 $\frac{1}{2}$		
5	25		2 $\frac{1}{4}$		3			15	40		19 $\frac{3}{4}$		20		
5	30		3 $\frac{3}{4}$		0			15	45		20 $\frac{1}{2}$		19 $\frac{1}{2}$		
5	35		4 $\frac{1}{2}$		2 $\frac{3}{4}$ E.			15	50		20 $\frac{1}{2}$		16 $\frac{1}{4}$		
5	5 E.		6 W.		16 W.			15	55		19 $\frac{1}{2}$		12 $\frac{1}{2}$		
5	10		7 $\frac{1}{4}$		17			15	60		18 $\frac{3}{4}$		9		
5	40		18		17			15	68		17		6		
5	45		18 $\frac{1}{2}$		16			15	70		15 $\frac{1}{4}$		4 $\frac{1}{4}$		
5	50		18 $\frac{1}{2}$		12 $\frac{1}{2}$			15	75		14		3 $\frac{3}{4}$		
5	55		17 $\frac{1}{2}$		9 $\frac{1}{4}$			15	80		12		2 $\frac{1}{2}$		
5	60		16 $\frac{1}{2}$		6 $\frac{1}{2}$			15	85		10		2 $\frac{1}{4}$		
5	65		14 $\frac{3}{4}$		4 $\frac{1}{2}$			15	90		8 $\frac{1}{2}$		2 $\frac{1}{4}$		
5	70		13		3			15	95		6 $\frac{1}{2}$		2 $\frac{3}{4}$	1780	2 $\frac{3}{4}$
5	75		11		1			15	100		5		3 $\frac{3}{4}$ W.		
5	80		9		0			15	105		3 $\frac{1}{2}$				
5	85		7		0 $\frac{3}{4}$ E.			15	100		2 $\frac{1}{2}$				
5	90		5		0 $\frac{1}{4}$ W.			20	0		3 $\frac{3}{4}$		13 $\frac{1}{2}$	1775	13 $\frac{1}{4}$
5	95		3 $\frac{3}{4}$		1 $\frac{1}{2}$ W.			20	5 W.		1 $\frac{3}{4}$		11 $\frac{1}{4}$		
5	100		3		1 $\frac{1}{2}$			20	15		0 $\frac{1}{2}$ E.		8 $\frac{3}{4}$		
10	5 W.		3 $\frac{3}{4}$		14 $\frac{3}{4}$			20	20		1 $\frac{3}{4}$		5 $\frac{3}{4}$		
10	10		0 $\frac{1}{2}$		12 $\frac{1}{2}$	1755	11 $\frac{1}{4}$	20	20		3		3	1772	3 $\frac{1}{4}$
10	15		0 $\frac{1}{2}$ E.		10 $\frac{1}{4}$			20	25		4 $\frac{3}{4}$		0		
10	20		1 $\frac{1}{4}$		7 $\frac{3}{4}$	1772	9 $\frac{3}{4}$	20	30		6		2 $\frac{1}{2}$ E.	1800	1 $\frac{1}{4}$
								20	35		7 $\frac{3}{4}$		5	1776	4 E.

VARIATION.

TABLE — continued.

Lat.	Long.	Year.	Variation.	Year.	Variation.	Year.	Variation.	Lat.	Long.	Year.	Variation.	Year.	Variation.	Year.	Variation.
Deg.	Deg.		Deg.		Deg.		Deg.	Deg.	Deg.		Deg.		Deg.		Deg.
20 S.	40 W.	1700	9 $\frac{1}{4}$ E.	1756	7 $\frac{1}{2}$ E.		Deg.	30 S.	35 E.	1700	20 $\frac{1}{4}$ W.	1756	24 $\frac{3}{4}$ W.		Deg.
20	5 E.		5 $\frac{1}{2}$ W.		15 $\frac{1}{2}$ W.			30	40		21 $\frac{3}{4}$		25 $\frac{1}{4}$		
20	10		7 $\frac{1}{4}$		16 $\frac{1}{4}$			30	45		23		24 $\frac{1}{2}$		
20	15		9 $\frac{1}{2}$		17 $\frac{3}{4}$			30	50		23 $\frac{1}{2}$		23 $\frac{1}{4}$		
20	35		19		22			30	55		23		21		
20	40		20 $\frac{1}{2}$		22			30	60		21 $\frac{1}{2}$		18		
20	45		21 $\frac{1}{4}$		21 $\frac{1}{4}$			30	65		20 $\frac{1}{4}$		15		
20	50		21 $\frac{1}{4}$		18 $\frac{3}{4}$			30	70		18 $\frac{1}{2}$		13		
20	55		20 $\frac{1}{2}$		15			30	75		17 $\frac{1}{4}$		11 $\frac{1}{2}$		
20	60		19 $\frac{1}{2}$		11 $\frac{3}{4}$			30	80		15 $\frac{1}{4}$		10 $\frac{3}{4}$		
20	65		18 $\frac{3}{4}$		8			30	85		14		10 $\frac{1}{4}$		
20	70		16 $\frac{3}{4}$		6	1800	9 W.	30	90		12 $\frac{1}{2}$		9 $\frac{1}{2}$		
20	75		15		4 $\frac{3}{4}$			30	95		10 $\frac{3}{4}$		9		
20	80		13 $\frac{1}{2}$		4 $\frac{1}{2}$			30	100		8 $\frac{3}{4}$		9		
20	85		11 $\frac{1}{2}$		4 $\frac{1}{4}$			35	0		2 $\frac{1}{2}$		10 $\frac{1}{2}$	1800	14 W.
20	90		10		4 $\frac{1}{4}$			35	5 W.		0		9		12 $\frac{1}{4}$
20	95		8		4 $\frac{3}{4}$			35	10		2 $\frac{1}{4}$ E.		7 $\frac{3}{4}$		10
20	100		6 $\frac{1}{2}$		4 $\frac{3}{4}$			35	15		4 $\frac{1}{4}$		5 $\frac{1}{2}$		9
20	105		4 $\frac{3}{4}$		4 $\frac{3}{4}$			35	20		6 $\frac{3}{4}$		2 $\frac{1}{4}$		
25	0		3		12 $\frac{1}{2}$			35	25		8 $\frac{3}{4}$		0 $\frac{1}{2}$ E.		
25	5 W.		1		10			35	30		10 $\frac{3}{4}$		3		
25	10		1 E.		7 $\frac{1}{2}$			35	35		12 $\frac{3}{4}$		5 $\frac{3}{4}$		
25	15		2 $\frac{1}{2}$		4 $\frac{1}{2}$			35	5 E.		5		13 $\frac{1}{4}$ W.	1772	14 $\frac{1}{2}$
25	20		4		2 $\frac{3}{4}$			35	10		7 $\frac{1}{4}$		15 $\frac{1}{4}$		16
25	25		6		1 E.	1772	1 $\frac{1}{4}$	35	15		9 $\frac{3}{4}$		17 $\frac{1}{2}$	1800	22 $\frac{1}{2}$
25	30		7 $\frac{1}{2}$		3 $\frac{1}{2}$	1800	0 $\frac{1}{2}$ E.	35	20		12 $\frac{1}{2}$		19 $\frac{3}{4}$	1775	21 $\frac{1}{2}$
25	35		9 $\frac{1}{4}$		6	1776	3 $\frac{1}{2}$ E.	35	25		15 $\frac{3}{4}$		22 $\frac{1}{4}$	1791	25 $\frac{1}{4}$
25	40		11		6 $\frac{1}{2}$			35	30		18 $\frac{1}{4}$		24		28
25	5 E.		5 $\frac{1}{4}$ W.		14 $\frac{1}{2}$ W.	1775	17 W.	35	35		21		26		
25	10		7 $\frac{1}{4}$		16		19	35	40		22 $\frac{3}{4}$		26 $\frac{3}{4}$		
25	35		9 $\frac{1}{2}$		17 $\frac{3}{4}$			35	45		24 $\frac{3}{4}$		26 $\frac{1}{2}$		27
25	40		19 $\frac{1}{2}$		23 $\frac{1}{2}$			35	50		24 $\frac{1}{4}$		24 $\frac{3}{4}$		
25	45		21		23 $\frac{3}{4}$			35	55		24 $\frac{1}{4}$		23		26
25	50		22 $\frac{1}{4}$		23			35	60		23		21		
25	60		22		18	1780	19	35	65		21 $\frac{1}{2}$		18 $\frac{3}{4}$		
25	65		20 $\frac{1}{4}$		14 $\frac{1}{4}$			35	70		19 $\frac{3}{4}$		16 $\frac{3}{4}$		
25	70		19 $\frac{1}{4}$		11 $\frac{1}{2}$			35	75		18 $\frac{1}{4}$		15 $\frac{1}{4}$		
25	75		17 $\frac{3}{4}$		9 $\frac{1}{2}$			35	80		14 $\frac{3}{4}$		14 $\frac{1}{4}$		
25	80		16 $\frac{1}{4}$		8			35	85		15		13 $\frac{1}{2}$		
25	85		14 $\frac{3}{4}$		7 $\frac{1}{4}$			35	90		13 $\frac{1}{4}$		12 $\frac{3}{4}$		
25	90		13		7 $\frac{1}{4}$			40	0		2 $\frac{1}{2}$		9 $\frac{1}{4}$		
25	95		11 $\frac{1}{4}$		7			40	5 W.		0 $\frac{3}{4}$ E.		6 $\frac{3}{4}$		
25	100		9 $\frac{1}{2}$		6			40	50		3 $\frac{1}{4}$		4 $\frac{1}{4}$		
30	0		2 $\frac{3}{4}$		11 $\frac{3}{4}$			40	20		5 $\frac{1}{2}$		1 $\frac{1}{2}$		
30	5 W.		0 $\frac{1}{2}$ E.		9 $\frac{1}{2}$			40	25		8		1 $\frac{1}{4}$ E.		
30	10		1 $\frac{1}{4}$ E.		6 $\frac{1}{4}$	1772	7	40	30		10 $\frac{1}{2}$		4		
30	15		3 $\frac{1}{4}$		3 $\frac{1}{2}$			40	5 E.		4 $\frac{1}{2}$ W.		6 $\frac{1}{2}$		
30	20		5		2 E.	1800	1 $\frac{1}{4}$	40	10		7 $\frac{1}{4}$		12 W.		
30	25		7 $\frac{1}{4}$		4 $\frac{1}{2}$			40	15		9 $\frac{3}{4}$		14 $\frac{1}{4}$	1772	19 $\frac{1}{4}$
30	30		9		7 $\frac{1}{4}$			40	20		12 $\frac{1}{4}$		17 $\frac{1}{4}$	1776	23 $\frac{1}{2}$
30	35		11		13 $\frac{3}{4}$ W.			40	25		16		20		
30	5 E.		5		15 $\frac{1}{2}$	1775	18	40	30		19		22 $\frac{3}{4}$		
30	10		7 $\frac{1}{4}$		18		20	40	35		21 $\frac{3}{4}$		25 $\frac{1}{4}$	1791	33
30	15		9 $\frac{1}{2}$		23 $\frac{1}{4}$	1780	26 $\frac{1}{2}$	40	40		23 $\frac{3}{4}$		27		
30	30		17 $\frac{1}{2}$					40	45		25 $\frac{1}{4}$		28 $\frac{1}{4}$		

VARIATION.

Of the Curves of no Variation.—In the preceding part of this article, we have principally alluded to the variation east or west, at different times and in different places; but it is no less interesting to trace the curve in which no variation is observed. We have seen, that there are certain points in the northern and southern hemispheres where the needle points to the true poles of the world; these points, however, are not all situated on the same meridian, but form an irregular curve, inflected different ways, and in perpetual motion.

In the northern hemisphere, a curve of no variation moved from west to east during two centuries prior to 1662. This curve first passed the Azores, then the meridian of London, and, after a certain number of years, the meridian of Paris. But in the southern hemisphere, there was another curve of no variation moving from east to west. This curve first passed Cape Aguillas, and then the Cape of Good Hope; the westerly variation following the easterly, the same as in the northern hemisphere, but in a contrary direction. And from the observations that have since been made, it appears that the curve of no variation in the northern hemisphere, after passing the meridian of London and Paris, has discontinued its eastern progress; while the curve of no variation in the southern hemisphere, still continues its course north-westward.

The variation on the east side of the curve of no variation, which passed the meridian of Aguillas in 1600, and extended north and south to a high degree of latitude in both hemispheres, being westerly; and the curve which passed the meridian of London in 1662 being easterly; it follows, that the curve which passed London could not reach beyond the 18th degree of east longitude, as the denomination of the variation was the same eastward of that meridian in 1600 that it now is, namely, westerly. The exact point where the southern curve of no variation passed the northern curve cannot be satisfactorily ascertained; but it is known, that while the northern curve passed London eastward, the southern curve passed westward in nearly the same longitude.

Dampier, in his voyage to the East Indies in 1669, found, that from 6° south latitude and 25° west longitude, to the point where the 37th degree of south latitude was intersected by the meridian of Greenwich, the variation was easterly, but never exceeding 13°; at which latter point the easterly variation was 0, and thence became westerly, and continued to increase to 47° E. long., and 25° S. lat., where it appears to have attained its maximum; *i. e.* 25° or 26° W.; and from this point the variation gradually diminished, till it again assumed another denomination in S. lat. 10°, and E. long. 125°: and from this last point, as far north of the equator as 10°, the variation appears to have then been, as it still is, influenced by local attractions; the quantity being always small, sometimes east, and at others west. Captain Cook, in 1772, in S. lat. 6°, and W. long. 16°, found 9° 30' westerly variation; and in S. lat. 24°, and W. long. 23° 51', found only 39' west variation. From this point the westerly variation gradually increased, as the southern latitude and eastern longitude augmented to 96° of east longitude, and 60° 49' south latitude, where it attained its maximum; *i. e.* 43° 45' west. From this last point it rapidly decreased, and became east in S. lat. 58° 53', and E. long. 143° 40'. But as the tract of D'Entrecasteaux, in 1791, nearly coincides with Dampier's in 1669, the change in the position of the curve of no variation, will be best illustrated by a comparison of their respective observations.

D'Entrecasteaux found the variation in S. lat. 6°, and W. long. 25°, to be 7° 15' west; and in S. lat. 25°, and W. long. 25°, only 1° 56' west; from which last point it again

increased as the west longitude diminished, till the meridian of Greenwich intersected the 33d degree of south latitude, where the variation was 15° west; and it attained its maximum of 30° 48' 9" in S. lat. 34° 52', and E. long. 38° 14' 18" from Paris; and from hence, to S. lat. 44°, and W. long. 133°, the variation continued westerly, but it there changed and became east.

The space between the two curves observed by Dampier in 1669, reached from the meridian of Greenwich to 130° E. long.; and the distance between them, according to D'Entrecasteaux, in 1791, must be 155°, Dampier having cut the curve in 80° E. long., and the other in 25° W. The curve of no variation must therefore have advanced from the westward annually about 16', in the parallel of 34° south latitude, to have shifted its place 25° in ninety-two years, and at a yearly rate of 14' 8" from the time it passed Cape Aguillas in 1600 to 1791. This curve is now known to extend across the magnetic and terrestrial equators, to a point in N. lat. 37° 27', and W. long. 70° 44'.

From a comparison of the above results, and others drawn from the observations of captain Flinders, and the Russian navigator Krusenstern, it appears, that a curve of no variation bending westward, extends from the highest degree of southern latitude, in about 144° E. long. to 52° N. lat. in the same parallel, intersecting the equator in 130° E. long. Now from the observations of La Perouse and Krusenstern, the westerly variation ceased, and the curve of no variation terminated in about 52° N. lat., and 153° E. long.; for the variation north-east of this point assumes another character; and 18° farther north, and 52° to the east, captain Cook found near 36° of easterly variation.

It appears also, from a comparison of observations made in Persia and the frontiers of China by Schubert, with those of Perouse, Krusenstern, and others, made on board his majesty's ship *Sybill* by Mr. Bain, that a curve of no variation again takes its rise in about 52° N. lat., and 143° E. long., and terminates a little east from Spitzbergen, extending in a direction nearly east by south, and west by north, through 6780 miles of longitude.

Biot, in speaking of this subject, says, "that a curve of no variation seems to take its rise in the great Southern ocean, passing through the western part of New Holland, traverses the Indian ocean, enters the continent of Asia at Cape Comorin, and thence passes through Persia and West Siberia, and proceeds towards Lapland. But what is more remarkable, that line divides itself into two in the great Asian archipelago, and gives rise to another branch, which, pointing directly from the south to the north, passes that archipelago, traverses China, and is again found in Eastern Siberia. The existence of this branch, and its separation from the former, are clearly indicated by the observations made in the Chinese seas; but I am able to offer a still farther confirmation of it, by the observations made in Russia and the frontiers of China, by the celebrated astronomer Schubert, who has been kind enough to communicate them to me;" which latter are the observations spoken of above.

We have seen that a curve of no variation, extending from 60° of south latitude to 52° of north latitude, in about 143° east longitude, but taking a small bend to the westward, is intersected by the meridian of Amboyna: and by comparing with each other different observations made by Mr. Wales, in his voyage with captain Cook, and those of Vancouver in 1791, and others made by sir Home Popham, and by Humboldt, it appears, that from the westerly part of the curve of no variation, found in about 130° east of the meridian of Greenwich, where the westerly changes to an easterly variation, to the meridian where the easterly varia-

tion was found to terminate by captain Cook, S. lat. $58^{\circ} 27'$. W. long. $13^{\circ} 10'$, the distance east and west will be $216^{\circ} 50'$.

To the meridian of Peroufe, S. lat. $20^{\circ} 39'$. W. long. $28^{\circ} 38'$, the distance is $201^{\circ} 22'$.

To the meridian of Vancouver, S. lat. 35° . W. long. $28'$, the distance is 202° .

To the meridian of fir H. Popham, S. lat. 30° . W. long. 26° , the distance is 204° .

To the meridian of Humboldt, N. lat. 13° . W. long. 59° , the distance (taking the mean) is 171° .

And if the curve of no variation extends to N. lat. $37^{\circ} 27'$. W. long. $70^{\circ} 40'$, the easterly variation in that parallel will only measure $158^{\circ} 16'$.

These different distances point out, under different parallels of latitude, the direction which the curve of no variation at present assumes; and we may perhaps conclude, that the variation of the magnetic needle is caused by two different and distinct systems of magnetic forces; the one producing a westerly variation in the northern hemisphere, over the space of $200^{\circ} 44'$; and in the southern hemisphere, in the same parallel of latitude, of $143^{\circ} 10'$: and the other an easterly variation in the northern hemisphere, over a space of $159^{\circ} 16'$; and on the southern, of $216^{\circ} 50'$.

From these facts it would seem, that the north end of the curve, which passed Cape Aguillas in 1600 north-westward, was in 1804 found to extend from S. lat. 60° . W. long. $13^{\circ} 10'$, to N. lat. $37^{\circ} 27'$. W. long. $70^{\circ} 40'$, intersecting the 13th degree of north latitude, and the 21st, 30th, and 35th of south latitude; whence the medium rate of its motion is found about $26\frac{1}{2}$ annually: but it is extremely probable, that the south end of this curve has during the same period remained stationary; and this difference in the motion of the two extremes of the curve in the southern hemisphere, may perhaps point out to us the reason why the quantity of variation should have continued the same off Cape Horn during 133 years, while at the Cape of Good Hope, Paris, and London, it should have increased 25° or 27° in the same period.

The curve of no variation which passed through London eastward, about the same time the curve in the southern hemisphere passed the meridian of Greenwich westward, appears to have been lost among the smaller magnetic powers at present found in the continent of Europe and Asia.

The view which we have given of this perplexing subject, deduced from actual observation, renders it obvious that all attempts, by *theory*, to fix on charts the exact positions of the curves of no variation, or lines of given variation, must prove, as they have always hitherto done, entirely abortive. There are indeed places in the world, such as Spitzberger, Cape Horn, Chili, and Mexico, the great Asian archipelago, the coast of Coromandel, Peru, Brasil, &c., where the curve of variation, and the variation itself, has not undergone any perceptible change since first observed; but we have good reasons to believe, that at all the above-mentioned places the variations are regulated by incidental magnetic attractions, which are lost or merged in the two great powers already described, at a little distance from their respective spheres. In all other places of the globe, it is continually undergoing a regular and progressive change; but it is impossible accurately to determine when this change may cease, or to foresee what quantity our present westerly variation may attain, though there is some reason to believe it has very nearly or entirely arrived at its maximum.

At present, we have spoken only of those great and in some measure continued changes in the variation which takes place, and become very obvious after a long period; but there are others of a more minute quantity, and of daily,

and we might add of hourly occurrence, to which it will be proper to refer in the present article.

Mr. George Graham made several observations of this kind in the years 1722 and 1723, professing himself altogether ignorant of the cause of the variation which he observed. Phil. Transf. N^o 383, or Abr. vol. vii. p. 290, &c.

About the year 1750, Mr. Wargentín, secretary of the Royal Academy of Sciences in Sweden, took notice both of the regular diurnal variation of the needle, and also of its being disturbed at the time of the aurora borealis, as recorded in the Phil. Transf. vol. xlvii. p. 126, &c.

About the year 1756, Mr. Canton commenced a series of observations, amounting to nearly 4000, with an excellent variation-compass, of about nine inches diameter. The number of days on which these observations were made was 603, and the diurnal variation on 574 of them was regular; *i. e.* the absolute variation of the needle westward was increasing from about eight or nine o'clock in the morning till about one or two in the afternoon, when the needle became stationary for some time; after that, the absolute variation westward was decreasing, and the needle came back again to its former situation, or near it, in the night, or by the next morning. The diurnal variation is irregular when the needle moves slowly eastward in the latter part of the morning, or westward in the latter part of the afternoon; also when it moves much either way after night, or suddenly both ways in a short time. These irregularities seldom happen more than once or twice in a month, and are always accompanied, as far as Mr. Canton observed, with an aurora borealis.

Mr. Canton lays down and evinces by experiment the following principle, *viz.* that the attractive power of the magnet (whether natural or artificial) will decrease while the magnet is heating, and increase while it is cooling. He then proceeds to account for both the regular and irregular variation. It is evident, he says, that the magnetic parts of the earth in the north on the east side, and the magnetic parts of the earth in the north on the west side of the magnetic meridian, equally attract the north end of the needle. If then the eastern magnetic parts are heated faster by the sun in the morning than the western, the needle will move westward, and the absolute variation will increase: when the attracting parts of the earth on each side of the magnetic meridian have their heat increasing equally, the needle will be stationary, and the absolute variation will then be greatest; but when the western magnetic parts are either heating faster, or cooling slower than the eastern, the needle will move eastward, or the absolute variation will decrease; and when the eastern and western magnetic parts are cooling equally fast, the needle will again be stationary, and the absolute variation will then be least.

By this theory, the diurnal variation in the summer ought to exceed that in winter; and accordingly it is found by observation, that the diurnal variation in the months of June and July is almost double that of December and January.

The irregular diurnal variation must arise from some other cause than that of heat communicated by the sun; and here Mr. Canton had recourse to subterranean heat, which is generated without any regularity as to time, and which will, when it happens in the north, affect the attractive power of the magnetic parts of the earth on the north end of the needle. That the air nearest the earth will be most warmed by the heat of it, is obvious; and this has been frequently taken notice of in the morning, before day, by means of thermometers at different distances from the ground. Phil. Transf. vol. xlviii. p. 526.

Mr. Canton has annexed to his paper on this subject a complete

complete year's observation; from which it appears that the diurnal variation increases from January to June, and decreases from June to December. Phil. Transf. vol. li. p. 398, &c.

It has also been observed, that different needles, especially if touched with different load-stones, will differ a few minutes in their variation. See Poleni Epist. Phil. Transf. N° 421.

We shall here subjoin a method practised by M. Du Hamel, who was one of those who attempted, and succeeded in the preparation of artificial magnets, for enlarging the scale of the variation. At each extremity of the needle, composed of two magnetic bars, and which is fourteen inches long, a slender pointed piece of steel is erected perpendicularly; and at the distance of fifty-two feet, in the direction of the needle, he has placed on two pillars, and in a line perpendicular to that direction, a graduated limb six feet long; being a segment of a supposed circle, described from the centre on which the needle turns. The observer, placing himself so as to bring the two pieces of steel at the extremities of the bar into a line with the eye, observes where that line prolonged, or the visual ray, points to the graduated arc. As, at this distance, each of these degrees measures a foot, the true direction of the needle is ascertained with the greatest precision; and lest the observer's eyes may not be good enough to enable him to see distinctly the particular divisions at that distance, an assistant occasionally moves a certain index, conformably to his direction. Hist. de l'Acad. Roy. des Science. Paris, for 1772, part ii. Mem. 2.

On the Effect of the local Attraction of the Ship upon the Variation of the Needle.—We have already had occasion to notice the necessity of attending to the direction of the ship's head, in observations made on ship-board relative to the direction of the compass; and that this may have a very sensible effect will appear very obvious, when we recollect the quantity of iron with which a ship of war, in particular, is generally loaded; and that this is mostly forward, while the compass is generally aft. The great attraction between the iron and the needle is generally known; and consequently, if we could imagine the magnetic power of the earth to cease entirely, we should have no difficulty in conceiving that the attraction of the guns, &c. would incline the needle to assume a direction coinciding with that of the vessel; and consequently, when the magnetic meridian and the direction of the ship are the same, that is, when the vessel lies north and south, both forces acting in the same manner, the position of the needle will be the same as if no such local attraction existed. But if the ship's head is put over to the east or the west, then the local attraction of the ship will incline the needle to the east and west, while the terrestrial attraction will draw it towards the north; and it will, therefore, assume a direction which corresponds with the resultant of these two distinct forces: and we may observe, that the direction of this resultant would furnish, if well observed, most important data towards determining the intensity of this mysterious power.

Simple and obvious as this idea is, it does not appear to have been formed till Mr. Wales, the astronomer in captain Cook's voyages, was struck with certain irregularities, which he could in no way at first account for, and of which we have the following account in the Introduction to the astronomical observations in the Second Voyage.

“In the English Channel, the extremes of the observed variation were from $19\frac{1}{2}^{\circ}$ to 25° ; and all the way to the Cape of Good Hope, I had frequently observed differences nearly as great, without being able in any way to account for them; the difference in the situation being by no means

sufficient. These irregularities continued after leaving the Cape, which at length put me upon examining into the circumstances under which they were made. In this examination it soon appeared, that when most of these observations were made, wherein the greatest variation had happened, the ship's head was *north* and *easterly*; and that when those where it was the least had been taken, it was *south* and *westerly*. I mentioned this to captain Cook, and some of the officers, who did not at first seem to think much of it; but as opportunities happened, some observations were made under those circumstances, and very much contributed to confirm my suspicions; and throughout the whole voyage, I had good reason to believe that variations observed, with the *ship's head in different positions, and even in different parts of her*, will differ very materially from one another, and much more will observations made on board different ships, which I now find fully verified, on comparing those made on board the Adventure with my own, made about the same time in the Resolution.”

Mr. Wales again recurs to this subject, in the course of his astronomical observations made in Cook's third voyage, and points out the quantity of the deviation in several cases; yet the true cause of these anomalies does not appear to have suggested itself to this able astronomer: he merely states the results, but offers no explanation of them. Nor does it appear that they were afterwards particularly noticed by any navigator, till captain Flinders's attention was called to the subject in the early part of his last voyage. Here that experienced navigator found such unaccountable differences in the quantity of variation, deduced from the different observations he occasionally made, that he determined on instituting an inquiry into their causes; and, if possible, to ascertain the laws by which they were regulated.

“Several instances,” he observes, “have been mentioned in the course of this voyage, where the compass shewed a different variation, on being removed from one part of the ship to another. Thus, observations on the binnacle gave $29\frac{1}{2}^{\circ}$ off the Start, where the true variation was $25\frac{1}{2}^{\circ}$; whilst others taken from the booms before the main-mast, 68 miles lower down the Channel, gave only 24° ; and in the experiments made with five compasses, the mean variation on the binnacle was $4^{\circ} 37'$ greater than on the booms.

“It soon became evident, however, that keeping the compass to one spot was not alone sufficient to secure accuracy: a change in the direction of the ship's head was also found to make a difference in the needle; and it was necessary to ascertain the nature and proportional quantity of this difference, before a remedy could be applied. This inquiry was attended with many difficulties, and no satisfactory conclusion could be drawn, until a greater variety of observations was collected. It then appeared, that when the ship's head was on the east side of the meridian, the differences were mostly one way; and when on the west side, they were the contrary: whence I judged that the iron in the ship had an attraction on the needle, which drew it forward. But there was this remarkable distinction: in the northern hemisphere, it was the north end of the needle which was attracted; and in the southern hemisphere, it was the south end. In the instances off the Start, before cited, when the ship's head was *west*, the north end of the needle had been drawn forward, or to the left of the north, nearly 4° , and the west variation thereby increased to $29\frac{1}{2}^{\circ}$; with the head at *east*, it would be drawn to the right of its natural position, and the variation diminished to about $21\frac{1}{2}^{\circ}$; but at *north*, the attraction of the ship was in the same line with the magnetic poles of the earth, and would, therefore, produce no change.

VARIATION.

change. The same thing took place at *fouth*, for the two attractions were still in the same continued line, though on opposite sides of the compass; and throughout the voyage, I found the variation, taken with the head at north and fouth, agreed very nearly in themselves, and with the ob-

servations themselves near the same place, when such observations were not affected by local attractions."

The following table contains a few of the instances, where the change in the variation was observed by captain Flinders.

TABLE of Variations observed in a Voyage of Discovery to Terra Australis, in 1801 and 1802, by Captain Flinders, in His Majesty's Ship Investigator.

Time.	Latitude.		Longitude.		Ship's-Head.	Variation.		Difference.		Remarks.	
	D.	M.	D.	M.		D.	M.	D.	M.		
1801	49	50 N.	5	52 W.	West.	29	34 W.	}		Off the Start.	
	49	48	4	2		29	30				
	5	38	16	50	S.E. by S.	12	18	}		Off the African coast.	
2	21	14	15	W.S.W.	14	54					
1802	35	48 S.	139	3 E.	W. by S.	5	11 E.	}	6	1	Encounter Bay.
	35	49	139	12	S.E.	0	50 W.				
	36	42	139	50	S.S.E. $\frac{1}{2}$ E.	0	25 E.	}	1	29	Off Cape Buffon.
	37	30	139	40	South.	4	8				
	37	50	139	41	S.E. by S.	2	39	}			
	37	56	139	41	S.S.E.	2	2				
	37	55	139	48	N.E.	2	2	}	3	50	Bass Straits.
	39	38	144	40	W.S.W.	11	52				
	39	38	144	1	South.	7	59	}	3	7	
	38	36	144	20	N.E. by E. $\frac{1}{2}$ E.	3	41				
	38	38	144	30	N.N.E. $\frac{1}{2}$ E.	6	48	}	5	16	At anchor in Goose Bay.
	34	5	123	9	W.S.W.	0	54 W.				
	34	4	123	10	East.	6	10	}	5	28	
	34	5	135	9	S.E. by E.	1	33				
	34	6	135	9	S.W. by W.	3	56 E.	}	4	48	Off Point Pearce.
	34	7	137	19	S.W. by S.	4	48				
	34	16	137	16	E. by N.	0	10 W.	}	2	40	
	34	22	137	21	S.E.	0	35				
	34	42	137	14	S.S.W.	3	15	}	2	59	At anchor off St. Vincent.
	34	36	138	18	S. by W.	5	22				
32	40	1	0	S.E.	2	27 W.	}	2	49	Off South Cape.	
32	30	125	25	E. by N.	7	25					
32	32	125	40	South.	4	26	}	1	55		
32	24	125	55	N.E.	6	13					
32	7	126	23	S. by E.	4	18	}	2	56		
32	17	128	1	E. by N.	6	4					
32	15	128	2	S. by E.	3	8	}	3	8	Nuyt's Archipelago.	
32	23	132	39	E. by N.	2	49					
		132	56	S. $\frac{1}{2}$ W.	0	19					

After various other observations, and much examination, (for the needle was not always deflected the same quantity, when the position of the ship was the same,) captain Flinders found that the errors had a close connection with the dip. When the north end of the needle had dipped, it was the north point of the compass that had been attracted by the iron of the ship; and as that dip diminished, so had the attraction, until at the magnetic equator; where the dipping-needle stands horizontal, there seemed to have been no attraction; and, upon the whole, it seemed probable that "the error produced at any direction of the ship's head would be to the error at east or west, at the same dip, as the sine of the angle between the ship's head and the magnetic meridian was to the sine of eight points or radius."

After captain Flinders's arrival in England, he made application to the lords commissioners of the Admiralty to have experiments tried on board some of his majesty's ships, that the observations made during his voyage might be verified;

and a series of observations was accordingly made on board five different ships at Sheerneck and Portsmouth, which fully established the accuracy of his former conclusions.

Should this rule, upon farther trial, be found to answer under all circumstances, we must consider it as a most important acquisition to our present knowledge of navigation; but those who wish fully to appreciate all the consequences of this discovery, should consult Bain's treatise on the "Variation of the Compass," to which work we have been much indebted in the composition of this article, and where they will find every information of a practical kind connected with the subject.

Theory of the Variation of the Needle.—Dr. Halley, as we have already stated, was the first who attempted any theory relative to the variation of the compass; and from the observations which he collected, many of which are included in our preceding remarks, he conceived "that the whole globe of the earth is one great magnet, having four mag-
netical

VARIATION.

netical poles, or points of attraction; near each pole of the equator two; and that in those parts of the world which lie nearly adjacent to any one of these magnetical poles, the needle is governed thereby; the nearest pole being always predominant over the more remote."

The pole which at present is nearest to us, he conjectures to lie in or near the meridian of the Land's-End of England, and not above 7° from the Arctic pole: by this pole the variations in all Europe and Tartary, and the North sea, are principally governed; though still with some regard to the other northern pole, whose situation is in the meridian passing about the middle of California, and about 15° from the north pole of the world, to which the needle has chiefly respect in all North America, and in the two oceans on either side thereof, from the Azores, westwards, to Japan, and farther.

The two southern poles, he imagines, are rather farther distant from the south pole of the world; the one about 16° , in a meridian 20° to the westward of Magellan's straits, or 95° west from London: this commands the needle in all South America, in the Pacific sea, and the greatest part of the Ethiopic ocean. The other seems to have the greatest power, and the largest dominion of all, as it is the most remote from the pole of the world, being distant from it little less than 20° , in the meridian which passes through New Holland, and the island Celebes, about 120° east from London; this pole is predominant in the south part of Africa, in Arabia, and the Red sea, in Persia, India, and its islands, and all over the Indian sea, from the Cape of Good Hope eastwards, to the middle of the Great South sea that divides Asia from America.

Such appears to have been the disposition of the magnetic attraction in the time of Dr. Halley; and from these data this author draws the following conclusions; *viz.*

1. Then, it is plain that, as our European north pole is in the meridian of the Land's-End of England, all places more easterly than that will have it on the west side of the meridian; and, consequently, the needle, respecting it with its northern point, will have a westerly variation, which will still be greater as you go to the eastward, till you come to some meridian of Russia, where it will be the greatest, and from thence will decrease again. Accordingly, in fact, we find, that at Brest the variation is but $1\frac{3}{4}^{\circ}$; at London, $4\frac{1}{2}^{\circ}$ (in 1683); and at Dantzic, 7° west. Again, to the westward of the meridian of the Land's-End, the needle ought to have an easterly variation, were it not that, by approaching the American northern pole, (which lies on the west side of the meridian, and seems to be of greater force than this other,) the needle is drawn thereby westward, so as to counterbalance the direction given by the European pole, and to make a small west variation in the meridian of the Land's-End itself. Yet, about the isle of Terceira, it is supposed our nearest pole may so far prevail as to give the needle a little turn to the east, though but for a very little space; the counterbalance of those two poles admitting no considerable variation in all the eastern parts of the Atlantic ocean, nor upon the west coasts of England and Ireland, France, Spain, and Barbary. But to the westward of the Azores, the powers of the American pole overcoming that of the European, the needle has chiefly respect to this, and turns still more and more towards it as we approach it. Whence it happens, that on the coast of Virginia, New England, Newfoundland, and in Hudson's straits, the variation is westward, that is, it decreases as you go from thence towards Europe; and that it is less in Virginia and New England than in Newfoundland and Hudson's straits.

2. This westerly variation, again, decreases as you pass

over North America; and about the meridian of the middle of California, the needle again points due north; and from thence westward to Yedzo and Japan, it is supposed the variation is easterly, and half-sea over, not less than 15° ; and that this east variation extends over Japan, Yedzo, Tartary, and part of China, till it meets with the westerly, which is governed by the European north pole, and which is the greatest somewhere in Russia.

3. Towards the south pole the effect is much the same, only that here the south point of the needle is attracted. Whence it will follow, that the variation on the coast of Brasil, at the river of Plata, and so on to the straits of Magellan, should be easterly, if we suppose a magnetical pole, situated about 20° more westerly than the straits of Magellan. And this easterly variation extends eastward over the greatest part of the Ethiopic sea, till it be counterpoised by the virtue of the other southern pole, as it is about mid-way between the Cape of Good Hope and the isles of Tristan d'Alcunha.

4. From thence eastwards, the Asiatic south pole becoming prevalent, and the south point of the needle being attracted thereby, there arises a west variation, very great in quantity and extent, because of the great distance of this magnetical pole from the pole of the world. Hence it is, that in all the Indian sea, as far as Hollandia Nova, and farther, there is constantly a west variation; and that, under the equator itself, it rises to no less than 11° , where it is most. And that, about the meridian of the island of Celebes, being likewise that of this pole, this westerly variation ceases, and an easterly one begins, which reaches to the middle of the South sea, between Zelandia Nova and Chili, leaving room for a small west variation, governed by the American south pole.

5. From the whole it appears, that the direction of the needle, in the temperate and frigid zones, depends chiefly upon the counterpoise of the forces of two magnetical poles of the same nature; as also why, under the same meridian, the variation should be in one place $29\frac{1}{2}^{\circ}$ west, and in another $20\frac{1}{2}^{\circ}$ east.

6. In the torrid zone, and particularly under the equinoctial, respect must be had to all four poles, and their positions must be well considered, otherwise it will not be easy to determine what the variation shall be, the nearest pole being always strongest; yet not so as not to be counterbalanced, sometimes, by the united forces of two more remote. Thus, in sailing from St. Helena, by the isle of Ascension, to the equator, on the north-west course, the variation is very little easterly, and in that whole tract is unalterable; because the South American pole, (which is considerably the nearest in the aforesaid places,) requiring a great easterly variation, is counterpoised by the contrary attraction of the North American and the Asiatic south poles; each of which singly, is, in these parts, weaker than the American south pole: and upon the north-west course, the distance from this latter is very little varied; and as you recede from the Asiatic south pole, the balance is still preferred by an access towards the North American pole. In this case, no notice is taken of the European north pole; its meridian being a little removed from those of these places, and of itself requiring the same variations which we here find.

After the same manner may the variations in other places, under and near the equator, be accounted for, upon Dr. Halley's hypothesis.

But in order to account for the *variation of the variation*, it was observed, that from many of the observed phenomena, it seemed to follow that all the magnetic poles have a motion

motion westward: but if it be so, it is evident that it is not a rotation about the axis of the earth; for then the variations would continue the same in the same parallel of latitude (the longitude only changed), as much as the motion of the magnetical poles: but the contrary is found by experience; for there is no where, in the latitude of $51\frac{1}{2}^{\circ}$ north, between England and America, a variation of 11° east, at this time; as it was once here at London. Wherefore it seems, that our European pole is become nearer the Arctic pole than it was heretofore; or else, that it has lost part of its virtue.

But whether these magnetic poles move altogether with one motion, or with several; whether equally, or unequally; whether circular, or libratory: if circular, about what centre; if libratory, after what manner; are things yet unknown.

This theory seems yet somewhat obscure and defective: to suppose four poles in one magnetical globe, in order to account for the variation, is a little unnatural; but to conceive those poles to move, and that by such laws as to solve the variation of the variation, is still more extraordinary. In effect, the solution appears not much less implicit and arbitrary than the problem.

The learned author of the theory, therefore, found himself under a necessity to solve the phenomena of his solution; and with this view, he presented the following hypothesis. The external parts of the globe he considers as the shell, and the internal as a nucleus, or inner globe; and between the two, he conceives a fluid medium. That inner earth, having the same common centre and axis of diurnal rotation, may turn about with our earth each twenty-four hours. Only the outer sphere having its turbinating motion some small matter either swifter or slower than the internal ball; and a very minute difference in length of time, by many repetitions, becoming sensible; the internal parts will, by degrees, recede from the external; and not keeping pace with one another, they will appear gradually to move either eastward or westward, by the difference of their motions.

Now, suppose such an internal sphere, having such a motion, the two great difficulties in the former hypotheses are easily solved; for if this exterior shell of earth be a magnet, having its poles at a distance from the poles of diurnal rotation; and if the internal nucleus be likewise a magnet, having its poles in two other places, distant also from the axis; and these latter, by a gradual and slow motion, change their place in respect of the external, we may then give a reasonable account of the four magnetical poles afore-mentioned, as likewise of the changes of the needle's variation.

The period of its motion being wonderfully great, and there being hardly a hundred years since these variations have been duly observed, it will be very hard to bring this hypothesis to a calculus; especially since, though the variations do increase and decrease regularly in the same place, yet in different places at no great distance, there are found such casual changes thereof, as can no ways be accounted for by a regular hypothesis; but seem to depend upon the unequal and irregular distribution of the magnetical matter within the substance of the external shell, or coat of the earth, which deflect the needle from the position it would acquire from the effect of the general magnetism of the whole. Of which the variations at London and Paris give a notable instance; for the needle has been constantly about $1\frac{1}{2}^{\circ}$ more easterly at Paris than at London: though it be certain that, according to the general effect, the difference ought to be the contrary way; notwithstanding which, the variations, in both places, do change alike.

Hence, and from some other things of like nature, it

seems plain, that the two poles of the external globe are fixed in the earth, and that if the needle were wholly governed by them, the variations thereof would be always the same, with some irregularities, upon the account just now mentioned. But the internal sphere having such a gradual translation of its poles does influence the needle, and direct it variously, according to the result of the attractive or directive power of each pole, and, consequently, there must be a period of the revolution of this internal ball; after which the variations will return again as before. But if it shall in future ages be observed otherwise, we must then conclude that there are more of these internal spheres, and more magnetical poles, than four; which, at present, we have not a sufficient number of observations to determine, and particularly in that vast Mar del Zur, or South sea, which occupies so great a part of the whole surface of the earth. If, then, two of the poles be fixed, and two moveable, it remains to ascertain which they are that keep their place.

The author thinks it may be safely determined, that our European north pole is the moveable one of the two northern poles, and that which has chiefly influenced the variations in these parts of the world; for, in Hudson's Bay, which is under the direction of the American pole, the change is not observed to be near so fast as in these parts of Europe, though the pole be much farther removed from the axis. As to the south poles, he takes the Asiatic pole to be fixed, and, consequently, the American pole to move.

This granted, it is plain that the fixed poles are the poles of this external shell, or cortex, of the earth; and the other the poles of the magnetical nucleus, included and moveable within the other. It likewise follows, that this motion is westwards, and, by consequence, that the afore-said nucleus has not precisely attained the same degree of velocity with the exterior parts in their diurnal revolution; but so very nearly equals it, that, in 365 revolutions, the difference is scarcely sensible. That there is any difference of this kind arises hence, that the impulse by which the diurnal motion was impressed on the earth, was given to the external parts; and from thence, in time, communicated to the internal; but not so as yet perfectly to equal the velocity of the first motion impressed on, and still conserved by, the superficial parts of the globe.

As to the precise period, we want observations to determine it, though the author thinks we may, with some reason, conjecture, that the American pole has moved westward 46° in ninety years, and that the whole period thereof is performed in about seven hundred years.

Mr. Whiston, in his "New Laws of Magnetism," raises several objections against this theory. See **MAGNETISM**.

M. Euler, the son of the celebrated geometrician of that name, has also controverted and censured the above theory: he thinks that two magnetic poles placed on the surface of the earth will sufficiently account for the variation; and he then endeavours to shew, how we may determine the declination of the needle, at any time, and on every part of the globe, from this hypothesis. But we must refer for the particulars of this reasoning to the *Histoire de l'Academie Royale des Sciences et Belles Lettres de Berlin*, for 1757.

Various other theories have been suggested by later authors, but most of these have been already alluded to under our articles **MAGNETISM**, **DIPPING-Needle**, &c.; we shall, therefore, here conclude this article, by referring the reader for a more minute account of the various theories, particularly that of Coulomb, to Haüy's "Elementary Treatise on Natural Philosophy," translated by Gregory, and to the first chapter of the third volume of Biot's "Traité de Physique."

VARIATION.

VARIATION of Declination of the Needle. To observe the.— Draw a meridian line, as directed under MERIDIAN, then, a style being erected in the middle of it, place a needle thereon, and draw the right line which it hangs over. Thus will the quantity of the variation appear.

Or thus: as the former method of finding the declination cannot be applied at sea, others have been thought of, the principal of which follow: suspend a thread and plummet over the compass, till the shadow pass through the centre of the card; observe the rhumb, or point of the compass, which the shadow touches when it is the shortest. For the shadow is then a meridian line; consequently the variation is shewn.

Or thus: observe the rhumb in which the sun, or some star, rises and sets; bisect the arc intercepted between the rising and setting; the line of bisection will be the meridian line; consequently the declination is had as before. The same may be had from two equal altitudes of the same star, observed either by day or night.

Or thus: observe the rhumb in which the sun, or a star, rises and sets; and from the latitude of the place find the eastern or western amplitude, for the difference between the amplitude, and the distance of the rhumb observed, from the eastern rhumb of the card, is the variation sought.

Or thus: observe the altitude of the sun, or some star, SI (Plate II. Navigation, fig. 7.) whose declination is known; and note the rhumb in the compass to which it then corresponds. Since then, in the triangle ZPS, we have three sides; viz. PZ, the complement of the elevation of the pole PR; SP, the complement of the declination DS; and ZS, the complement of the altitude SI; the angle PZS is found by spherical trigonometry; the contiguous one to which, viz. AZS, measures the azimuth HI. The difference, then, between the azimuth, and the distance of the rhumb observed from the south, is the variation sought. See AZIMUTH COMPASS.

Note, to have the eastern or western amplitude accurately, regard must be had to the refraction. See REFRACTION.

For the more commodious observing in what rhumb of the compass the sun, or a star, is seen, it will be proper to have two little apertures, or glass windows, opposite to each other, under the limit of it, with a telescope-sight fitted to one of them, and to the other a fine thread.

The use of the variation is to correct the courses a ship has steered by the compass: *e. g.* given the course set, and the variation of the compass, and let it be required to find the true course the ship steers: if the variation is west, call the N.W. quarter the 1st, the S.W. the 2d, the S.E. the 3d, and the N.E. the 4th; but if the variation be east, call the N.E. quarter the 1st, the S.E. the 2d, the S.W. the 3d, and the N.W. the 4th. Then, if the course be set in the 1st or 3d quarters, add the variation to the points or degrees in the given course; but if in the 2d or 4th quarters, subtract, and the sum in the former, or the difference in the latter case, will be the course corrected by the variation.

VARIATION of Curvature, in Geometry, is used for that inequability, or change, which happens in the curvature of all curves, except the circle. And this variation or inequability constitutes the quality of the curvature of any line.

Sir Isaac Newton makes the index of the inequability or variation of curvature, to be the ratio of the fluxion of the radius of curvature to the fluxion of the curve: and Mr. Maclaurin, to avoid the perplexity that different notions, connected with the same terms, occasion to learners, has adopted the same definition; but he suggests, that this ratio

gives rather the variation of the ray of curvature, and that it might have been proper to have measured the variation of curvature rather by the ratio of the fluxion of the curvature itself to the fluxion of the curve; so that the curvature being inversely as the radius of curvature, and, consequently, its fluxion as the fluxion of the radius itself directly, and the square of the radius inversely, its variation would have been directly as the measure of it, according to Sir Isaac Newton's definition, and inversely as the square of the radius of curvature.

According to this notion, it would have been measured by the angle of contact contained by the curve and circle of curvature, in the same manner as the curvature itself is measured by the angle of contact contained by the curve and tangent. The reason of this remark may appear from this example: The variation of curvature, according to Sir Isaac Newton's explication, is uniform in the logarithmic spiral, the fluxion of the radius of curvature in this figure being always in the same ratio to the fluxion of the curve; and yet, while the spiral is produced, though its curvature decreases, it never vanishes, which must appear a strange paradox to those who do not attend to the import of Sir Isaac's definition. Newton's Meth. of Flux. and Inf. Series, p. 76. Maclaurin's Fluxions, art. 386. Phil. Trans. N^o 468. sect. 6. p. 342.

The variation of curvature at any point of a conic section, is always as the tangent of the angle contained by the diameter that passes through the point of contact; and the perpendicular to the curve at the same point, or to the angle formed by the diameter of the section, and of the circle of curvature. Hence the variation of curvature vanishes at the extremities of either axis, and is greatest when the acute angle, contained by the diameter, passing through the point of contact and the tangent, is least.

When the conic section is a parabola, the variation is as the tangent of the angle, contained by the right line drawn from the point of contact to the focus, and the perpendicular to the curve. See CURVATURE.

VARIATION of Ratios. In the investigations of the relation which varying and dependent quantities bear to each other, conclusions are frequently more readily obtained by expressing only two terms in each proportion, than by retaining the four. But although in considering the variation of such quantities two terms only are expressed, it will be necessary to bear constantly in mind that four are supposed, and that the operations by which our conclusions are in this case obtained, are in reality the operations of four proportionals.

1. One quantity is said to vary directly as another, when their magnitudes depend wholly upon each other, and in such a manner, that if the one be changed, the other is changed in the same proportion: thus, let A and B be mutually dependent upon each other in such a way, that if A changes to any other value *a*, B is changed to another value *b*, such that $A : a :: B : b$; then A is said to vary directly as B, which is denoted by the symbol of general proportion \propto placed between the two quantities. Thus, for example, while the altitude of a triangle remains constant, the area varies directly as the base, or the *area* \propto *base*; for if the base be increased or diminished, the area is increased or diminished in the same proportion.

2. One quantity is said to vary inversely as another, when one cannot be changed in any manner; but the reciprocal of the other is changed in the same proportion.

A varies inversely as B, or $A \propto \frac{1}{B}$, if when A is changed

to a , B is changed to b , in such a manner, that

$$A : a :: \frac{1}{B} : \frac{1}{b}; \text{ or } A : a :: b : B.$$

For example, if the area of a triangle be given, the base varies inversely as the perpendicular altitude; for let A and a represent the altitude of two triangles of equal areas, and B and b their two bases; then

$$\frac{A \times B}{2} = \frac{a \times b}{2}; \text{ or } A \times B = a \times b :$$

therefore,

$$A : a :: b : B; \text{ or } A : a :: \frac{1}{B} : \frac{1}{b}.$$

3. One quantity is said to vary as two others *jointly*, if, when the former is changed in any manner, the product of the other two is changed in the same proportion: that is, A varies as B and C jointly, or $A \propto BC$, when A cannot be changed to a , but BC is changed to bc , such that $A : a :: BC : bc$. The area of a triangle, for example, varies as the base and altitude jointly; for let A, P, B , represent the area, perpendicular, and base of one triangle, and a, p, b , the corresponding quantities in another; we know

that $A = \frac{1}{2}PB$, and $a = \frac{1}{2}pb$; consequently $\frac{A}{a} = \frac{PB}{pb}$,

or $A : a :: BP : bp$.

4. One quantity is said to vary *directly* as a second, and *inversely* as a third, when the first cannot be changed in any manner; but that the second, multiplied by the reciprocal of the third, is changed in the same proportion. That is, A

varies as $\frac{B}{C}$, or $A \propto \frac{B}{C}$, when $A : a :: \frac{B}{C} : \frac{b}{c}$; A, B, C , and a, b, c , being corresponding values of these quantities.

For example, the base of a triangle varies as the area directly, and as the altitude inversely; for as in the preceding example,

$\frac{BP}{pb} = \frac{A}{a}$; if we multiply both sides by

$\frac{p}{P}$, we have $\frac{B}{b} = \frac{pA}{Pa}$, whence $B : b :: \frac{A}{P} : \frac{a}{p}$.

The following are some of the principal propositions relating to the ratio of variable quantities.

If $A \propto B$, and $B \propto C$; then $A \propto C$.

If $A \propto B$, and $B \propto \frac{1}{C}$; then $A \propto \frac{1}{C}$.

If $A \propto C$, and $B \propto C$; then $A \pm B \propto \sqrt{BA} \propto C$.

If $A \propto B$, and m is any given number, $A \propto mB$.

If $A \propto B$; then $A^n \propto B^n$, or $A^{\frac{1}{n}} \propto B^{\frac{1}{n}}$.

If $A \propto a$, and $M \propto m$; then $AM \propto am$.

If $A \propto BC$; then $B \propto \frac{A}{C}$, and $C \propto \frac{A}{B}$.

If AB be constant; then $A \propto \frac{1}{B}$, and $B \propto \frac{1}{A}$.

If $A \propto B$, and $C \propto D$; then $AC \propto BD$.

Wood's Algebra.

VARIATION, *Calculus of*, is a department of the modern analysis, which we owe, as a distinct branch, to the inventive genius of Lagrange, who published his first memoir on this subject in the second volume of the Transactions of the Academy of Sciences of Turin, in 1762; and his second memoir, published in the fourth volume of the same Transactions, in 1770, gave to this theory a perfection and general-

ization far beyond what it was supposed capable of possessing. This method was also in the interval illustrated in the most simple and elementary manner by the celebrated Euler, in the Memoirs of the Academy of Sciences at Peterburgh for 1764, as it was afterwards in the third volume of his *Calcul Integral*, and again in the *Acta Petro.* for 1771. Since that time it has been treated of by different authors at greater or less extent; and to Mr. Woodhouse, of Cambridge, we are indebted for a very neat little volume, in which this subject is handled in a very clear and conspicuous manner, from which work we have already given a few extracts under the article ISOPERIMETRY. Bossut, also, in vol. ii. of his "*Traité de Calcul Differential et de Calcul Intégral*," has a very perspicuous chapter on the calculus of variations, of which we shall avail ourselves in the present instance.

Let there be any indefinite expression or function compounded of variable and constant quantities, which changes its value by the increase or diminution of one or more of the elements which it contains: it will thus undergo a variation, and the method of finding this is what is called the *calculus of variations*.

In the same manner as \dot{x} is made to denote the fluxion of x , and $d x$ the differential of x ; so δx is used to indicate the variation of x ; and the fundamental rules of this calculus are founded on the same principles as those of the differential calculus: at the same time, however, it is necessary to guard against confounding the one with the other. A very simple example will shew clearly the distinction that must be made between the two cases.

Let us suppose the equation $y^2 = ax$, which denotes the relation between the absciss $A P = x$, and ordinate $P M = y$, of a parabola $A M$ (*Plate XIII. Analysis, fig. 1.*), a being the parameter. By drawing pm indefinitely near to PM , and Mr parallel to the axis AV ; the line Pp , or Mr , will represent the differential dx , and Mr the differential dy ; and the relation of these differentials is found by the differentiation of the equation $y^2 = ax$, which gives

$$2y dy = a dx, \text{ or } dy = \frac{a dx}{2y}, \text{ or } dy = \frac{a dx}{2\sqrt{ax}}.$$

Let us conceive now that the equation $y^2 = ax$, vary by the indefinitely small augmentation of its parameter a , which is one of its elements; and let us construct a second parabola $A N$, which has $a + \delta a$ for its parameter. Then supposing the absciss $A P$ to continue the same for both parabolas, it is obvious that the ordinate $P N$, of the parabola $A N$, will have for its value the primitive ordinate $P M$, augmented by the small quantity $M N$, which therefore represents the variation that the ordinate $P M$ undergoes in consequence of the variation of the parameter a ; hence, in representing by δy the variation of y , as that of a is denoted by $a + \delta a$, the new equation will be $(y + \delta y)^2 = (a + \delta a)x$; from which subtracting the original equation $y^2 = ax$, we shall have (neglecting, as in the differential calculus, the variations

of the second order) $2y \delta y = x \delta a$, or $\delta y = \frac{x \delta a}{2y}$, or δy

$$= \frac{x \delta a}{2\sqrt{ax}}, \text{ an equation which exhibits the relation of the}$$

variations δa and δy .

If, also, we make the absciss $A P$ vary by the indefinitely small quantity $Pp = \delta x$, the corresponding ordinate for the parabola $A N$ will be qn , and the line sn will represent the variation of the primitive ordinate $P M$. Now to find the relation between the variations δa , δx , δy , we must substitute in the equation $y^2 = ax$, $(a + \delta a)$ for a ,

$(x +$

VARIATION.

$(x + \delta x)$ for x , and $(y + \delta y)$ for y , and the equation becomes

$$(y + \delta y)^2 = (a + \delta a)(x + \delta x);$$

from which subtracting $y^2 = ax$, we shall have

$$2y\delta y = x\delta a + a\delta x;$$

therefore,

$$\delta y = \frac{x\delta a + a\delta x}{2y} = \frac{x\delta a + a\delta x}{2\sqrt{ax}};$$

which is an expression for the variation s_n , of the ordinate P M.

In this example, (and the same has place for all similar equations,) the parameter a , and its variation δa , are constant quantities for the entire parabolas, while those of the co-ordinates P M and A P continually change; the changes, therefore, relative to the same parabola belong to the differential calculus, and those which result from the passage of one parabola to another, to the calculus of variations. Any one of the variations δa , δx , δy , may be arbitrarily assumed; as, for example, we may suppose $\delta x = dx$, but this supposition being once made, the values of the other variations must be subordinate to this, and we cannot therefore afterwards make $\delta y = dy$, or $\delta y = \delta a$.

There is no difficulty in determining the variations of every order for algebraical and circular quantities, and common exponentials; the operations being exactly the same as in the differential calculus; we therefore obtain the variations by the same rules, and have only to write δ instead of d , and in this respect the calculus of variations return again to the differential calculus; but this latter will not be sufficient when it is required to determine the variation of formulae, which contain in themselves the sign of integration: thus, for example, let the integral formula be $\int V dx$, where V is any function of x , y , and z , and constant quantities; we difference this by omitting the sign \int ; that is, $d(\int V dx) = V dx$; but the expression $\delta \int V dx$ is very different, as we shall see in what follows.

Now the principal object of the calculus of variations, is to determine the variation of these sorts of integral formulae; let us, therefore, endeavour to establish the principles which are to serve as the basis of this research.

First Principle.—The variation of a differential is equal to the differential of a variation, and reciprocally; that is, we shall have $\delta d\pi = d\delta\pi$.

For let us suppose that the variable π represent the ordinate of a curve; then this ordinate will change by *differentials* while it belongs to the same curve, and by *variations* in passing from the proposed curve to the curve indefinitely near to the first. In the primitive curve, let π' be the consecutive value to π , and consequently $\pi' = \pi + d\pi$, or $d\pi = \pi' - \pi$. Now taking the variation of this last equation, we shall have $\delta d\pi = \delta\pi' - \delta\pi$; and in the same manner as π and π' are consecutive values in the series of π 's, we may consider $\delta\pi$ and $\delta\pi'$ as consecutive values in the series of $\delta\pi$'s, so that $\delta\pi' = \delta\pi + d\delta\pi$, or $d\delta\pi = \delta\pi' - \delta\pi$; thus in equating these two values of $\delta\pi' - \delta\pi$, we shall have $\delta d\pi = d\delta\pi$.

Hence if we have an expression which contains any number of d 's and δ 's affecting one and the same variable, we make these characteristics change place at pleasure; for we have seen that $\delta d\pi = d\delta\pi$; and in the same manner, we may for $\delta d^2\pi$ write $d\delta d\pi$, or $d^2\delta\pi$; and for $\delta d^3\pi$ we may write $d\delta d^2\pi$, or $d^2\delta d\pi$, or $d^3\delta\pi$, and so on of others.

Second Principle.—The variation of an integral formula is equal to the variation of its differential; that is, $\delta f\xi = f\delta\xi$.

Let $f\xi = z$, and consequently $\xi = dz$, we shall have by taking the variations $\delta\xi = \delta dz$, or $\delta\xi = d\delta z$; and integrating this last equation, we obtain $\int \delta\xi = \delta z = \delta f\xi$.

Hence in repeated integrations, we change at pleasure the signs f and δ ; for we have seen that $\delta f\xi = f\delta\xi$; and in the same manner, $\delta f f\xi = f\delta f\xi = f f\delta\xi$; so also $\delta f f f\xi = f\delta f f\xi = f f f\delta\xi$; and so on of others.

On the Method of determining the Variations of indefinite integral Formulae.—By indefinite integral formulae, is here to be understood those expressions which contain the sign \int , and such at the same time that the integration cannot be effected: these formulae are said to be *simple*, when they contain only one sign \int , and *compounded*, when they contain two or more such signs, or when they are any function of simple integral formulae, combined or not with algebraical quantities, by addition, multiplication, or division.

Let us begin by considering those formulae which contain only two variable quantities x and y , and between which we shall always suppose the relation $dy = p dx$, $dp = q dx$, $dq = r dx$, $dr = s dx$, &c. a supposition which it will be very necessary to bear in mind.

PROBLEM I.

To investigate a general rule for determining the variation of any indefinite integral formula $\int \pi dx$.

Whatever may be the quantity π , we have always from the second principle given above, $\delta \int \pi dx = \int \delta(\pi dx)$; but $\delta(\pi dx) = dx\delta\pi + \pi\delta dx$; and the first principle gives $\delta dx = d\delta x$; whence $\delta \int \pi dx = \int dx\delta\pi + \int \pi d\delta x$. Now by the method of integrating by parts, the last term

$$\int \pi d\delta x = \pi \delta x - \int \delta \pi dx;$$

whence by substitution,

$$\delta \int \pi dx = \pi \delta x + \int dx \delta \pi - \int \delta \pi dx, \text{ or}$$

$$\delta \int \pi dx = \pi \delta x + \int (dx \delta \pi - d\pi \delta x)$$

Now the different values that we may attribute to π , will give rise to different general problems; of which we shall develop a few of most common use, and which will open the way to others of a higher kind.

PROB. II.

To determine the variation of the indefinite simple integral $\int V dx$, V being a given function of x , y , z , p , q , r , &c.

First, by the preceding problem we have

$$\delta \int V dx = V \delta x + \int (dx \delta V - dV \delta x) \dots (A)$$

Again, the quantity V being a function of x , y , z , &c. we shall have, by taking the differentials and the variations, the two equations

$$dV = M dx + N dy + P dp + Q dq + R dr + \&c.$$

$$\delta V = M \delta x + N \delta y + P \delta p + Q \delta q + R \delta r + \&c.$$

in which the co-efficients M , N , P , Q , R , &c. (which are the same for both equations) represent given functions of x , y , p , q , r .

Multiply the first of these equations by δx , the second by dx , and subtract the first product from the second, and we shall have

$$dx \delta V - dV \delta x = N (dx \delta y - dy \delta x)$$

$$+ P (dx \delta p - dp \delta x)$$

$$+ Q (dx \delta q - dq \delta x)$$

$$+ R (dx \delta r - dr \delta x)$$

$$+ K$$

VARIATION.

If now we put for $dy, dp, dq, dr, &c.$ their values $p dx, q dx, r dx, s dx, &c.$ we shall find

$$d x \delta V - d V \delta x = \left\{ \begin{array}{l} N d x (\delta y - p \delta x) + P d x (\delta p - q \delta x) + \\ Q d x (\delta q - r \delta x) + R d x (\delta r - s \delta x) + \&c. \end{array} \right.$$

Consequently our equation (A) becomes

$$\delta \int V d x = V \delta x + \int \left\{ \begin{array}{l} N d x (\delta y - p \delta x) + \\ P d x (\delta p - q \delta x) + Q d x (\delta q - r \delta x) + \\ R d x (\delta r - s \delta x) + \&c. \end{array} \right\} = \\ V \delta x + \int N d x (\delta y - p \delta x) + \int P d x (\delta p - q \delta x) \\ + \int Q d x (\delta q - r \delta x) + \int R d x (\delta r - s \delta x) \dots (B)$$

This being established, let us make $\delta y - p \delta x = \delta w$, (a substitution that will be employed in what follows,) and differencing, we shall have

$$d \delta y - d p \delta x - p d \delta x = d \delta w.$$

But the formula $dy = p dx$ gives, by taking the variations,

$$\begin{aligned} d \delta y &= d x \delta p + p d \delta x, \text{ or} \\ d \delta y &= d x \delta p + p d \delta x, \text{ or} \\ d \delta y - p d \delta x &= d x \delta p. \end{aligned}$$

$$\begin{aligned} \int P d \delta w &= P \delta w - \int d P \delta w \\ \int \frac{Q d^2 \delta w}{d x} &= \frac{Q d \delta w}{d x} - \int \frac{d Q d \delta w}{d x} = \frac{Q d \delta w}{d x} - \frac{d Q \delta w}{d x} + \int \frac{d^2 Q \delta w}{d x} \\ \int \frac{R d^3 \delta w}{d x^2} &= \frac{R d^2 \delta w}{d x^2} - \int \frac{d R d^2 \delta w}{d x^2} = \frac{R d^2 \delta w}{d x^2} - \frac{d R d^2 \delta w}{d x^2} + \int \frac{d^2 R d^2 \delta w}{d x^2} = \\ &= \frac{R d^2 \delta w}{d x^2} - \frac{d R d^2 \delta w}{d x^2} + \frac{d^2 R \delta w}{d x^2} - \int \frac{d^3 R \delta w}{d x^2}; \text{ and so on.} \end{aligned}$$

Whence, making the necessary substitutions, we obtain finally

$$\delta \int V d x = \left\{ \begin{array}{l} \int d x \delta w \left(N - \frac{d P}{d x} + \frac{d^2 Q}{d x^2} - \frac{d^3 R}{d x^3} + \&c. \right) \\ + V \delta x + \delta x \left(P - \frac{d Q}{d x} + \frac{d^2 R}{d x^2} - \&c. \right) \\ + \frac{d \delta w}{d x} \left(Q - \frac{d R}{d x} + \&c. \right) \\ + \frac{d^2 \delta w}{d x^2} \left(R - \&c. \right) \\ + \&c. \dots \dots \dots (D) \end{array} \right.$$

a formula in which dx is supposed constant.

It will be seen from this expression for the variation $\delta \int V d x$, that it includes two distinct orders of terms, the one affected with the sign \int , and the other free from it. And farther, that the integration by parts necessarily introduces certain constant quantities which must be annexed

But

$$\delta t = \delta \int V d x = V \delta x + \int (d x \delta V - d V \delta x);$$

therefore,

$$\begin{aligned} d x \delta Z - d Z \delta x &= T V d x \delta x + T d x \int (d x \delta V - d V \delta x) - T d t \delta x \\ &= T d x \int (d x \delta V - d V \delta x); \end{aligned}$$

because $T V d x \delta x = T d t \delta x$.

Consequently we have

$$\delta \int Z d x = Z \delta x + \int T d x \int (d x \delta V - d V \delta x) \dots \dots (F)$$

Now integrating the last term by parts, and representing the integral $\int T d x$ by h , for the sake of abridging, the preceding equation becomes (F)

$$\delta \int Z d x = Z \delta x + h \int (d x \delta V - d V \delta x) - \int h (d x \delta V - d V \delta x).$$

Whence, by substitution, we have

$$d x \delta p - d p \delta x = d \delta w.$$

Now putting for dp its equivalent $q dx$, we shall have

$$d x \delta p - q d x \delta x = d \delta w, \text{ or}$$

$$\delta p - q \delta x = \frac{d \delta w}{d x};$$

and as the quantity δw has for its value $\delta y - p \delta x$, by hypothesis we have again $\delta p - q \delta x = \frac{d(\delta y - p \delta x)}{d x}$. And

a calculation exactly similar to the preceding gives also,

$$\delta q - r \delta x = \frac{d(\delta p - q \delta x)}{d x} = \frac{d^2 \delta w}{d x^2}$$

$$\delta r - s \delta x = \frac{d(\delta q - r \delta x)}{d x} = \frac{d^3 \delta w}{d x^3}$$

$$\&c. = \&c.$$

Consequently the equation (B) becomes

$$\begin{aligned} \delta \int V d x &= V \delta x + \int N d x \delta w + \int P d \delta w \\ &+ \int \frac{Q d^2 \delta w}{d x} + \int \frac{R d^3 \delta w}{d x^2} + \&c. \dots (C) \end{aligned}$$

Now by the method of integrating by parts, we find, by making dx constant,

to the terms of the latter species. The aggregate of the terms affected with the sign \int extends through all the variation, *viz.* from its commencement to its termination, while the other quantities answer only to the beginning and end of the variation. This remark finds its application in treating of the *maxima* and *minima* of quantities.

PROB. III.

To determine the variation of the indefinite compound integral $\int Z d x$, Z being a given function of the indefinite simple integral formula $\int V d x$, where again V is a function of $x, y, z, p, q, r, &c.$ as in the preceding problems.

First by Prob. I.

$$\delta \int Z d x = Z \delta x + \int (d x \delta Z - d Z \delta x) \dots (E)$$

And supposing $\int V d x = t$, or $V d x = dt$; since Z is by hypothesis a function of t , we shall have $dZ = T dt$, T being a given function of t , and we shall thus have $\delta Z = T \delta t$; therefore

$$d x \delta Z - d Z \delta x = T d x \delta t - T d t \delta x.$$

VARIATION.

This being premised, and making here for the values of dV and δV the same suppositions, and the same calculations as in the preceding problem, we shall obtain

$$\begin{aligned}
 & b f (d x \delta V - d V \delta x) = \\
 & b f d x \delta w \left(N - \frac{d P}{d x} + \frac{d^2 Q}{d x^2} - \frac{d^3 R}{d x^3} + \&c. \right) + \\
 & b \delta w \left(P - \frac{d Q}{d x} + \frac{d^2 R}{d x^2} - \&c. \right) \\
 & \frac{b d \delta w}{d x} \left(Q - \frac{d R}{d x} + \&c. \right) \\
 & \frac{b d^2 \delta w}{d x^2} (R - \&c.) (G)
 \end{aligned}$$

And we shall find in the same manner, by putting bN for N , bP for P , bQ for Q , $\&c.$

$$\begin{aligned}
 & f b (d x \delta V - d V \delta x) = \\
 & f d x \delta w \left(b N - \frac{d (b P)}{d x} + \frac{d^2 (b Q)}{d x^2} - \frac{d^3 (b R)}{d x^3} + \&c. \right) \\
 & + \delta w \left(b P - \frac{d (b Q)}{d x} + \frac{d^2 (b R)}{d x^2} - \&c. \right) \\
 & + \frac{d \delta w}{d x} \left(b Q - \frac{d (b R)}{d x} + \&c. \right) \\
 & + \frac{d^2 \delta w}{d x^2} (b R - \&c.)
 \end{aligned}$$

$$\delta f Z d x = \left\{ \begin{aligned}
 & f d x \delta w \left(k N - \frac{d (k P)}{d x} + \frac{d^2 (k Q)}{d x^2} - \frac{d^3 (k R)}{d x^3} - \&c. \right) \\
 & + Z \delta x + k \delta w \left(k P - \frac{d (k Q)}{d x^2} + \&c. \right) \\
 & + \frac{k d \delta w}{d x} \left(k Q - \frac{d (k R)}{d x} + \&c. \right) \\
 & + \frac{k d^2 \delta w}{d x^2} (k R - \&c.) (H)
 \end{aligned} \right.$$

PROB. IV.

To determine the variation of the indefinite integral formula $\int Z d x$, Z being a function of $x, y, p, q, r, \&c.$; and of the indefinite simple integral formula $\int V d x$, where V is the same as before.

First, we have

$$\delta \int Z d x = Z \delta x + f (d x \delta Z - d Z \delta x) (I)$$

Let us suppose $\int V d x = t$, or $V d x = dt$. The quantity Z being given in $t, x, y, p, q, \&c.$ we shall have

$$\begin{aligned}
 d Z &= L' d t + M' d x + N' d y + P' d p + Q' d q + \&c. \\
 \delta Z &= L' \delta t + M' \delta x + N' \delta y + P' \delta p + Q' \delta q + \&c.
 \end{aligned}$$

expressions in which the quantities $L', M', \&c.$ are functions of $t, x, y, p, q, \&c.$

Whence we draw, by a proceeding similar to that which has been employed in the second problem,

$$\begin{aligned}
 d x \delta Z - d Z \delta x &= L' (d x \delta t - d t \delta x) + N' d x (\delta y - p \delta x) \\
 &+ P' d x (\delta p - q \delta x) + Q' d x (\delta q - r \delta x) \\
 &+ R' d x (\delta r - s \delta x) + \&c.
 \end{aligned}$$

But $d t = V d x$, and $\delta t = \delta \int V d x = V \delta x + \int (d x \delta V - d V \delta x)$; therefore

$$L' (d x \delta t - d t \delta x) = L' d x (d x \delta V - d V \delta x);$$

Finally, substituting in Equation (G), instead of $b f (d x \delta V - d V \delta x)$ and $f b (d x \delta V - d V \delta x)$, their values, which we have found above, we shall have the expression for the variation of $\delta \int Z d x$.

As in these sorts of problems, it is required to find the variation which answers to a given absciss a , it is evident that in denoting by H the integral $\int T d x$, corresponding to this absciss, we may regard H as a given constant quantity relative to the total variation, while b constantly represents the indefinite integral $\int T d x$, that is to say, the integral for an indeterminate part of the absciss a .

Then, in writing H for b in the part

$$b f (d x \delta V - d V \delta x),$$

and passing H under the sign of integration, the expression

$$b f (d x \delta V - d V \delta x) - f b (d x \delta V - d V \delta x)$$

will become

$$\begin{aligned}
 & \int H (d x \delta V - d V \delta x) - f b (d x \delta V - d V \delta x) = \\
 & \int (H - b) (d x \delta V - d V \delta x).
 \end{aligned}$$

If, for the sake of abridging, we make $H - b = k$, which gives $d(H - b) = d k$, H being constant: now, making conformably to these remarks, and to these abbreviations, the substitutions indicated at the end of the preceding article for equation G, we shall find that this equation becomes

and thus Equation I. becomes

$$\begin{aligned}
 \delta \int Z d x &= Z \delta x + f \left\{ L' d x f (d x \delta V - d V \delta x) \right\} \\
 &+ f \left\{ N' d y f (\delta y - p \delta x) \right\} \\
 &+ P' d x (\delta p - q \delta x) + Q' d x (\delta q - r \delta x) \\
 &+ R' d x (\delta r - s \delta x) + \&c. . . . (K)
 \end{aligned}$$

Now if we represent by b' the integral $\int L' d x$, and take, by parts, the integration of the second term, we shall have

$$\begin{aligned}
 & \int L' d x f (d x \delta V - d V \delta x) = \\
 & b' f (d x \delta V - d V \delta x) - f b' (d x \delta V - d V \delta x).
 \end{aligned}$$

Let us suppose now that the value of the integral $\int L' d x$, for any determinate absciss a , is H' , and that b' still continues to represent the indeterminate integral $\int L' d x$; then, by passing H under the sign of integration, the term

$$\int \left\{ L' d x f (d x \delta V - d V \delta x) \right\}$$

becomes

$$\int (H' - b') (d x \delta V - d V \delta x):$$

or if $H' - b' = k$, then

$$\int k' (d x \delta V - d V \delta x).$$

VARIATION.

If now, as in the second problem, we make

$$dV = M dx + N dy + P dp + Q dq + \&c.$$

we shall have

$$dx \delta V - dV \delta x = N dx (\delta y - p \delta x) + P dx (\delta p - q \delta x) + Q dx (\delta q - r \delta x) + R dx (\delta r - s \delta x) + \&c.$$

$$\begin{aligned} \delta fZ dx &= Z dx + f \left\{ N'' dx (\delta y - p \delta x) + P'' dx (\delta p - q \delta x) \right. \\ &\quad \left. + Q'' dx (\delta q - r \delta x) + R'' dx (\delta r - s \delta x) + \&c. \right\} \\ &= Z \delta x + fN'' dx (\delta y - p \delta x) + fP'' dx (\delta p - q \delta x) \\ &\quad + fQ'' dx (\delta q - r \delta x) + fR'' dx (\delta r - s \delta x) + \&c. \end{aligned}$$

An equation which, being of the same kind as Equation (B), Prob. II. will give in the same manner, by making $\delta y - p \delta x = \delta w$, and supposing dx constant,

$$\delta fZ dx = \begin{cases} f dx \delta w \left(N'' - \frac{dP''}{dx} + \frac{d^2 Q''}{dx^2} - \frac{d^3 R''}{dx^3} + \&c. \right) \\ + Z \delta x + \delta w \left(P'' - \frac{dQ''}{dx} + \frac{d^2 R''}{dx^2} - \&c. \right) \\ + \frac{d \delta w}{dx} \left(Q'' - \frac{dR''}{dx} + \&c. \right) \\ + \frac{d^2 \delta w}{dx^2} (R'' - \&c.) + \&c. \dots (L) \end{cases}$$

It may be remarked here, the same as in Problem II., that the expression of this variation includes two distinct species of terms; *viz.* those which are affected with the sign f , and those that are free from it; and moreover, that the integrating by parts introduces certain constant quantities, which are additive to the terms of the second species; and that the aggregate of the terms affected with the sign f , extends through all the variation, *viz.* from the place where it commences to that where it finishes; while the other terms answer only to the beginning and end of the variation.

PROB. V.

To determine the variation of the indefinite simple integral $\int V dx$, where V is any given function of three variables x, y , and z , and their differentials.

We shall have at first, the same as in the formula of two variables,

$$\delta \int V dx = V \delta x - \int (dx \delta V - dV \delta x) \dots (M)$$

Let us suppose $dy = p dx$, $dp = q dx$, $dq = r dx$, $dr = s dx$, &c. $dz = p' dx$, $dp' = q' dx$, $dq' = r' dx$, &c. the letters p, q, r, s , &c. p', q', r' , &c. expressing functions of x, y, z , and their differentials.

Now making

$$dV = \begin{cases} M dx + N dy + P dp + Q dq + R dr + \&c. \\ + F dz + G dp' + H dq' + I dr' + \&c. \end{cases}$$

and hence, also,

$$\delta V = \begin{cases} M \delta x + N \delta y + P \delta p + Q \delta q + R \delta r + \&c. \\ + F \delta z + G \delta p' + H \delta q' + I \delta r' + \&c. \end{cases}$$

expressions in which N, M, P, Q, R , &c. F, G, H, I , &c. are given functions of x, y, z, p, q, r , &c. p', q', r' , &c. we shall find

$$\begin{aligned} dx \delta V - dV \delta x &= \\ N dx (\delta y - p \delta x) &+ P dx (\delta p - q \delta x) \\ + Q dx (\delta q - r \delta x) &+ R dx (\delta r - s \delta x) + \&c. \\ + F dx (\delta z - p' \delta x) &+ G dx (\delta p' - q' \delta x) \\ + H dx (\delta q' - r' \delta x) &+ I dx (\delta r' - s' \delta x) + \&c. \end{aligned}$$

Substituting, in equation (K), instead of $\int L' dx (dx \delta V - dV \delta x)$, its actual value $\int L' (dx \delta V - dV \delta x)$, and instead of $dx \delta V - dV \delta x$, the value assumed above, reuniting the several parts, and for the sake of abridging, making $L' N + N' = N''$, $L' P + P' = P''$, $L' Q + Q' = Q''$ &c. this equation will become

Now let $\delta y - p \delta x = \delta w$, and $\delta z - p' \delta x = \delta w'$; and supposing dx constant, we shall have, by precisely similar operations to those performed in Prob. II.

$$\begin{aligned} \delta \int V dx &= \\ f dx \delta w \left(N - \frac{dP}{dx} + \frac{d^2 Q}{dx^2} - \frac{d^3 R}{dx^3} + \&c. \right) &+ f dx \delta w' \left(F - \frac{dG}{dx} + \frac{d^2 H}{dx^2} - \frac{d^3 I}{dx^3} + \&c. \right) \\ + V \delta x + \delta w \left(P - \frac{dQ}{dx} + \frac{d^2 R}{dx^2} - \&c. \right) &+ \frac{d \delta w}{dx} \left(Q - \frac{dR}{dx} + \&c. \right) \\ + \frac{d^2 \delta w}{dx^2} (R - \&c.) &+ \delta w' \left(G - \frac{dH}{dx} + \frac{d^2 I}{dx^2} - \&c. \right) \\ + \frac{d \delta w'}{dx} \left(H - \frac{dI}{dx} + \&c. \right) &+ \frac{d^2 \delta w'}{dx^2} (I - \&c.) \\ + \&c. \quad \&c. &+ \&c. \quad \&c. \end{aligned}$$

To which it will be necessary to add certain terms, in order to complete the integral, as stated in the conclusion of our second and last problem.

The formulæ above considered are the simplest of their kind, and the solution of them is found by a calculation comparatively direct and easy to perform; but it may happen, that in the general expression $\int Z dx$, of which the variation is required, the quantity Z is a function of many variables, consisting of algebraical expressions and various indefinite simple integrals; or the quantity Z may depend upon the integration of an equation of any order; it may also, in some cases, be required to find the variation of a formula under a double

VARIATION.

a double or triple, &c. sign of integration, as $\iint Z dx dy$, in which Z is any function of x and y , and f of others. In all these cases, except the last, the variations are determined in the same manner, but the calculus of course becomes more long and intricate, which our limits will not allow of our entering upon in this place. On this head, therefore, the reader is referred to the several works mentioned in the introduction to the present article. We only propose giving here one problem, by way of illustrating the preceding calculus; *viz.*

To determine the curve OMD (*Plate XIII. fig. 2.*) through which a body will pass from the point O to D , not in the same vertical line, in the shortest time possible.

Let AV represent the vertical plane, in which are situated the two given points O and D ; AV the axis of the absciss; and the horizontal line AF that of the ordinates. Also, let us suppose any absciss $AP = x$, the ordinate $PM = y$, and consequently the element of the arc $Mm = \sqrt{(dx^2 + dy^2)} = dx \sqrt{(1 + p^2)}$, making $dy = p dx$.

Now whatever may be the nature of the curve OMD , the velocity of the body along and in the direction of the element of the curve Mm , is equal to that which it would have acquired in falling from a certain vertical height; all these heights deriving their origin in the same horizontal line, which we may suppose to be the axis of the ordinates AZ , the position of this axis being arbitrary.

Thus, calling g the gravity of the body, the velocity along Mm will be expressed by $\sqrt{2gx}$, and consequently

the time in passing $Mm = \frac{M}{\sqrt{2gx}} = \frac{dx \sqrt{(1 + p^2)}}{\sqrt{2gx}}$; therefore we shall have

$$\int \frac{dx \sqrt{(1 + p^2)}}{\sqrt{2gx}} = a \text{ minimum,}$$

or, simply

$$\int \frac{dx \sqrt{(1 + p^2)}}{\sqrt{x}} = a \text{ minimum.}$$

Now generally, when a quantity becomes a maximum or a minimum, its variation is equal to zero; consequently we shall have

$$\delta \int \frac{dx \sqrt{(1 + p^2)}}{\sqrt{x}} = 0.$$

Now this agrees with our formula $\int V dx$ in the second problem; *viz.* in the present case $V = \frac{\sqrt{(1 + p^2)}}{\sqrt{x}}$; consequently we shall have $dV = -\frac{\sqrt{(1 + p^2)}}{2x\sqrt{x}} \cdot dx + \frac{p}{\sqrt{x} \cdot \sqrt{(1 + p^2)}} \cdot dp$; an expression which, being compared with the general value

$$dV = M dx + N dy + P dp + \&c.$$

gives here

$$M = \frac{-\sqrt{(1 + p^2)}}{2x\sqrt{x}}; N = 0;$$

$$P = \frac{p}{\sqrt{x} \cdot \sqrt{(1 + p^2)}}; Q = 0, R = 0, \&c.$$

Now the expression of the variation $\delta \int V dx$ comprehends generally, as we have seen in Equation (D), two parts, the one indefinite, containing the sign \int , and the other definite, in which that sign is not found; and it is evident that these two parts are wholly independent of each other; and conse-

quently, if the whole is equal to zero, these two parts are each also equal to zero; thus the equation $\delta \int V dx = 0$, gives in general the two following equations, of which the one is definite, and the other indefinite; *viz.*

$$(1) 0 = \int dx \delta w \left(N - \frac{dP}{dx} + \frac{d^2Q}{dx^2} - \&c. \right)$$

$$(2) 0 = \begin{cases} V \delta x + \delta w \left(P - \frac{dQ}{dx} + \frac{d^2R}{dx^2} - \&c. \right) \\ + \frac{d \delta w}{dx} \left(Q - \frac{dR}{dx} + \&c. \right) \\ + \frac{d^2 \delta w}{dx^2} (R - \&c.) \\ + \&c. \\ + C, \text{ correction.} \end{cases}$$

Equation (1) is that on which depends the nature of curves, since the second member of this equation is an indeterminate expression, which being made equal 0, gives to the curve OMD the character of a maximum or a minimum. As to Equation (2), it belongs only to the extreme points of the curve OMD , which may be subject to particular conditions, wholly independent of the nature of the curve.

Now differencing Equation (1), and dividing the whole by $dx \delta w$, we shall have

$$(3) 0 = N - \frac{dP}{dx} + \frac{d^2Q}{dx^2} - \frac{d^3R}{dx^3} + \&c.$$

which gives generally the solution of the problem, where only the nature of the curve is required, that renders $\int V dx$ a maximum, or a minimum; V being a function of the perpendicular co-ordinates x and y of the curve, and of the quantities $p, q, r, \&c.$ which are given by the hypothesis $dy = p dx, dp = q dx, \&c.$ remembering that the differential dx has been supposed constant.

Now to apply these general results to our problem; since

we have $N = 0$, and $P = \frac{p}{\sqrt{x} \cdot \sqrt{(1 + p^2)}}$; also $Q = 0$,

$R = 0, \&c.$ our Equation (3) becomes

$$0 = \frac{-1}{dx} d \left(\frac{p}{\sqrt{x} \cdot \sqrt{(1 + p^2)}} \right), \text{ or,}$$

$$0 = d \left(\frac{p}{\sqrt{x} \cdot \sqrt{(1 + p^2)}} \right);$$

which is the differential equation of the curve OMD ; consequently, by integrating we shall have $\frac{p}{\sqrt{x} \cdot \sqrt{(1 + p^2)}}$

$= \frac{1}{\sqrt{a}}$, a being an arbitrary constant quantity. Now

substitute for p its value $\frac{dy}{dx}$, and we shall have

$$\frac{dy}{\sqrt{x} \cdot \sqrt{(dx^2 + dy^2)}} = \frac{1}{\sqrt{a}};$$

which gives

$$dy = dx \sqrt{\frac{x}{a - x}};$$

the equation of the reversed cycloid, its base being horizontal, and its generating circle having for its diameter the constant quantity a .

This equation being integrated, will receive a second arbitrary constant b ; and we shall have then, in the final equation, two constants, a and b , which will be determined from the condition that the cycloid passes through the two points, O and D ,

O and D, given in position. For other examples illustrative of this calculus, see the article ISOPERIMETRY.

VARIATION, in *Music*, is the different manner of playing or singing the same air, tune, or song, either by subdividing the notes into several others of less value, or by adding graces, in such a manner, however, as that the tune itself may still be discovered through all its embellishments, which the French call *broderies*.

Thus, great masters of the last century, flattering the bad taste of the public, have condescended to make variations to old tunes; as Corelli to Farinel's ground, or "All Joy to great Cæsar," which the Italians call "La Follia d'Espagna," and which he has made the theme of his whole twelfth solo. Handel and Tartini have composed simple airs on purpose to be the ground-work of variations. The late John Christian Bach, Fischer, Giardini, &c. have varied Scotch and Irish tunes to corrupt the public taste, instead of improving it by new compositions, which would have done them more credit, and given them less trouble. See THEME and DOUBLE.

"All Paris," says Rousseau, "used to go to the concert spirituel, to hear the variations of Messrs. Guignon and Mondoville; and still at a more recent period, those of Messrs. Guignon and Gaviniès, to the tunes of the Pont-neuf, which had no other merit than that of being trifled with by the two greatest performers on the violin in France."

VARICA, in *Ancient Geography*, a town of Asiatic Iberia, according to Ptolemy.

VARICELLA, in *Medicine*, a diminutive of *Variola*, (the small-pox,) signifying a vesicular eruption, accompanied with slight febrile symptoms, and occurring but once in the period of human life, which is popularly termed *chicken-pox* and *swine-pox*.

It will not be matter of surprise that this disease should bear the name of a *lesser small-pox*, and that it should have been described by the older writers as a modification of that distemper, under various similar appellations, such as *variola pusilla*, *volatica*, *spuria*, &c.; when we are informed by a late acute investigator of diseases, Dr. Willan, that, from the year 1800, to the time of the publication of his essay on vaccination, in 1806, he had seen *seventy-four* cases of chicken-pox that had been mistaken for small-pox, after vaccine inoculation. It is true, indeed, that the distinction has been rendered somewhat more difficult, in consequence of the milder degree, shorter duration, and modified form, which the small-pox itself has been made to assume by the influence of the previous cow-pox, in the few cases where it has occurred after this disease. Nevertheless, the resemblance is sufficient at all times to mislead ordinary observers; and the foreign nosologists, from Sauvages down to Burserius, have considered the disease as a species of *variola*. (See Sauvages Nosol. Method. class. iii. gen. 2. Vogel, De Cognoscend. et Curand. Hominum Morbis, § 128. Burserius, Inst. Med. vol. ii. cap. 9.) It is singular, however, that not only some of the earliest Italian writers on the small-pox, who lived three centuries ago, have distinctly described the chicken-pox under a specific name, *crystalli*, and with the mention of the scarcely perceptible fever, and absence of all danger (see Vidus Vidius, De Crystallis; and Ingrassias de Tumoribus præter Naturam, lib. i. cap. 1.); but that the vulgar, in several countries of Europe, had distinguished it by popular appellations, even while physicians were regarding it as a modification of small-pox. Thus Daniel Sennert, who was a professor at Wittemberg at the commencement of the seventeenth century, observes, in his Treatise on Small-pox and Measles, that there are other varieties, "præter communes variolas et morbillos," which are popularly known in Germany by the terms *scheffsblattern* (*sweep-pox*, or *sweep-*

blebs or *blains*) and *windboßen* (*wind-pox*). (See his Med. Pract. lib. iv. cap. 12.) And Riverius, who was professor at Montpellier at the same period, speaks of it as familiarly known by the common people in France by the name of *veirolette*. (See his Praxis Med. cap. ii.) In Italy it was also known to the vulgar under the appellation of *ravaglione*. Again, in our country, Fuller, who published his "Exanthematologia" in 1730, acknowledges himself indebted to the old women for his appellation. "I have adventured to think," he says, "this is what among our women goeth by the name of chicken-pock." (P. 161.) Other popular names have been given to the disease in different parts of this country. Thus it is in many places called *swine-pox*; in some, *bives*; and at Newcastle and Sunderland, *water-jags*. (See Dr. Wood in the Med. and Phys. Journal, vol. xiii. p. 58.) In some places, however, the different forms which the disease itself assumes, three of which have been distinctly described by the late ingenious Dr. Willan, are designated by the terms *chicken-pox*, *swine-pox*, and *bives*, respectively.

The character of each of these varieties, under which the varicella occasionally appears, we shall copy from the work of that excellent observer of diseases, as there is no other description of them extant of equal accuracy; and it is highly necessary to be able to discriminate between this eruption and the milder forms of small-pox, and especially that modified and altered *variola* which sometimes succeeds vaccination. The only other account of the chicken-pox in our language, which bears the stamp of observation, is a paper of the late excellent Dr. Heberden, another physician of the true Hippocratic school, written in the year 1767, and published in the first volume of the Transactions of the College of Physicians, and which we shall have occasion also to quote, on the point of diagnosis, in the sequel of this article.

Dr. Willan observes, "there are three varieties of the varicella, which, from the different forms of the vesicles, may be entitled the *lenticular*, *conoidal*, and *globate*." And he adds, in a note, "In the northern parts of England, and in some counties of Scotland, these varieties are denominated the chicken-pox, the swine-pox, and the hives. In the south, both the latter varieties are called swine-pox.

1. "The *lenticular* varicella exhibits, on the first day of eruption, small red protuberances, not exactly circular, and having a flat shining surface, in the centre of which a minute vesicle is soon formed. This, on the second day, is filled with a whitish lymph, and it then somewhat resembles a miliarial vesicle, but is not so prominent, so tense, or so regularly circumscribed: its diameter is about the tenth of an inch. On the third day, the extent of the vesicles continues the same, but the lymph they contain becomes straw-coloured. On the fourth day, many of the vesicles are broken at the most prominent part; the rest begin to shrink, and are puckered at their edges. Few of them remain entire on the fifth day, but the orifices of several broken vesicles are closed, or adhere to the skin, so as to confine a little opaque lymph within the puckered margins. On the sixth day, small thin brown scabs appear universally in the place of the vesicles. The scabs, on the seventh and eighth days, become yellowish, and gradually dry from the circumference towards the centre. On the ninth and tenth days they fall off, leaving for a time red marks in the skin, without depression.

"The eruption is generally first observed on the breast and back, and afterwards on the face and extremities. As fresh vesicles arise during two or three successive days, and go through the same stages as the first, the duration of the disease is sometimes longer than I have stated above.

2. "In the *conoidal* varicella, the vesicles rise suddenly, and have a hard inflamed border. They are, on the first day of their

VARICELLA.

their appearance, acuminated, and contain a bright transparent lymph. On the second day they appear somewhat more turgid, and are surrounded by more extensive inflammation than on the preceding day; the lymph contained in many of them is of a light straw-colour. On the third day, the vesicles are shrivelled; those which have been broken exhibit at the top slight gummy scabs, formed by a concretion of the exuding lymph. Some of the shrivelled vesicles, which remain entire, but have much inflammation round them, evidently contain on this day purulent fluid. Every vesicle of this kind leaves, after scabbing, a durable cicatrix or pit. On the fourth day, thin dark-brown scabs appear intermixed with others, which are rounded, yellowish, and semi-transparent. These scabs gradually dry and separate, and fall off in four or five days.

"A fresh eruption of vesicles usually takes place on the second and third day, and as each set has a similar course, the whole duration of the eruptive stage in this species of varicella is six days; the last-formed scabs, therefore, are not separated till the eleventh or twelfth day.

3. "In the swine-pox, or hives, the vesicles are large and globated, but their base is not exactly circular. There is an inflammation round them, and they contain a transparent lymph, which, on the second day of eruption, resembles milk-whey. On the third day, the vesicles subside, and, as in the two former species, become puckered or shrivelled. They likewise appear yellowish, a small quantity of pus being mixed with the lymph. Some of them remain in the same state till the following morning, but, before the conclusion of the fourth day, the cuticle separates, and thin blackish scabs cover the bases of the vesicles. The scabs dry and fall off in four or five days.

"The eruption is usually completed in three days, but I have sometimes observed a few fresh vesicles on the fourth day; in which case, therefore, the eruptive stage occupied eight days.

"The fever in varicella commences two or three days before the eruption appears, and it sometimes continues to the third day of the eruption, but is generally very slight. Its symptoms are, languor, with disposition to sleep, loss of appetite, thirst, heat of the skin, occasional flushing of the cheeks, a severe cough, soreness of the throat, a white fur on the tongue, a quick but unequal pulse, pains in the head, back, and limbs, sometimes pain in the stomach and bowels, with nausea, or vomiting of bile.

"The eruption usually commences on the breast and back, appearing next on the face and scalp, and lastly on the extremities. It is attended, especially in children, with an incessant tingling or itching, which leads them to scratch off the vesicles, so that the characteristics of the disease are often destroyed at an early period. Many of the vesicles, thus broken and irritated, but not removed, are presently surrounded by inflammation, and afterwards become pustules, containing thick yellow matter. These continue three or four days, and finally leave pits in the skin. The eruption is usually fullest in the conoidal form of varicella: I have seen the vesicles close together, or coherent, but seldom confluent. When they are numerous on the scalp, some of the glands below the base of the cranium are enlarged.

"The incidental appearance of pustules among the vesicles sometimes occasions a doubt respecting the nature of the eruption." See Dr. Willan's "Treatise on Vaccination," page 86.) Dr. Heberden says, "the principal marks by which the chicken-pox is distinguished are:

1. "The appearance, on the second or third day from the eruption, of the vesicle full of serum upon the top of the pock. The pustules which are fullest of the yellow liquor

resemble what the genuine small-pox are on the fifth or sixth day, especially when there happens to be a larger space than ordinary occupied by the extravasated serum. It happens to most of them, either on the first day that the little vesicle arises, or on the day after, that its tender cuticle is burst; a thin scab is then formed at the top of the pock, and the swelling of the other part abates, without its ever being turned into pus, as it is in the small-pox.

2. "Slight scabs cover the chicken-pox on the fifth day; at which time the small-pox are not at the height of their suppuration.

3. "The inflammation round the chicken-pox is very small, and the contents of them do not seem to be owing to suppuration, as in the small-pox, but rather to what is extravasated immediately under the cuticle by the ferous vessels of the skin, as in a common blister. No wonder, therefore, that this liquor appears so soon as on the second day, and that upon the cuticle being broken, it is presently succeeded by a slight scab. Hence too, as the true skin is so little affected, no mark or scar is likely to be left." See Med. Transf. of the Coll. of Physicians, vol. i. art. 16.

To these remarks Dr. Willan adds, that "variola pustules, on the first and second day of their eruption, are small, hard, globular, red, and painful. The sensation of them to the touch, on passing the finger over them, is similar to that which one might conceive would be excited by the pressure of small round seeds under the cuticle. In the varicella almost every vesicle has, on the first day, a hard, inflamed margin, but the sensation communicated to the finger in this case, is like that from a round seed, flattened by pressure." He also observes that, "on the third and fourth days, the shrivelled or wrinkled state of the vesicles which remain entire, and the radiating furrows of others, whose ruptured apices have been closed by a slight incrustation, fully characterise the varicella, and distinguish its eruption from the firm and durable pustules of small-pox. As the vesicles of the chicken-pox appear in succession during three or four days, a partial examination will not always discover the characteristic here specified. In order to form a proper judgment, practitioners should inspect the eruption on the face, breast, and limbs, attending more especially to the places in which it was first observed. If the whole eruption be viewed on the fifth or sixth day, every gradation of the progress of the vesicles will appear at the same time. This circumstance may be added to the diagnostics of varicella, as it cannot take place in the slow and regulated progress of the small-pox.

"The globated vesicles not having any resemblance to variolous pustules, distinguish the varicella from the small-pox, whenever they appear; for it is to be remembered, that these large vesicles are occasionally intermixed, both with the lenticular and conoidal vesicles of the chicken-pox. It may be said, that an acknowledged co-existence of different sets of vesicles in the same person tends to abrogate the distinctions I have made. The vesicles, however, are, in many cases, all of the same kind; or, where they are intermixed, one sort greatly predominates. I do not contend for the perfect accuracy of nosological arrangement, but I adopt it because it is in many respects convenient. Systems of botany and zoology are useful, though they have not been yet brought to perfection, for we find some species which break the order of every classification proposed." Loc. cit. p. 95.

With respect to the treatment of varicella, under any of its forms, very little need be said: since it is seldom attended by any severe indisposition, and often by scarcely any perceptible disorder of any of the functions, except a little lassitude and inability for the usual exertions, a whitish tongue,

tongue, and some loss of appetite. In these cases, the treatment consists rather in avoiding all causes of irritation, especially in the way of diet, than in the actual administration of medicines. Where the fever is more considerable, however, not only are these cautions necessary, but it will be proper also to evacuate the bowels, by gentle means, as by a little rhubarb, or neutral salts, to take diluent drinks, and gently diaphoretic medicines.

VARICOCELE, in *Surgery*, derived from *varix*, a dilated vein, and *κνίλη*, a tumour, sometimes denotes a varicose enlargement of the veins of the spermatic chord; but, more commonly, a similar disease of the veins of the scrotum; the term *circoccele* being usually applied to the other affection.

Varicocele, or a varicose enlargement of the veins of the scrotum, is a subject of but little importance; because these vessels are never thus affected, except in consequence of some other more serious disease of the testicle and its coats. Indeed the varicocele is to be regarded as the mere effect of another complaint, the removal of which is the only necessary indication. This having been attended to, the swelling of the scrotal veins, which was never itself a source of much inconvenience, always subsides without farther trouble.

Varicocele, considered as a varicose enlargement of the spermatic veins, is a disease that demands greater attention; but as it has been explained in a previous volume (see *CIRSOCELE*), we do not mean to detain the reader with it in the present place. One remark, however, appears to merit particular attention: a varicose swelling of the spermatic veins is more frequently than any other disease mistaken for an omental hernia. Mr. Astley Cooper has given the following rule, by which the two diseases may be distinguished. Place the patient in a horizontal posture, and empty the swelling by pressure upon the scrotum: then put the fingers firmly upon the upper part of the abdominal ring, and desire the patient to rise: if it be a hernia, the tumour cannot reappear as long as the pressure is continued at the ring; but if it be a circoccele, the swelling returns with increased size, on account of the return of blood into the abdomen being prevented by the pressure. See Cooper on Inguinal Hernia.

VARICOSE VEINS. The term *varix* is applied by surgeons to the permanently dilated state of a vein, attended with an accumulation of dark-coloured blood, the circulation of which is materially retarded in the affected vessel. When veins are varicose, they are not only dilated, but they are also evidently elongated, presenting a cylinder larger than natural, irregular, and in several places studded with knots. They likewise make a variety of windings, and, coiling themselves, form actual tumours from the assemblage of their convolutions in one particular place. The trunk and branches of a vein, thus dilated and elongated, constitute a very distinct swelling, when they are numerous, and confined to a certain part of the body. Indeed, when the diseased vessels are situated near the integuments, the surgeon can feel, and even see the outlines of their tortuous course. These things, for instance, are remarkably obvious in the *vena saphæna interna*, where the affection is particularly common. This vessel may be observed to form in its course several of these swellings, in the interspaces of which it runs in a very serpentine tortuous manner.

Varices are most commonly observed in the lower extremities, reaching sometimes even as far up as the abdomen. They have, however, been noticed in the upper extremities, and it is probable that the whole venous system is susceptible of the affection. As a well-informed writer observes, "the great venous trunks sometimes become varicose. When the disease is situated near the heart, it is attended with pulsation, which

renders it liable to be mistaken for aneurism. Morgagni observed that the jugular veins were occasionally very much dilated, and possessed a pulsation. (Letter xviii. art. 9, 10, 11.) He also relates a case in which the *vena azygos*, for the length of a span, was so much dilated, that it might be compared with the *vena cava*. The patient died suddenly in consequence of the rupture of this varix into the right side of the chest. (Letter xxvi. art. 29.) A similar case is related by Portal, who also mentions an instance, in which the right subclavian vein was excessively dilated, and burst into the chest. (Cours d'Anatomie Medicale, tom. iii. pp. 354. 373.) Mr. Cline described in his lectures the case of a woman who had a large pulsating tumour in her neck, which burst, and proved fatal by hemorrhage. A sac proceeded from the internal jugular vein; the carotid artery was lodged in a groove at the posterior part of this sac. The veins of the upper extremity very rarely become varicose. Excepting cases of aneurismal varix, the only instance of this disease with which I am acquainted is mentioned by Petit. (Traité des Maladies Chir. tom. ii. p. 49.) In this case a varix was situated at the bend of the arm: the patient was so fat, that no other vein could be found for the purpose of venesection, which operation Petit repeatedly performed by puncturing this varix. The superficial epigastric veins sometimes become varicose; but the most frequent seats of this disease are the *venæ saphenæ*, the spermatic and hemorrhoidal veins." (See Hodgson's Treatise on the Diseases of Arteries and Veins, pp. 538, 539.) The deep-seated veins of the extremities seldom become varicose.

The disease rarely occurs before the adult period of life, and its progress is extremely slow. It is very frequently remarked in pregnant women, who have passed a certain age; but it is particularly unusual for it to happen in young women, even during a series of repeated pregnancies. Surgeons have not hitherto made out any very precise information respecting the places, climates, and kinds of constitution which promote the occurrence of a varicose enlargement of the veins. Nor has it been well proved, that the disease often proceeds from swellings of the abdominal viscera, or any other species of tumour capable of mechanically obstructing the venous circulation. One or more veins of the same limb are at first most commonly affected with a slight degree of dilatation, without pain, or any sensation of uneasiness. This beginning change ordinarily advances with great slowness, except in cases where it accompanies pregnancy, in which circumstance one or both the lower extremities, as early as the first months, are frequently seen covered with largely dilated veins, or even with tumours formed by an assemblage of varices. The veins gradually become more and more distended, lengthened, coiled up, and tortuous. The patient then begins to complain of a sense of heaviness, numbness, and sometimes of very acute wandering pain through the whole of the affected limb. In a more advanced stage, in proportion as the varices increase, and especially when the dilated veins actually form tumours, the limb swells, and becomes more or less œdematous, according to the extent of the disease, and the time which it has existed. M. Delpech thinks, however, that the œdema in this case is not such as to justify the conclusion, that the increased size of the veins, and the way in which they distend the integuments, produce a mechanical interruption of the function of the absorbent system. For, says he, we meet with, though not often, enormous varices, which are not attended with any swelling of the cellular substance; and we still more frequently see cases, in which there is a considerable degree of œdema, while the varices are scarcely remarkable. When the latter have prevailed a long while, and made

VARICOSE VEINS.

much progress, the coats of the affected veins are not unfrequently thickened, swelled, and indurated, forming a sort of half canal, or solid tube, which has been regarded as an excavation made by the pressure of the varix against the neighbouring bone. But the same phenomena are equally observable, when varicose veins lie at a distance from any bone, against which it can be pressed.

As Mr. Hodgson remarks, "the blood occasionally deposits frings of coagulum in varicose veins: when this is the case, the vessel is incapable of being emptied by pressure, and is firm to the touch. The deposition does not in general fill the vessel, but, by diminishing its calibre, it retards the flow of blood, and causes the dilatation to increase in the inferior portion of the vein, and in the branches which open into it." (On the Diseases of Arteries and Veins, p. 541.) This gentleman has seen four cases, in which the coagulum accumulated to such an extent, that the canals of the dilated vessels were obliterated, and a spontaneous cure was the consequence.

The excessive distension of the coats of a superficial vein produces an inflammatory irritation, at first in the adjoining cellular membrane, and afterwards in the integuments. These organs become at first connected together by the adhesive inflammation; and if the distension continue to operate, they may at length ulcerate, and burst, and hemorrhage be the consequence. In such cases, the effusion of blood has sometimes been very considerable; but, says M. Delpech, we have no example of its having proved dangerous. The syncope following it, or a moderate compression, has sufficed for its stoppage. A more common occurrence than bleeding, is the coagulation of the blood in the cavity of a varicose vein. The vessel then becomes hard and incompressible, and it loses that elastic yielding softness, which renders it capable of being diminished by gentle pressure. If the parts be already inflamed, Delpech conceives, that the clot in the diseased vein may act as an extraneous body, and bring on ulceration, by the effects of which it is at last brought into view. In this sort of case, it is extremely uncommon for hemorrhage to occur; for, in general, the vessel has been already obliterated by the preceding inflammation. But the ulcer itself is very difficult to heal, and may be kept up a long while by the œdematous swelling of the limb. Varices, or rather the œdema which is the consequence of them, has the same effect upon every other species of ulcer, and even upon the most simple solution of continuity. While the swelling of the limb cannot be dispersed; while the edges of a solution of continuity are kept asunder by the tense state of the skin; and while the divided parts are irritated by this painful tension; every thing is unfavourable to cicatrization. Thus, we see the most simple wounds, which have been allowed to suppurate, and ulcers, which should have healed rapidly, continue uncured a great many years, merely because the limbs, on which they are situated, are affected with an œdematous swelling, the consequence of varices. Such is the condition of things in the case which has been improperly named the *varicose ulcer*. Delpech *Traité des Maladies Chir.* tom. iii. sect. 8. art. 3.

In the investigation of the causes of varices, it is usual to dwell very much upon the mechanical obstructions which may affect the circulation of the blood in the veins. Surgeons have thought themselves justified in regarding this as the only cause, because a circular, moderate compression incontrovertibly retards the course of the blood in these vessels, and produces a temporary dilatation of them. The opinion has seemed also to derive confirmation from the knotty appearance of varicose veins, a circumstance which has been

accounted for by supposing, that the distension is greatest in the situation of the valves. Lastly, the idea is further supported on the well-known fact of the frequent occurrence of varices during the state of pregnancy. But it has not been remembered, that the use of garters, for example, is extremely common; but varices of the legs infinitely less frequent; that very large varices are met with in persons who have never employed any kind of ligatures, to which the origin of the complaint can be imputed; that when the dilatation of the veins extends to the thighs and parietes of the abdomen, no causes of this description even admit of suspicion; that varicose veins are observable round several kinds of tumours, especially scirrhi, when there is no possibility of pointing out any mechanical obstruction to the circulation of the blood; that varices sometimes make their appearance at the commencement of pregnancy, and long before the enlargement of the womb can impede the free return of the blood through the veins in the pelvis; that nothing is more unusual than a varicose dilatation of the veins of the lower extremities, in consequence of swellings of the abdominal viscera; and lastly, it has been forgotten that the knots of the dilated veins are far too numerous to admit of being ascribed to the resistance of the valves. It cannot be denied, that pressure applied in the track of the vessels, tends to promote their dilatation; but it can neither be considered as the only cause, nor as the principal one. The foregoing observations made by Delpech, render it probable, that some unknown general cause is concerned in producing varices, the formation of which may also be facilitated by the impediments to the free return of the blood, occasioned by certain attitudes, and particular articles of clothing.

Mr. Hodgson conceives it probable, that in some instances, the valves are ruptured in consequence of muscular exertions, or external violence, in which cases, the pressure of the column of blood is the first cause of the dilatation of the veins. Sometimes, also, the disease appears to arise from preternatural weakness in the coats of the veins, as in those instances in which, without any evident cause, it exists in various parts of the same person. *Treatise on the Diseases of Arteries and Veins*, p. 537.

Experience proves, says Delpech, that there is no certain mode of curing *varices*, strictly so called, which he thinks cannot be wondered at, since the nature and causes of the disease are completely unknown. The same source of knowledge, however, also proves, that the increase in the dilatation of varicose veins may be retarded, and that the œdematous swelling attendant on the complaint may be beneficially opposed. But these effects cannot be produced by resolvent, tonic, astringent applications, nor by aperient, diuretic, and purgative remedies, as some even of the latest writers so inconsiderately assert; but only by means of methodical and permanent compression. When the whole of a limb affected with varices is subjected to this last mode of treatment, the dilated veins subside, the circulation is more regularly performed, and the œdema and pain cease. There is not, says Delpech, any better method of healing the solutions of continuity in the soft parts produced or kept up, by the varicose state of the limb and its consequences. But as soon as the compression is discontinued, the varices make their appearance again, the pain recurs, the œdema returns, and the ulcers which were healed break out afresh. Compression, therefore, which absolutely required to be constantly employed, can be regarded only as a palliative, the more useful indeed, inasmuch as the changes which it brings about in the state of things are nearly equivalent to a perfect cure.

Inflammation of the integuments covering a varix, or varicose tumour, cannot invariably be prevented by compression, nor will this treatment always succeed even in removing the intolerable pain which sometimes attends numerous clusters of varicose veins. In the first case, rest and relaxing applications will often succeed; and in the second, the topical use of sedatives frequently gives relief. It has been proposed to puncture and empty varicose veins; but if a temporary emptiness and relaxation of these vessels, which are rendered painful by their distension, could remove the pain for a time, things would fall into the old state again in the course of a few days. If it should appear also, that the clotted blood had the effect of keeping up the unfavourable symptoms, it would be necessary to make a very considerable opening into the dilated vein, in order that the coagulum might be extracted. In such a case, it would be useless to tie the vessel above and below the opening, as has been recommended: the slightest compression is afterwards sufficient for the stoppage of the bleeding, and by the subsequent inflammation the vessel is certain of being obliterated.

We learn from Celsus, that the ancients were accustomed to remove varices by excision, or destroy them with the cautery. (*De Rê Medica*, lib. vii. cap. 3.) When the vein was much convoluted, extirpation with the knife was preferred; but in other cases, the dilated vessel was exposed by an incision, and then cauterized. Petit, Boyer, and many surgeons in this country, have also sometimes practised the operation of cutting out clusters of varicose veins.

Delpech remarks, that the extirpation of tumours composed of numerous varices, has been practised either for the purpose of removing the pain in the situation of the disease, or other inconveniences. This operation has been successfully performed; but it appears also not to have constantly had the effect of preventing the formation of new varices, and it has sometimes proved tedious, difficult, and severely painful in its execution. In fact, an erroneous judgment must necessarily be formed of the extent of these swellings, when they are judged of only from the appearance which they present under the skin. When we attempt to operate, says Delpech, we may be led to organs which ought not to be meddled with, and a long and extremely painful dissection may be found requisite. Besides, varices are not always confined to the superficial veins, and a relapse would be inevitable. These reflections tend to the conclusion, that operations of this sort should never be undertaken, except when the disease is accompanied with perilous symptoms, or nearly deprives the patient of the use of his limb.

It has been thought, that one of the established principles in the treatment of aneurisms might be advantageously extended to the cure of varicose veins. By tying the principal venous trunk above the point to which the varicose affection reaches, it is said that the course of the blood in the morbid vessels may be totally stopped; the column of this fluid contained in them made to coagulate; and the consequent obliteration of the vessels themselves accomplished.

The practice of tying veins for the cure of varices appears to have been employed in the days of Paré and Dionis, (*Cours d'Opérations de Chirurgie*, p. 610.) who have accurately described the operation of tying and dividing the vein between the two ligatures. Sir Everard Home has related many cases of varicose veins in the leg, some of them being accompanied with tedious ulcers, in which, after tying the vena saphæna major, where it passes over the inside of the knee, not only the dilatation of the veins of the leg was relieved, but the ulcers were readily healed. This proceeding has unquestionably been sometimes followed

with success; but it has also had its failures. Amongst other evils, an inflammation of the tied vein has been observed extending very far in the vessel, and succeeded by convulsions and death. Indeed, the dangers arising from an inflammation of the internal coat of the veins are now generally acknowledged, and every endeavour should be made to avoid them. A case which lately happened in one of the large hospitals of this metropolis, has fully proved them: we allude to the example, in which the femoral vein happened to be wounded in the operation for aneurism, and had a ligature applied round the small aperture accidentally made in it. Inflammation of its internal coat took place to a considerable extent, and the patient is supposed to have died of the indisposition resulting from it.

As Mr. Brodie observes, it seems to be now established by the experience of modern surgeons, that a mechanical injury inflicted on the trunk of one of the larger veins, is liable to be followed by inflammation of its internal membrane, and a fever of a very serious nature: and the occasional occurrence of these symptoms after the ligature, or even the simple division of the vena saphæna, has made surgeons less confident than formerly, of the propriety of attempting these operations for the relief of a varicose state of the branches of that vessel in the leg. Certain reflections, however, induced Mr. Brodie to think, that the same ill effects would not follow a similar operation performed on the branches themselves. "Where the whole of the veins of the leg are in a state of morbid dilatation, and the distress produced by the disease is not referred to any particular part, there seem to be no reasonable expectations of benefit, except from the uniform pressure of a well-applied bandage. But not unfrequently, we find an ulcer which is irritable, and difficult to heal, on account of its connection with some varicose vessels; or without being accompanied by an ulcer, there is a varix in one part of the leg, painful and perhaps liable to bleed, while the veins in other parts are nearly in a natural state, or at any rate are not the source of particular uneasiness. In some of these cases, I formerly applied the caustic potash, so as to make a slough of the skin and veins beneath it; but I found the relief which the patient experienced from the cure of the varix, to afford but an inadequate compensation for the pain to which he was subjected by the use of the caustic, and the inconvenience arising from the tedious healing of the ulcer, which remained after the separation of the slough.

"In other cases, I made an incision with a scalpel through the varix and skin over it; this destroyed the varix as completely as it was destroyed by the caustic, and I found it to be preferable to the use of the caustic, as the operation occasioned less pain, and as, in consequence of there being no loss of substance, the wound was cicatrized in a much shorter space of time. I employed the operation, such as I have described it, with advantage in several instances; but some months ago I made an improvement in the method of performing it, by which it is much simplified, rendered less formidable, not only in appearance, but also in reality; and followed by an equally certain, but more speedy cure.

"It is evident," says Mr. Brodie, "that the extensive division of the skin over a varix, can be attended with no advantage. On the contrary, there must be a disadvantage in it, as a certain time will necessarily be required for the cicatrization of the external wound. The improvement to which I allude consists in this; the varicose vessels are completely divided, while the skin over them is preserved entire, with the exception of a moderate puncture, which is necessary for the introduction of the instrument with which the incision

incision of the veins is effected. Thus the wound of the internal parts is placed under the most favourable circumstances for being healed, and the patient avoids the more tedious process, which is necessary for the cicatrization of a wound in the skin above.

“For this operation, I have generally employed a narrow sharp-pointed bistoury, slightly curved, with its cutting-edge on the convex side. Having ascertained the precise situation of the vein, or cluster of veins, from which the distress of the patient appears principally to arise, I introduce the point of the bistoury through the skin on one side of the varix, and pass it on between the skin and the vein, with one of the flat surfaces turned forwards, and the other backwards, until it reaches the opposite side. I then turn the cutting-edge of the bistoury backwards, and in withdrawing the instrument, the division of the varix is effected. The patient experiences pain, which is occasionally severe, but subsides in the course of a short time. There is always hemorrhage, which would be often profuse if neglected, but which is readily stopped by a moderate pressure, made by means of a compress and bandage carefully applied.” Mr. Brodie particularly enjoins the necessity of keeping the patient quietly in bed for four or five days after the operation, and removing the bandage and first dressings with the utmost care and gentleness. He also cautions surgeons not to make the incision more deeply than absolutely necessary. Inflammation of the coats of the veins has not occurred in any of the cases in which Mr. Brodie has adopted this method of treatment. This gentleman wishes it to be understood, however, that he does not recommend the practice indiscriminately, but with a due attention to the circumstances of each individual case. “The cases for which it is fitted, are not those in which the veins of the leg generally are varicose, or in which the patient has little or no inconvenience from the complaint; but those in which there is considerable pain referred to a particular varix; or in which hemorrhage is liable to take place from the giving way of the dilated vessels; or in which they occasion an irritable and obstinate varicose ulcer.” See *Medico-Chir. Trans.* vol. vii. p. 195, et seq.

On the subject of cutting through veins affected with varix, it is proper to observe, that even this plan has been known to bring on severe and fatal symptoms. Cases confirming this fact are recorded in a valuable modern work, which should be in the hands of every practical surgeon. (See Hodgson's *Treatise on the Diseases of Arteries and Veins*, p. 555, et seq.) It is but justice to state, however, that in these examples, Mr. Brodie's manner of doing the operation was not adopted.

As we have already noticed, cases of spontaneous varix in the veins of the arm are rarely observed. When these vessels become varicose, it is almost always in consequence of a communication being formed, in the operation of venesection, between the brachial artery and one of the veins at the bend of the arm. The superficial veins in this situation then become more or less dilated by the impulse of the stream of arterial blood which is thrown into them. There is, however, a good deal of difference between those accidental varices actually induced by a mechanical cause, and those which originate spontaneously, or from causes not very clearly understood. The former never acquire the size which the latter often attain; they never exceed a certain magnitude, whether pressure be employed or not; they never form tumours composed of an assemblage of varicose veins; they are never filled with tough coagula of blood; their coats are never thickened, nor constitute the solid half canal remarked in the other species of varices; the

skin which covers them is not disposed to inflame and ulcerate; they are not subject to occasional hemorrhage; and the limb is not affected with any œdematous swelling. (See Delpech *Traité des Maladies Chir.* tom. iii. p. 261.) These circumstances must render it sufficiently evident that all surgical interference in such a case would be entirely unnecessary.

For additional observations connected with the subject of varicose veins, see the article ANEURISM, where the aneurismal varix is described; CIRSOELE, where the varix of the spermatic cord is treated of; HEMORRHOIDS, where the diseased and enlarged veins of the rectum are considered; and VARICOELE, where those of the scrotum are noticed. Delpech *Précis Elementaire des Maladies réputées Chirurgicales*, tom. iii. Hodgson's *Treatise on the Diseases of Arteries and Veins*. Cooper's *Dictionary of Practical Surgery*.

VARICOSE Ulcer. See the preceding article, and ULCERS.

VARICOSE, or *Varicous*, a term applied to a kind of soft puffy swelling, or particular sort of ulcer in animals, mostly about the legs. See ULCERS, in *Animals*.

VARICULA, (diminutive of *varix*,) in *Surgery*, a varicose enlargement and dilatation of the veins of the tunica conjunctiva of the eye; a frequent consequence of chronic ophthalmia.

VARJEAS, in *Geography*, a town of Portugal, in the province of Beira; 14 miles S.E. of Lamego.

VARIEGATED LEAVES, in *Botany and Vegetable Physiology*, *folia variegata*, or more properly *variata*, are such as are irregularly blotched with white or yellow, constituting a variety, for the most part permanent, and which is not uncommon in several species of shrubs, trees, or herbs. The white variegation is most usually seen in Elder, some kinds of Elm, Round-leaved Mint, or *Mentha rotundifolia*, and Striped Grass, or *Phalaris arundinacea*; the yellow one in Jasmine, White Lily, and in many evergreens, as Holly, *Rhamnus Alaternus*, *Phillyrea latifolia*, *Aucuba japonica*, and many others. We have seen an accidental, very beautiful, specimen, in *Rumex obtusifolius*, but it was not permanent. A romantic garden, among some very uncommon and whimsical rocks at Plumpton, near Harrogate, was originally planted with nothing but variegated shrubs, of every species that could be procured. It might have delighted a Chinese, but the effect was not picturesque.

This change in the colour of leaves, more or less extended occasionally to the rest of the herbage, can be considered but as a sort of disease. The plants affected with it are much more tender, and difficult of cultivation, than in their natural state, as well as less luxuriant; witness *Antirrhinum Cymbalaria*, *Fritillaria imperialis*, and many others. Variegated Oaks are rare, and sickly. We do not recollect to have seen any Willow in this state, nor any Cherry, Plum, Currant, or Gooseberry. The Holly assumes different shades of yellow, sometimes accompanied with pink. *Prunus Lauro-cerasus* now and then puts forth an entirely white or colourless shoot, and we have several times met with the same circumstance in *Rosa canina*, but we do not know that either of these shrubs is permanently variegated.

The cause of these blotches in leaves is probably among those secrets of Nature, hardly, if ever, to be discovered. That it must consist in some quality of the soil, in which the original stock vegetated, is a probable conjecture, but no more. The variety commonly continues unimpaired, in offsets or cuttings from this original stock, in whatever soil they may be planted. Nevertheless, a shrub thus marked, or diseased, will now and then, from luxuriance of health, return to the pristine and natural verdure of its species,

making shoots of extraordinary vigour, which soon overtop and exclude the variegated parts of the same individual.

VARIETIES, in *Natural History*, a word used to express an accidental change in some body, which is not essential to it, and therefore does not constitute a different species.

The naturalists of former ages have run into great errors, in mistaking the accidental varieties of plants, animals, and minerals, for distinct species. Many of them have called a plant a new species, because its flower, which should have been blue or red, is white, on account of the poorness of the soil, or some other such reason. Mr. Ray has established a very good test for varieties in botany; he allows every thing to be a distinct plant, which will propagate itself in its own form by its seeds; but such as, when sown, lose their difference, and run back to the old standard, he accounts varieties, however great their distinctions may appear.

In the history of fish, as much confusion has been introduced, by mistaking varieties for distinct species, as in botany. Artedi is the only author who has rationally attempted to bring this part of natural history into order in this respect, and to settle regularly the rules by which to distinguish real and essential from accidental differences.

The principal grounds of the error of supposing varieties distinct species of fish have been these: the variable and inconstant colour of fish hath been mistaken for a specific difference; in this manner Rondeletius has described many varieties of the turdi, labri, and other fish, under the names of distinct genera.

Others have paid the same too great regard to the more constant varieties of colour, which are found only to differ in degree in the several individuals of the same species, and their differences to be only in the degrees of the same colour, which is much more intense in some, and more remiss in others. These differences can only make varieties of the same fish, the species remaining always the same. Of the same kind are the mistakes of those who esteem size or magnitude a specific character; and thus, out of the varieties of the same fish, occasioned by scarcity or plenty of food, or other such occasions, make larger or smaller species. The place where fish are caught is also another cause of making new species with these authors: thus, though the *perca fluviatilis* of Bellonius, and the *perca marina* of other authors, be the same fish, yet they are pretended to be different species. The time of spawning is also with some made a distinction of species; and thus we find the common pike divided into three species, according to its spawning, in spring, summer, and autumn, which it does according to the heat or coldness of the climate. See SPECIFIC NAMES.

All these differences are false and frivolous, and the utmost they can do is to make what are properly called varieties, though few of them are sufficient even for that. A salmon caught at sea is not different from one of the same brood caught in a river; and if the *perca marina*, falsely so called, be a little different from the *perca fluviatilis*, yet if its spawn will produce regular *perca fluviatilis*, its difference can only amount to a variety, not a distinct species.

The time of spawning is no essential difference; for we daily see the change of climate make changes of that kind in all creatures; and even in the same climate, and under the same circumstances, the same species of birds will afford some individuals much earlier or later in laying their eggs than others. Artedi Ichthyol.

VARIETIES, in *Botany and Vegetable Physiology*, are certain differences between individuals of the same species, which are not sufficiently important to constitute a specific

distinction, nor, however important or striking, are they permanent, except in offsets, buds, cuttings, or layers of the same individual. Even these are observed, sooner or later, to wear out; while, on the other hand, some varieties do appear to be continued, by seed, through successive generations, at least in annual plants; but a very slight degree of observation will shew that these gradually return to their original nature; sometimes very speedily. Varieties amongst eatable fruits seem to be the most numerous and the most lasting; but whether they are more so than others, which, being unimportant to mankind, pass unnoticed, as in the *Fungus* tribe, may be doubted. Mr. Knight, the learned and experienced President of the Horticultural Society, has convinced himself, and we believe most of his intelligent readers, that varieties of Apples and Pears have only a limited duration. (See SPECIES OF PLANTS.) Thus the most valuable, perhaps, of all, the Golden Pippin, and particularly the russet-coated kind of that fruit, is generally wearing out. It may be propagated by grafting; but the young trees, thus obtained, quickly canker, and cease to bear any fruit worth notice. Numbers of Apples and Pears, celebrated in the horticultural works of the French, and many known to have existed formerly in England, are no more to be found. Those who plant orchards draw out admirable plans upon paper, buy trees, and wait with great complacency for the produce, till they find themselves miserably deceived. Half their trees, possibly, bear something different from what was promised. So far they have a right to complain of an ignorant, careless, or dishonest nurseryman. The greater part of their whole stock, whether the fruit be good or bad in quality, cankers, turns mossy, or dies, in a few years. Some few hardy trees only, of ordinary fruits, perhaps remain. The soil is concluded to be unfit for apples, and the possessor bears his disappointment as well as he can. This is the literal history of several orchards, which have passed under our observation. We have also seen fine trees of Golden Pippins and Nonpareils, which twenty years ago bore full crops of excellent fruit, canker and die, without any apparent cause, so that "the places which knew them, know them no more." Such is the melancholy history of our orchards. But it is still more grievous to observe, that new varieties, which Mr. Knight, and some other patriotic cultivators, are obtaining every year from seed, prove far more transient than their predecessors, cankering and disappearing in four or five years. Some, however, we hope and trust, will remain, and that our descendants will not be destitute of the most valuable of all English fruits. With this important end in view, we cannot sufficiently recommend, to those who have the means, the raising of apple-trees from seed, every year, on a large scale. It has usually been the practice of such experimentalists to select the kernels of good apples, for their purpose; thinking such more likely to yield something analogous to their parent fruit. Perhaps they may inherit too much of the same constitution, and this may be the latent cause of their own short existence. Might it not be worth while to sow the seeds of healthy wild crab-trees, whose vigour might remain in their offspring? From such, doubtless, all our valuable varieties must, at first, have originated. Who can tell that the degeneracy so prevalent among the new-raised stocks, as to duration, may not be owing to the repeated cross impregnation of diseased worn-out varieties, which must take place in a garden? The ornaments of our courts and drawing-rooms may descend from the heroes of Cressy and Agincourt, but our modern heroes commonly rise from the ranks, and the quarter-deck.

In the ornamental department of horticulture, varieties

VARIETIES.

are much attended to. Cape Geraniums are raised, by crosses impregnation, which often excel their parents in size and beauty, and for a while are continued by cuttings, if not by seed. Nothing, however, can be more transitory than these ephemeral productions. We have adverted to some of them under the article *PELARGONIUM*. Double-flowered varieties are produced from time to time, either by nature or by some accident of cultivation, for which we cannot in any manner account. Thus, if we sow an hundred seeds of the common Annual Stock, *Cheiranthus annuus*, one, or perhaps many, of the plants may bear nothing but completely double flowers, all the rest being quite single. When such a variety occurs in any perennial, or shrubby, species of plant, it is justly prized, being capable of multiplication by cuttings, layers, &c.; and when variations of colour are superadded, as in the favourite *Camellia japonica*, the treasures of the conservatory are still more multiplied. We must be content, in the present state of knowledge at least, to seize each vegetable Proteus as it comes in our way, without attempting to explain, or to imitate, the cause of its transformation.

Colour is, of all things, most liable to vary in the petals of flowers. Almost every blue flower is capable of changing to white, and it appears that in several instances the seeds of the white variety more generally produce their like, than those of the natural-coloured flowers change to white. But this rule is not invariable. The seeds of Canterbury Bells, *Campanula Medium*, whether taken from a white or blue flower, appear, as far as we can judge, to produce a great majority of blue-flowered plants, with a few white ones. The elegant varieties of the Sweet Pea, *Lathyrus odoratus*, seem more constant; but they are comparatively of recent introduction amongst us, and it is probable they may in time wear out, like other more short-lived beauties.

Varieties in the luxuriance or flavour of annual herbs, or their seeds, which make the riches of a kitchen garden, require, of all things, the most assiduous attention of a cultivator. These are the most casual and fugacious of all things. They do, however, appear to be more within the control of a skilful gardener, than many above-mentioned; especially with regard to soil, or manure. An eminent London seedsmen assured the writer of this, that he found it expedient to send lettuce seed to a remote country, the south of France, for instance, one season, and its produce to Holland, or Germany, perhaps, the next, in order to preserve or improve its quality. Change of crops every body knows to be essential in farming, as well as change of seed. What are the various degrees of excellence in Wheat, Barley, or other grain, but varieties, in what possibly, when originally wild, resembled but an ordinary grass. These excellencies are kept up by culture, that is, by attention to the circumstances just detailed. Such attention is infinitely more requisite in the cultivation of high-fed, pampered, and delicate culinary vegetables, which, if at all neglected, soon return to their original kind, or more frequently vanish altogether. Varieties of Peas, obtained by crosses impregnation, are a late improvement in horticulture, which promises a more durable success. For this acquisition to our tables we are indebted to the skill and indefatigable exertion of Mr. Knight, who has also extended his philosophical inquiries and experiments to Strawberries. It is much to be wished that the test of distinction between a variety and a species, which this gentleman has assumed, or rather adopted from animal physiologists, may hold good. This is, their power of generating together, without limitation. That unquestionably distinct species in the vegetable king-

dom will, like the horse and the ass, produce a mule; and that such mules will, for a longer or shorter period, continue to propagate themselves, as the animal mule is said occasionally to do, we cannot deny. It is sufficient for the preservation of order in nature, that such bastard progenies are limited; nor have we any doubt that, if they were all diligently watched, their termination, sooner or later, might always be observed. But we are not the less aware of the hazard of drawing conclusions on this subject, without a sufficiently long course of observation; analogy, always in philosophy to be followed with caution, being in the present case peculiarly treacherous.

In practical botany, varieties often cause no small trouble. Linnæus was among the first who, upon sound principles, distinguished them from species. Tournefort, and most of his followers, enumerated all the different appearances of plants that fell in their way, without regard to their permanency, or specific distinction. Hence a plant with a blue or a white flower stands, in the works of these authors, as two different species; though manifestly the same in every other character, and perhaps produced from seed out of one and the same capsule. Linnæus blames Micheli for making sixteen species out of the common Dutch Clover. (See *TRIFOLIUM repens*.) Of these, some indeed prove more certainly distinct species than Linnæus imagined; but the rest are, many of them, distinguished by casual marks, that may or may not exist, in the same individual plant, the following season. Some botanists contend that the red and the white *Lychnis dioica*, so different in colour, must constitute two species. We have found the larger kind, which is usually white, with a pink flower, and thinking we had made a great acquisition, transplanted it into a garden. Next year the same root bore pure white flowers, and no others. All cultivators know how Tulips, Hyacinths, Anemones, and the garden Ranunculus, differ and vary in colour, from the same seed, and even on the same root at different seasons. The same plant of *Hydrangea hortensis* will produce pink or blue flowers according to the time of year, or the manner in which it is treated as to soil and watering. Bog-earth generally induces the blue tint. To multiply instances of this sort, would lead us beyond all bounds.

Pubescence has been thought to afford a good specific distinction, and in some cases it unquestionably does. Its direction is certainly very material, and has been applied by the writer of this to discriminate species of *Mentha*, as it has by Dr. Roth to establish distinct species of *Myosotis*. But the quantity of hairiness on a plant is very variable, and can hardly be said to mark even a variety. A perfectly smooth wild plant of *Mentha hirsuta*, the calyx and flower-stalk excepted, being transplanted into a garden, proved as hairy all over as any of its brethren, the very next season. On the subject of the specific characters, as opposed to mere varieties, we have already been sufficiently explicit, under the head *SPECIES of Plants*, nor need we here add any further illustrations.

Some botanical writers, even of the present day, are curious to mark varieties under each species. This may on some occasions, and in gardening books, be useful; but if their specific distinctions be well founded, each variety will of itself fall into its proper place. To dwell upon them is a trifling study, except so far as their different qualities may lead to any practical utility; or their various origins and changes, to any physiological instruction. With the latter intention, the ingenious Mr. R. Brown has, for some time past, been attentive to every strange deformity or mon-

strosity,

strosity, that has fallen in his way, in the parts of fructification; nor can it be doubted that, under so acute an inspector, new secrets of Nature are likely to be discovered. We shall conclude this subject with one remark, that, as in the establishment of generic or specific characters, no rule whatever is perfectly absolute; so there are several distinctions, in most instances decidedly indicative of a species, that in others hardly mark a variety. Such are, the leaves being opposite or alternate, simple or compound, serrated or entire: the flowers terminal or lateral, with or without petals. Examples of such differences, on the same individual plant, will occur to the recollection of every botanist; yet every one knows that, under the direction of common sense and the most trivial degree of observation, nothing can afford more clear and absolute specific characters.

VARIETIES, in *Gardening*, the different variations of plants of the same general nature from that of the parent or particular sort from which they came. They are, of course, the offspring of certain peculiar determinate sorts, which vary in some accidental particular of their habits of growth, or some other circumstance, from the natural original sort, or parent plant. But although this is the case, as their variations are, for the most part, confined to some particular part or parts, they still retain the specific mark or marks of distinction of the parent plant, which discriminates them from those of other different sorts. Consequently there are frequently numerous varieties from the same sort, all of which differ from it, either in their manners of growth, foliage, flowers, the economical qualities which they possess, or some other particular of a similar nature. All kinds of plants, both of the annual, biennial, and perennial descriptions, as well as those of the herb and tree sort, are liable to vary in this way. This is effected by different modes and kinds of culture, by the nature of the climate, by that of the soil, by the use of particular sorts of manure and other materials, by frequent changes in their situation, by age, and in many other methods, and respects their differences in size and magnitude, their luxuriant, dwarfish, erect or trailing growths, their being smooth or prickly; the nature and shape of their leaves, as broad, narrow, entire, divided, curled, spotted, variegated, round, oval, sharp, blunt, &c.; smooth, hairy, downy: in their flowers, as single, double, proliferous, white, red, blue, yellow, variegated, &c.: in their smell, as sweet-scented, rank-scented, &c.: also in the form, size, colour, taste, quality, &c. of the fruit, in some cases, as round, oval, oblong, smooth, furrowed, warted, hairy, downy, large, small, red, green, sour, sweet, compact, pulpy, &c. as in the cucumber, melon, apple, pear, gooseberry, currant, &c.: likewise, in particular instances, in the shape and appearances of the roots, as in the carrot, the radish, the turnip, the potatoe, &c.: in the manner of their producing their seeds, fruits, &c.; as in the hop, spinach, hemp, &c.; and the cucumber, melon, &c. And it takes place in many other circumstances.

However, notwithstanding these different modes of variation in the particular parts of the varying plants of a peculiar sort, if those of each such sort still all maintain the same specific mark of distinction as that which characterizes and discriminates the respective natural sorts from all others, it shews them all the offspring, or varieties, of the same original sort. For as every different and distinct sort, in any particular kind of plants, is discriminated by some peculiar, uniform, constant mark or appearance in some part of its growth, all the plants of the same particular kind unchangeably bearing exactly the same, are, notwithstanding their accidental variation in other parts of their growth, all

varieties of one sort. Consequently all the plants which are produced from the seed of the same particular sort, however they may put on different forms and appearances, are to be considered as the real varieties of it.

The difference betwixt any particular sort and that of a variety, is, that a really true sort, raised from seed, will, though it may sport into many variations, still retain and keep its true and invariable mark of distinction through all its varieties; and although there may be varieties of that particular sort with different sized leaves, and colours of the flowers, &c.; if the seed of any one be sown, it will probably produce young plants of all these kinds, each having the characteristic discriminating mark of the parent.

It is, indeed, in a great measure, from plants of the seedling kind, that the different varieties of particular sorts were first obtained, as in the case of the auricula, polyanthus, &c. each being a distinct sort of the same kind, and each of which consists of innumerable varieties, in the colours and variegations of the flowers, first gained in this way, the seed of the same plant often producing a great diversity in this respect, each variation of colour, &c. forming a real variety; but probably not one of them with a flower exactly like that of the original parent plant: yet each variety retains the specific difference of its respective particular sort, the auricula, for instance, never changing to the polyanthus, nor that to the auricula, but the varieties of each keep their proper distinction; as the auricula, in all its varieties, continues its *smooth fleshy serrated* leaves; and the polyanthus, its *rough-toothed* leaves. And the same is the case with the carnation, the ranunculus, the anemone, the tulip, and a great number of other flower-garden plants.

The tree kind, especially those for the production of fruit, are particularly disposed to form varieties, equally in their modes of growth, their foliage, and the fruit: for instance, one original sort of apple-tree is only admitted, but which furnishes an almost endless variety of fruit, in regard to shape, size, colour, taste, quality, &c. as well as in the growth of the trees, so far as respects their size or magnitude, the dimensions and colours of the foliage, &c.; the specific distinction of which is, *serrated leaves, and close-setting flowers in the form of an umbel*, which runs through all the numerous varieties, however different the trees may be in size, growth, leaves, and fruit. And the same takes place in the pear, the plum, the common cherry, the peach, and many others, there being only one principal sort of each of these, but the varieties of the fruit are many in number, which, in all these sorts of trees, were originally obtained from seedling plants, that is, such trees as were raised by setting the stones or kernels of the fruit. Almost all the fruit-tree kind sport greatly in their seedling plants, so that out of hundreds of trees raised from the seeds of the best fruits, very few, if any, will produce fruit exactly like that of the parent plant, or which possess any good perfection. Therefore, on account of the uncertainty of producing and continuing the approved sorts of fruit from seedling plants, recourse is constantly necessary to be had, in the practice of gardening, to the modes of grafting, budding, and, in some instances, the making of layers and cuttings, in order to propagate the intended and desired sorts, or to continue and increase any good newly acquired variety.

The greater number of varieties in herbaceous plants, as well as many kinds of fruit and other trees, are of a variable and sporting nature, so that when raised from seed, there is no dependance on having the seedling plants coming again of the same sort, but varying into different sorts of one another. In cases of this nature, the propagation of such of them as

VARIETIES.

are perennial, to continue them with certainty, is to be accomplished either by means of planting their suckers, or the offsets or slips of the roots, and in some by layers and cuttings, or in the woody descriptions by layers, cuttings, grafting, and budding; but in the annual tribe there is no other means than by sowing or setting the seed, except in some few sorts, by the planting of their cuttings, as in the chrysanthemum, nasturtium, and some others; however, in a great number of kinds, where particular attention has constantly been bestowed in saving the seeds from only the most perfect, they will continue tolerably permanent, and frequently come again the same, or with but very little variation.

In many sorts of plants of the kitchen-garden and annual flower kind, though there be a number of varieties in each, yet by good care, and constantly saving seed from the most perfect plants, which shew no signs of degenerating, they remain, year after year, permanent from seed.

But most of the perennial tribe, the herbaceous as well as the woody sorts, as being in general more variable from seed, afford great opportunities of continuing the permanency of any particular variety, by making use of the offsets from their roots, the suckers, layers, and cuttings, as well as by grafting and budding, as has been already seen.

It sometimes occurs, however, that plants, although not immediately raised from seed, will, on account of some accidental cause, vary materially from their usual natural growths, and assume quite different appearances, arising in consequence either of culture, climate, exposure, soil, age, disease, abundance, or deficiency of nourishment, contusions, or other similar circumstances; and by such means produce accidental varieties in some particular parts of their growth.

The ascertaining of the reality of the varieties is, in many sorts, readily and easily accomplished by a comparison of the variable plant with the specific distinctions of the natural sort; and the variations of growth of the variety with the same parts in the natural plant. But still there are many varieties that require all the skill and knowledge of the most expert gardener to fully distinguish and ascertain them. It is, however, of material importance, in many cases of practical gardening, to have a nice and correct notion of the varieties of the plants which are to be cultivated, as the work can thereby be performed with greater certainty and advantage, as well as with more and better effect.

In the first volume of the Transactions of the Horticultural Society, T. A. Knight, esq., makes the following conclusions on the means of raising new and early varieties of fruits: after stating that "variation is the constant attendant on cultivation, both in the animal and vegetable world;" and that "in each the offspring are constantly seen, in a greater or less degree, to inherit the character of the parents from which they spring:" that as every particular sort of fruit acquires its greatest state of perfection in some peculiar sort of soil or situation, and under some similar mode of culture; the proper choice of such "must be the first object of the improver's pursuit; and that nothing should be neglected which can add to the size, or improve the flavour of the fruit which it is intended to propagate. Due attention to these points will, it is contended, in almost all cases, be found to comprehend all that is necessary to insure the introduction of new varieties of fruit, of equal merit with those from which they spring;" but that, at the same time, "the improver, who has to adapt his productions to the cold and unsteady climate of this country, has still many difficulties to contend with; he has to con-

bine hardiness, energy of character, and early maturity, with the improvements of high cultivation. Nature has, it is maintained, however, in some measure, pointed out the path he has to pursue; and that, if it be followed with patience and industry, no obstacles will be found, which may not be either removed or passed over."

Thus, "if two plants of the vine, or other tree, of similar habits, or even if obtained from cuttings of the same tree, were placed to vegetate, during several successive seasons, in very different climates; if the one were planted on the banks of the Rhine, and the other on those of the Nile, each would adapt its habits to the climate in which it was placed; and if both were subsequently brought, in early spring, into a climate similar to that of Italy, the plant which had adapted its habits to a cold climate, would instantly vegetate, whilst the other would remain perfectly torpid. Precisely the same thing occurs in the hot-houses of this country, where a plant accustomed to the temperature of the open air, will vegetate strongly in December; whilst another plant of the same sort, and sprung from a cutting of the same original stock, but habituated to the temperature of a stove, remains apparently lifeless. It appears, therefore, that the powers of vegetable life, in plants habituated to cold climates, are more easily brought into action than in those of hot climates; or in other words, that the plants of cold climates are most excitable: and as every quality in plants becomes hereditary, when the causes which first gave existence to those qualities continue to operate, it follows that their seedling offspring have a constant tendency to adapt their habits to any climate in which art or accident places them." But it is remarked, that "the influence of climate on the habits of plants, will depend less on the aggregate quantity of heat in each climate, than on the distribution of it in the different seasons of the year." Where it comes on suddenly and violently after the plants have been long exposed to severe and intense cold, and their capability of being excited is, of course, greatly increased, or become abundant, the progress of vegetation will consequently be extremely rapid. But, on the contrary, where it takes place in a slow and irregular manner, and increases only in a tardy moderate way on plants which have been little affected with the preceding cold, and in which the powers of life have scarcely at any time been suspended, the progress is much more gradual and restrained. Thus the crab, which is a native of Russia as well as of England, has adapted alike its habits to each: the Siberian variety, when introduced into the climate of this country, retains its habits, expands its leaves, and blossoms on the first approach of spring, vegetating strongly in the same temperature, in which the native tree of that sort hardly displays any signs of life; and its fruit acquires a degree of maturity, even in the early part of an unfavourable season, which the variety of this country is rarely or ever seen to attain.

It is likewise suggested, that "similar causes are productive of similar effects on the habits of cultivated annual plants," but that "these appear most readily to acquire habits of maturity in warm climates; for it is in the power of the cultivator to commit his seeds to the earth at any season; and the progress of the plants towards maturity will be most rapid where the climate and soil are most warm." This knowledge is not only of great utility in many cases of gardening, but of much practical advantage in the business of agriculture.

It is added, that "the value to the gardener of an early crop has attracted his attention to the propagation and culture of the earliest varieties of many particular sorts of our esculent plants; but in the improvement of these, he is

more often indebted to accident than to any plan of systematic culture; and contents himself with merely selecting and propagating from the plant of the earliest habits, which accident throws in his way, without inquiring from what causes those habits have arisen; and few efforts have been made to bring into existence better varieties of those fruits which are not generally propagated from seeds, and which, when so propagated, of necessity exercise during many years the patience of the cultivator, before he can hope to see the fruits of his labour, industry, and attention." The attempts which the writer has made to produce early varieties of fruit are, it is believed, all that have yet been made; and though the result of them is by no means sufficiently decisive to prove the truth of the hypothesis he is endeavouring to establish, or the eligibility of the practice he has adopted, it is amply sufficient to encourage future experiment on the subject.

It is noticed, that the first sort of fruit which was subjected to experiment in this way, was the apple; some young trees of the desired varieties of which for propagation were trained to a south wall, until they afforded buds containing blossoms. The branches of which then, in the following winter, were detached from the wall, and removed to as great a distance from it as possible, in which state they continued till so far advanced in their blossoms in the following spring, as to be in danger from frost. Then the branches were trained to the wall, where each blossom allowed to remain quickly expanded, and formed fruit, that in a few months attained perfect maturity; and the seeds produced plants that have ripened the fruit much earlier than other trees raised at the same time from seeds of the same fruit grown in the orchard. In this trial, the blossoms of each variety were fecundated by the farina of another kind; from which is supposed to have been attained in this as well as other similar instances a greater vigour and luxuriance of growth; but no earlier ripening of the fruits than in the plants grown by the ordinary modes of culture. The early maturity of those mentioned, is consequently ascribed to the other peculiarity of circumstances under which the fruit and seeds ripened from which they sprang.

By the same method of culture, several new varieties, that are the offspring afforded by the Siberian crab and the richest apples of this country, were obtained in the intention of providing fruits for the presses that might ripen well in cold and exposed situations. The plants furnished in this manner possess a remarkable hardness and luxuriance of growth, appearing in every way perfectly suited to answer the intended purpose. In each of these trials, some of the new varieties inherited the character of the male, and others of the female parent, in the greatest degree; and of some varieties of fruit, especially of the golden pippin, a better example was obtained by the introduction of the farina into the blossom of another apple, than by sowing their own seeds. The new variety of the Downton pippin, obtained in this manner from the farina of the golden pippin, will, it is believed, be found, in a favourable season and situation, little if at all inferior to the golden pippin, when first taken from the tree; but it is a good deal earlier, and probably cannot be preserved so long in a perfect state.

The next trials were on the grape, which, though less successful than the above in producing new varieties, were not less favourable to these conclusions. After supposing a vine without fires in the winter, to afford a climate to the vine similar to that afforded by the southern parts of Siberia to the apple or crab-tree; the same extensive variation of temperature taking place in it, and the sudden transition

from great comparative cold to excessive heat, as productive of the same rapid progress in the growth of the plants and the advancement of the fruit to maturity; he states that his first attempt was to combine the hardness of the blossom of the black cluster, or Burgundy grape, with the large berry and early maturity of the true sweetwater, often confounded with the white chasselas and white muscadine. In this case, the seedling plants produced fruit in his vinery at the age of three or four years, and in some of them it was very early; but the bunches were short and ill-formed, and the blossoms did not set by any means so well as he had expected.

On substituting the white chasselas for the sweetwater, many varieties were obtained whose blossoms appeared perfectly hardy, and capable of setting well in the open air; and the fruit of some of them ripening a good deal earlier in the year than that of either of the parent plants. But the berries are smaller than those of the chasselas, having less tender and delicate skins: and though not without much merit for the desert, they are generally better calculated for the press. In the latter intention, in a cold climate, it is supposed that one or two of them possess very great excellence. From the white chasselas and sweetwater, plants have since been obtained, the appearance of which is greatly more promising: and the earliest variety of the grape he has ever yet seen was produced from a seed of the sweetwater, and the farina of the red Frontignac. It is a very fine grape, resembling the Frontignac in colour and the form of the bunch; but it is feared that its blossoms will prove too tender to succeed in the open air in this country; a single bunch consisting of a few berries is, however, all that has yet existed of this kind. Two new varieties of the vine, with striped fruit and variegated autumnal leaves, have also been produced from the white chasselas and the farina of the Allipo vine: one of these has ripened extremely early, and is thought a good grape. As in all attempts to obtain new varieties of fruit, the propagator is at a loss to know the kinds which are best suited to answer his purpose, those varieties of the grape which he has employed with the most success are mentioned. In short, the facts which he has obtained on this subject, leave no doubt in his mind that varieties of the grape capable of ripening perfectly in our climate, when trained to a south wall, as well as of other fruits better suited to this climate than those which are now cultivated, may be readily produced; but whether the method of cultivation which he has adopted and advised be the most eligible, must be left to the decision of future and more extensive practice and experience.

Trials similar to these have been made on the peach; but it is stated that nothing more can yet be said of the result of them, than that the plants are perfectly healthy and luxuriant in their growth, affording sufficient evidence in their leaves of the good quality of the future fruit. And though he is uncertain at what age plants of this sort become capable of producing blossoms, the sudden changes in the character of the leaves and growth of those raised by him, which are now in their third year, lead him to believe that they will be in a state to produce fruit at the age of three or four years.

Upon the whole, from these and a close attention to the subject for years, it may be maintained that new varieties of every particular sort of fruit will in general be better obtained from the introduction of the farina of one variety of it into the blossoms of another, than by propagating from any single kind. Where trials of this nature are made between varieties of different size and character, the farina of the

VARIETIES.

the smaller kind should be introduced into the blossoms of the larger, as under these circumstances it has generally, though with some exceptions, been found that there is a prevalence in the fruit of the character of the female parent, probably on the following account. The seed-coats are wholly generated by the female parent, and these regulate the bulk of the lobes and plantula; and it has been noticed, in raising new varieties of the peach, that when one stone contained two seeds, the plants these afforded were inferior to others. The largest seeds, procured from the finest fruit, and from that which ripens most perfectly and most early, should constantly be chosen. When it is intended to propagate new varieties in this manner, it will be necessary for the gardener to extract the stamina of the blossoms from which he purposes to propagate some days before the farina begins to shed. After young trees have risen from seed, a certain time must elapse before they become capable of bearing fruit, which, it is believed, cannot be shortened by any means of cultivation. Pruning and transplanting are equally hurtful; and no alteration in the character or merits of the future fruit can be effected during this length of time, either by manure or any sort of culture. The young plants should be suffered to extend their branches in every direction, in which they do not interfere with each other in a hurtful manner; and the soil be just sufficiently rich to promote a moderate degree of growth, without exciting the plant to preternatural exertion, which constantly brings on diseases. The soil of an old garden is particularly destructive in this way. The length of time that different sorts of fruit-trees require to attain the age of puberty, admits of great variation. The pear demands from twelve to eighteen years; the apple, from five to twelve or thirteen; the plum and cherry, from four to five years; the vine, three or four; and the raspberry, two years. The strawberry, if its seeds be sown early, affords an abundant crop in the following year; and he has produced several new and excellent varieties of this fruit; but the hautboy strawberry does not seem to propagate readily with the other varieties, possibly belonging to an original distinct sort. He has, however, obtained several offspring from its farina; but they have all afforded a feeble and abortive blossom, and been of little value.

In another paper in the same volume, the same writer, in speaking of raising new and early varieties of the potatoe, says that those who have cultivated early varieties of this plant, must have noticed that they never afford seeds or even blossoms, and that the only mode of propagating them is by the division of their tuberous roots. Also farther, that each variety has been found by experience, when long propagated, to gradually lose some of those good qualities which it possessed in the early stages of its culture; the duration of a variety in the state of perfection, being limited to about fourteen years. A good new variety of an early potatoe is, of course, considered highly valuable by the person who raised it; and as such early varieties, according to any method of culture heretofore practised, can only be gained by chance from seeds of late kinds, they are not very frequently produced. But by the method here directed, seeds are readily obtained from the earliest and best varieties; and the seeds of these may possibly, in successive generations, finally afford much earlier and better varieties than have yet appeared.

The cause of the constant failure of the early potatoe to produce seed has been suspected, and found "to be the preternaturally early formation of the tuberous root, which draws off for its support that portion of sap, which in other

plants of the same sort affords nutriment to the blossoms and seeds."

After taking several methods of placing the growing plants so as readily to prevent this, he found the following to be the best. He fixed strong stakes into the ground, and raised the mould in a heap round the bases of them, in perfect contact with their bottom parts; and then planted on their south sides the potatoes from which seeds were desired. As soon as the young plants were about four inches high, they were fastened to the stakes by means of shreds and nails, and the mould washed away, by a strong current of water, from the bases of their stems, so that the fibrous roots only of the plants entered into the soil. As the fibrous roots of this plant are perfectly distinct organs from the runners, which give existence and subsequently convey nutriment to the tuberous roots; and as the runners spring from the stems only of the plants, which are, in this mode of culture, placed wholly out of the soil, the formation of tuberous roots is easily prevented. Whenever this is therefore done, numerous blossoms will soon appear, and almost every blossom will afford fruit and seeds. It is also suggested as not improbable, that by introducing the farina of the small and very early varieties into the blossoms of those of larger sizes, and somewhat later habits, moderately early varieties, adapted to field culture, and winter use, may be obtained; the value of which to the farmer in the colder parts of the kingdom, whose crops of this root are followed by one of wheat, would be extremely great.

It is likewise stated by Mr. Biggs, in the above work, that the different varieties of the apple-tree may be raised in a ready manner by means of cuttings, and that the trees so produced, "from healthy one-year old branches, with blossom-buds upon them, will continue to go on bearing the very finest possible fruit, in a small compass, for many years. Such trees are also peculiarly proper for forcing, by way of curiosity or luxury, and, it is believed, that they are less liable to canker than when raised by grafting. This has been more than once experienced in the golden pippin, cuttings of which have remained seven years in perfect health, when grafts, taken not only from the same tree, but from the very branch, part of which was divided into cuttings, cankered in two or three years. This mode of raising young apple-trees was discovered by accident, from sticking cuttings of these kinds of trees into the ground, as flower-marks during a wet season, which took root.

In raising new varieties of carnations, much advantage has lately been found from ripening the feed of the old plants by means of placing them in the artificial heat or warmth of some sort of house, frame, or other contrivance of these kinds, as they naturally flower late in the season, and, of course, fully ripe seed can seldom be procured in that way for the purpose.

VARIETIES of Land, in Agriculture, the different sorts or qualities of it, as they relate to the nature and manner of its cultivation, or the uses to which it is applied. Though no general principles are probably yet capable of being laid down in regard to the comparative value or utility of different modes or plans of cultivation, or of the different methods of proceeding in respect to crops that are had recourse to in different cases and situations, as the real nature of it, and the particular circumstances to which it is exposed and liable, in every instance, are not sufficiently known; it is evident that all the less firm, close, and solid sorts of land are not so greatly benefited by much working over, as those of the stiff and cohesive kinds, in which minute division of their parts and full aeration are essentially necessary,

necessary, effects which are produced in the most extensive manner, under the drill practice of culture; but the labour, trouble, and expenditure attending its use, in some cases, may not be adequate to its benefits. Thus, the former and all the dry and less moist sorts of land are commonly well suited for the purposes of tillage and those of sheep-pasture; while the latter and those of the more wet and retentive kinds are more fitted to the raising broad-leaved crops, and those of the artificial and natural grass sorts. Stiff clayey or aluminous lands are mostly best suited for wheat crops, and those of the lime-stone or calcareous descriptions for producing sainfoin and clover crops. The varieties of land, too, are considerable, as they relate to different practices, such as those of draining, watering, and many others. See SOIL, SPRING and SURFACE-Draining, TILLAGE, and WATERING of Land.

VARIGNON, PETER, in *Biography*, was born at Caen, in France, in 1564, and originally intended for the church; but imbibing an early taste for the mathematics, this kind of science became the object of his attention, in the prosecution of which he was discouraged by his relations, who obliged him to devote some part of his time to theology. With the abbé St. Pierre, who studied philosophy in the same college, he formed an intimacy; and they mutually encouraged and aided each other in their favourite studies. The abbé took him to his house, and in order to render him more independent, bestowed upon Varignon out of his own income, which was only 1800 livres a-year, 300. In 1686 the abbé took him to Paris, where he wholly employed himself in the study of mathematics, and where he formed an intimacy with Du Hamel, Du Verney, and De la Hire. From Du Verney he acquired a considerable knowledge of anatomy, whilst in return he taught him the application of mathematical reasoning to that subject. In 1687 Varignon became known by his "Projet d'une nouvelle Mécanique," dedicated to the Academy of Sciences. This treatise was much admired, and served to introduce him to two considerable places, viz. that of geometrician to the Academy of Sciences, and that of professor in the college of Mazarine. In 1690 he published "Nouvelles Conjectures sur la Pesanteur;" and he became one of the most early cultivators of the science of infinitesimals. Of his application and industry we have ample evidence in the volumes of the Academy of Sciences; his papers are numerous, and contain complete theories on the laws of motion, central forces, and the resistance of different media. In 1703 he suffered much from his intense application, which impaired his naturally strong constitution, and reduced him for three years to a very languishing state. His physicians prohibited study, from which, however, he could not totally abstain. Having censured Dr. Wallis for asserting that there are certain spaces more than infinite, ascribed by this celebrated geometrician to hyperbolas, whilst Varignon maintained that they were finite, his criticism was shewn to M. Carré, and by him caused to be printed in the Memoirs of the Academy, without his knowledge. After his recovery, he resumed his application, by republishing his "Projet d'une nouvelle Mécanique" in a new and enlarged form, by an extensive correspondence, and by reading lectures to his scholars in the college of Mazarine, as well as in the royal college, in each of which he occupied a professor's chair. In the latter part of his life, much as he valued peace, he was engaged in a scientific dispute with an Italian monk on the subject of tangents, and the angle of contact in curves. In the two last years of his life he laboured under an asthmatic complaint, which baffled all remedies. At length,

having finished his lecture at the Mazarine college, on the 22d of December 1722, he died suddenly on the following night. His character, says Fontenelle, was as simple as his superior understanding could require. He had no jealousy of the fame of others; for, indeed, he was at the head of the French mathematicians, and one of the first in Europe. In the discharge of every personal and social duty he was conscientiously strict. On the theory of the mathematics few mathematicians have laboured more successfully than Varignon; introducing into this science that mode of generalization which characterises it, simplifying many of its principles, and resolving many questions that had not before been considered; such, especially, as relate to the doctrine of motion. His works, published separately, were "Projet d'une nouvelle Mécanique," 4to. Paris, 1687; "Des nouvelles Conjectures sur la Pesanteur," 12mo. 1692; "Nouvelle Mécanique," 2 tom. 4to. 1725; and his papers in the different volumes of the Academy of Sciences are very numerous. Montucla Hist. des Mathem. Fontenelle's Eloges des Académiciens.

VARILHES, in *Geography*, a town of France, in the department of the Arriège; 10 miles W.S.W. of Mirepoix.

VARILLAS, ANTONY, in *Biography*, was born in 1624 at Gueret, in the Upper La Marche, and upon his settlement at Paris, Gaston, duke of Orleans, made him his historiographer; and in 1655 he obtained a place in the royal library, very favourable for the prosecution of his historical studies. Huet says of him, that no man ever brought to the illustration of French affairs so rich a provision of valuable observations, or so copious a store of domestic narrative. But he adds, that his excellent qualifications were disparaged by his immoderate assurance, which led him to confide in his own conjectures and suspicions, and to relate with as bold assertion things for which he had no authority, and which were altogether fictitious, as if he had been an eye-witness of them. In fact, Varillas was destitute of the most essential and estimable quality of an historian, a love of truth; and this has rendered his voluminous labours of inferior value. His leading object seems to have been the gratification and amusement of his readers. In the prosecution of this object he at first succeeded; his books were much read, and Colbert gave him a pension, which was afterwards withdrawn. In lieu of this, he contented himself with a pension which the French clergy granted him, as the reward of his services to the Catholic cause, obtained for his "Histoire des Révolutions arrivées en Europe en Matière de Religion," a mere party performance, concerning which Menage said to the author, "You have given a history of heresy full of heresies." Bishop Burnet published a critique on part of it, which is said to have prevented Dryden from translating it; a task which was proposed to him, after his conversion to Popery, by James II. Bayle, and many others, have detected the errors and falsifications of Varillas. As his writings, which chiefly relate to French and Spanish history, are scarcely ever read or cited, it is needless to copy their titles. Varillas died in 1696, in easy circumstances, so that he left few legacies for pious purposes. Moreri. Huet. Nouv. Dict. Hist. Gen. Biog.

VARINAS, in *Geography*, a province and city of South America, which in the year 1787 was detached from the government of Maracaibo, and made a separate government, constituted at the expense of those of Venezuela and Maracaibo. The chief has only the title of political governor, although his functions, in the district assigned to him, are the same as those of other governors, in the civil, military, and

religious departments. He has also, like them, a salary of 1000 dollars a-year. In order to secure its defence, a militia was raised in 1803, and a garrison allotted to the city of Varinas, consisting of a company of 77 men. Varinas has been long known in the European markets, from the reputed quality of the tobacco which its territory produces; though it is in fact inferior to that which is raised elsewhere, particularly at Cumanacoa, in the province of Cumana. However, sugar, coffee, cotton, indigo, and in general all the fruits of the torrid zone, find here a soil adapted to each, and their quality is unrivalled. The commodities of this district are transported chiefly by water to Guiana; the shipping-place being five leagues below the city, at a spot called Tocunos. Within the jurisdiction of Varinas are also very large commons, furnishing a number of beeves and mules, that are exported by the Oronoko, or consumed in the province. This city enjoys a tolerably pure air, and its inhabitants are reckoned at 6000. The public edifices consist of one parish church and an hospital. It lies in N. lat. 7° 40', 100 leagues S.E. of Caraccas.

VARIN-KEY, a small island in the Spanish Main. N. lat. 11° 10'. W. long. 83°.

VARIOLA, in *Surgery*, the small-pox. See INOCULATION and SMALL-POX.

VARIOLA *Vaccina*, the cow-pox, sometimes termed by modern medical writers *vaccinia*. See COW-POX and VACCINATION.

VARIOLARIA, in *Botany*, a genus of the *Lichen* family, (see LICHENES,) named from the eruptive aspect of its fructification, resembling the small-pox, or measles, *variole* of modern medical writers.—Perfoon in *Ul. Annal. fasc. 7. 23.* Achar. *Prodr. 27.* Meth. 12. *Lichenogr. 67. t. 5. f. 1—9.* Syn. 129. *Sm. Engl. Bot. 2400.* *Prodr. Fl. Græc. Sibth. v. 2. 305.*—Class and order, *Cryptogamia Algæ. Nat. Ord. Algæ, Lichenes.*

Eff. Ch. Receptacles cup-shaped, with a torn border from the crust, powdery, with a fertile disk beneath.

The whole of this genus was confounded by Linnæus under his *Lichen fagineus*, and *L. lacteus*, so far at least as its species were then noticed. They now amount, in the last work of Acharius, to ten, all of a crustaceous nature, found, some on the trunks of trees, others on rocks or walls, one on the ground. We have several, of British origin, to add to this list.

1. *V. velata*. Veiled Variolaria. Achar. n. 1. (*Lichen velatus*; *Engl. Bot. t. 2062.* *Parmelia velata*; *Turn. Tr. of Linn. Soc. v. 9. 143. t. 12. f. 1.*)—Crust limited, tartareous, thin, rugged, greyish, with a pale edge. Receptacles small, crowded; disk yellowish, veiled with a white membrane; border thick, even, of the substance of the crust.—Found by Mr. W. Borrer, but rarely, on the bark of ash-trees in Suffex. The *crust* is thin, spreading in roundish patches, two or three inches broad, of a greenish-grey, corrugated in the disk, minutely fibrous at the edge. Receptacles numerous, sessile, shield-like, about a line in diameter, pale salmon-coloured, with a thick smooth border, from which a white membrane is drawn across the disk, so as entirely to conceal that part.

2. *V. multipuncta*. Many-dotted Variolaria. *Turn. Tr. of Linn. Soc. v. 9. 137. t. 10. f. 1.* Achar. n. 2. (*Lichen multipunctus*; *Engl. Bot. t. 2061.*)—Crust ash-coloured, warty, rugged, tartareous, thin, with a fibrous edge. Receptacles hemispherical, with a white, aggregate, powdery disk, and smooth, lobed border.—Found, not uncommonly, on the trunks of beeches in Suffex, by Mr. W. Borrer.—Nearly akin to the last, but the *crust* is more of a grey hue, and less uneven, though becoming rugged and

warty by age. It changes nearly to white in drying. *Fructifications* the size of the last, but essentially differing in the want of a separate membranous covering, and in having each *receptacle* marked with three or four depressions, making so many distinct disks, in one thick lobed border. The surface of these disks is white and powdery; their inside pale chestnut.

3. *V. globulifera*. Vesicle-fruited Variolaria. *Turn. Tr. of Linn. Soc. v. 9. 139. t. 10. f. 2.* Achar. n. 3. *Prodr. Fl. Græc. n. 2432.* (*Lichen globuliferus*; *Engl. Bot. t. 2008.*)—Crust spreading, faintly bordered, rugged, greyish with white powdery warts. Receptacles spherical, closed; at length bursting, with a thin ragged border, and blackish disk.—This also was discovered by Mr. W. Borrer, growing on the trunks of beeches and oaks in Suffex, but rarely. Dr. Sibthorp met with it in Greece. The *crust* agrees in appearance with the following, but the globular vesicles, of the size of small peas, scattered over the disk, and each lodging a blackish *receptacle* of seeds, are peculiar to the present species.

4. *V. faginea*. Common Bitter Variolaria. *Perf. in Uff. Ann. fasc. 7. 24.* Ach. Meth. 12. *Prodr. Fl. Græc. n. 2433.* (*V. communis*; Achar. n. 4. *Lichen fagineus*; *Linn. Sp. Pl. 1608.* Achar. *Prodr. 27.* Hoffm. *Enum. 18. A. t. 2. f. 4.*)—Crust cartilaginous, rugged, polished, greyish, bordered with brown. Receptacles prominent, hemispherical, mealy, very white, with a pale, flattish, at length naked, disk.—Very common on the trunks of beech, sycamore, oak, &c. throughout Europe, from Sweden to Greece. The *crust*, in a perfect state is circular, grey or greenish when young, corrugated, but with a smooth polished surface, and circumscribed by a thin border, elegantly coloured with concentric shades of brown. Numerous, prominent, almost stalked, tubercular *receptacles* are scattered over the central part, which are very white, especially in wet weather; powdery and somewhat convex in their disks, with a clumsy indistinct kind of border. By age these, like the *crust*, become of a dirty white. Mr. W. Borrer has first observed a very bitter taste in this species, not immediately perceptible, but after a while very strong, disagreeable and permanent, like the flavour of the *Cyclamen* root. No other species of *Variolaria* has been found to have this bitterness. We know not by what accident the learned Acharius, generally so accurate, has transferred it to our *discoidea*, which he has therefore called *amara*. His specific characters of the two species leave no doubt of what he intends under each, though we do not presume to decide on all his synonyms. This being the case, we do not feel authorized to change the old Linnæan name, though we readily allow that Linnæus here confounded two species.

5. *V. discoidea*. Flat-cupped Variolaria. *Perf. in Uff. Ann. fasc. 7. 23.* Achar. Meth. 14. (*V. amara*; Achar. n. 5. *Lichen discoideus*; Achar. *Prodr. 28.* *Engl. Bot. t. 1714.* *L. fagineus*; Hoffm. *Enum. 19. B, C, D. t. 7. f. 2, 5.* *L. albelcens*; Hudf. 529. *L. carpineus*; Lightf. 807. *Lichenoides candidum et farinaceum, scutellis ferè planis*; *Dill. Musc. 131. t. 18. f. 11.*)—Crust cartilaginous, cracked, somewhat rugged, polished, greyish, bordered with brown; at length powdery. Receptacles flattish, mealy, very white; at length concave, depressed, with a dilated torn border.—This is probably as common as the preceding, with which it has been confounded. The chief mark of distinction consists in the little elevation of its *receptacles*, which, after discharging their powdery contents, become quite concave, with a thin expanded margin. Hence the present plant has been separated by several botanists from *fagineus*, even without their adverting to its insipidity, remarked by Mr.

Borrer, and which obliges us to retain the old name *discoideus*, that of *amara* being only applicable to the former, where it is not wanted. On the trunks of old trees, particularly in wet weather, *V. discoidea* is very conspicuous for its whiteness. No proper *receptacle*, of a different colour from the frond, has been detected in this species.

6. *V. conglobata*. Conglobate Variolaria. Achar. n. 6.—“Crust tartareous, thick, milk-white, plaited and conglomerated, with a smooth cartilaginous surface. Warts of the receptacles close-pressed, of the same colour. Disk powdery. Margin elevated, tumid. Nucleus thick, included, yellowish; flattened above.”—Native of France. This appears by its colour, and the different habit of its parts, to be distinct from all the other known species. *Acharius*.

7. *V. griseo-virens*. Greyish-green Variolaria. Turner and Borrer Lich. Brit. v. 1. 54, unpubl. Engl. Bot. t. 2400.—Crust elliptical, thin, slightly tartareous, rugged, grey, scarcely limited. Receptacles roundish, with a narrow border. Powder greenish.—Gathered by Mr. Borrer, on the smooth cuticle of the bark of birch and cherry trees, in Norfolk. The patches, about an inch or two in length, and half as broad, look like a dirty stain, or some decayed *Lepraria*; but when accurately examined, prove to consist of a continued, rugged, though thin, *crust*, of a dirty greenish-grey, bearing very distinct mealy *receptacles*, of a yellowish rather bright green when wet, bordered with white.

8. *V. Cinchona*. Smooth Green Variolaria.—Crust elliptical, thin, cartilaginous, polished, nearly even, olive-coloured, slightly bordered with black. Receptacles round, white, mealy, with a smooth pale border.—Found on the bark of *Cinchona floribunda* from the island of St. Lucia. Our only specimen is above an inch in diameter, of a brighter more olive-brown than the bark, but otherwise scarcely distinguishable therefrom. The whitish *fructifications*, scattered all over it, smaller than pins' heads, are very conspicuous.

9. *V. aspergilla*. Sprinkled Variolaria. Achar. Meth. 13. Turn. and Borr. Lich. Brit. v. 1. 67. Engl. Bot. t. 2401. (*V. communis* g; Achar. Syn. 131. Lichen aspergillus; Achar. Prodr. 28, excluding the reference to Perfoon.)—Crust orbicular, tartareous, thickish, dull white, wrinkled, with a smooth, white, polished edge. Receptacles scattered, elevated, hemispherical, with an obsolete border. Powder very white.—Found by Mr. Borrer in Suffex, more commonly on rails than on trees. This gentleman and Mr. Turner have, on the authority of an original specimen, determined the synonym of *Acharius*. That learned botanist has sent us, under the same name, what has a different aspect, being whiter and full of cracks; and such may perhaps have induced him to refer his plant to *V. communis* (*faginea*) as a variety. However this may be, our *aspergilla* is infipid, and surely distinct from *faginea*; yet, though like *discoidea* devoid of bitterness, it cannot be confounded with this latter. The edge is polished and white; the rest of a pale greyish or blueish hue, unaltered by moisture. *Receptacles* neither numerous nor crowded, but scattered, convex, very prominent; their border minute, and soon obliterated; their internal *disk*, or *nucleus*, pale flesh-coloured, concealed by the copious white powder, which forms a dense mass, and turns greenish by rubbing.

10. *V. cinerea*. Ash-coloured Variolaria. Engl. Bot. t. 2411.—Crust orbicular, tartareous, thin, ash-coloured, cracked; its circumference indeterminate. Receptacles orbicular, very small, white, with an elevated margin, and a flesh-coloured concealed disk.—Discovered by the Rev. Mr. Harriman, on whinstone rocks, in the county of Durham. We conceive it to be of all things most distinct from the following, with which it is said to have been confounded.

The colour and great tenuity of the *crust*; the want of an expanded or zoned border; the more evident red *nucleus*; and the much smaller *receptacles*; all mark it with precision. The white powder of the latter is easily abraded, and then the *disk* or *nucleus* becomes conspicuous.

11. *V. lactea*. Milky-white Variolaria. Perf. in Uft. Ann. fasc. 7. 24. Achar. n. 7. Meth. 14. t. 1. f. 6. Engl. Bot. t. 2410. Turn. and Borr. Lich. Brit. v. 1. 69, unpubl. (Lichen lacteus; Linn. Mant. 131. Hudf. 526. Wulf. in Jacq. Coll. v. 3. 107. t. 4.)—Crust orbicular, tartareous, thick, white, cracked; thin, polished, zoned and flesh-coloured in the circumference. Receptacles orbicular, very white, with an elevated margin when young.—Found on rocks in the north of Europe. Mr. Harriman's specimen, on whinstone, from Durham, figured in Engl. Bot., shews this elegant species in great perfection. Its diameter is often from three to five inches. The finely granulated, tartareous, cream-coloured central part, is bordered by a broad thin circumference, polished almost like satin, marked with many concentric lines or plaits, and tinged with a delicate flesh-colour at the extreme edge. *Fructification* when young small, and shield-like, with a thick border; but the disk becomes very white, powdery, and much elevated. Mr. Turner found a pale brown *nucleus*, which we have not seen.

12. *V. dealbata*. White-wash Variolaria. Decand. Franco. v. 2. 525? Engl. Bot. t. 2519. (*V. corallina*; Achar. n. 8. Lich. Univ. 319. t. 5. f. 6. Lichen dealbatus; Achar. Prodr. 29. *Ilidium corallinum*, a supposed variety; Achar. Meth. 138. t. 3. f. 7, D, E, bad. *I. paradoxum*; Turn. and Borr. Lich. Brit. v. 1. 97.)—Crust tartareous, thickish, greyish-white, cracked, tumid, papillary and rugged; obscurely zoned at the circumference. Receptacles orbicular, prominent, white, with an aggregate internal disk.—Not rare on rocks in mountainous countries. Differs from the last in having a very narrow, imperfectly zoned, border, and especially in the cylindrical, papillary, erect processes, sometimes in pairs, scattered over the crust. The *receptacles* when young are small, concave, powdery, white cups; but the few which arrive at maturity become raised, convex, the size of hemp-seed, their surface still white and powdery, but finally displaying several little, concave, brownish or flesh-coloured, separate disks. We are not quite free from doubts, as to the plant of *Acharius* being the same as our's, and therefore we would not hastily follow him in altering the name, by which we have already adopted this most distinct and curious species in the English Botany.

13. *V. tiflea*. Georgian Variolaria. Achar. n. 9.—“Crust somewhat tartareous, unequal, white. Receptacles minute, hemispherical, powdery, very white; nucleus lenticular, concealed, afterwards exposed, furrowed with a margin from the crust, and finally deciduous.”—Found on the ground, near Tiflis in Georgia. A minute species. *Nucleus* slightly convex, at length nearly globose. *Acharius*.

14. *V. gaditana*. Spanish Variolaria. Achar. n. 10.—“Crust nearly orbicular, tartareous, continued, rugged, grey, slightly powdery; its circumference somewhat crenate, or partly cylindrical, crowded in the centre, and of the same colour.”—Gathered on walls near Cadiz, by Don Simon de Roxas Clemente. The *warts*, or *receptacles*, whether hemispherical or somewhat cylindrical, become concave with age.

VARIOLITE, in *Mineralogy*, a name given by some mineralogists to porphyritic rocks, in which the imbedded substances

substances are imperfectly crystallized, or are rounded, giving the stone a spotted appearance.

VARIORUM, in *Matters of Literature*, a term or phrase of abbreviation, used for an edition of a classic author, printed in Holland, with the notes of divers authors upon it: *Cum notis variorum*, or *cum selectis variorum observationibus*.

In this sense we say, *Plautus variorum*; a set of Dutch *variorums*, &c. Many of the *variorums* are valuable editions.

The word is the genitive plural of the Latin *varius*, *different*, *divers*.

VARIS, in *Ancient Geography*, a place of the isle of Albion, on the route from Segontium (Caernarvon) to Deva (Chester), between Conovium (Caer-Rhyn) and Deva; supposed to be Bodvay; 32 miles from Deva, or Chester.

VARIUS, in *Ichthyology*, a name used by most authors for a small fresh-water fish, common in brooks and running waters, and well known in England by the name of the *minnow*.

VARIUS *Mus*, in the old authors of *Zoography*, a name used for the same creature they otherwise called *mus ponticus*; which seems to have been no other than the European flying squirrel.

VARIX, from *varius*, *irregular*, in *Surgery*, denotes an uneven swelling of a dilated vein. The tumour is softish, generally not painful, and presents an appearance as if studded with several knobs, or tubercles, which correspond to the valves in number and situation. The diseased vein is also elongated as well as dilated, and describes in its course a variety of windings or convolutions. A particular account of the symptoms, causes, and treatment of this common disease, will be found under the head of **VARICOSE Veins**.

VARIX, in *Animals*, a sort of puffy dilatation or enlargement in some part of a vein, forming a kind of knot. It mostly happens in the veins of the legs, and is of the nature of spavin. It may readily be removed, on its first appearance, by the use of cold solutions, and applications of that sort, frequently applied, and suitable bandages.

VARLER, in *Geography*, a town of Germany, in the bishopric of Munster; 4 miles N.N.W. of Coesfeld.

VARLET. See **VALET**.

VARMAT, in *Geography*, a town of Hungary; 12 miles N.N.W. of Zatmar.

VARMO, a river of Italy, which runs into the Tajaumento, 2 miles N. of Latisfana, in the country of Friuli.

VARNA, in *Ancient Geography*, a town of Asia, in the interior of Media. Ptolemy.

VARNA, in *Geography*, a sea-port town of European Turkey, in Bulgaria, situated on a gulf or bay of the Black sea, to which it gives name, at the mouth of the river Vrana; the see of a Greek archbishop. In the year 1444, Ladislaus, king of Hungary, was defeated and slain by Amurath I. emperor of the Turks, near this town; 144 miles N. of Constantinople. N. lat. 43° 14'. E. long. 27° 10'.

VARNA. See **VRANA**.

VARNAVA, a mountain of Greece, near Athens.

VARNAVIN, a town of Russia, in the government of Kostrom, on the Vetluga. N. lat. 57° 16'. E. long. 45° 14'.

VARNI, in *Ancient Geography*, a people of Asia, in Bactriana. Ptolemy.

VARNISH, or **VERNISH**, *Vernix*, a thick, viscid, glossy liquor, used by painters, gilders, and various other artificers, to give a gloss and lustre to their works, as also to defend them from the weather, dust, &c.

There are divers kinds of varnishes; some of the principal of which are as follow:

VARNISH, *Amber*, is prepared in the following manner: Put four ounces of amber into a crucible, and melt it with a small degree of heat, and pour it out upon an iron plate; when cold, reduce it to powder, and add to it two ounces of drying oil, that is, linseed oil thickened by boiling it up with litharge, and one pint of oil of turpentine, and dissolve the whole together into a liquid varnish.

This simple amber varnish is of great use for many purposes, and is said to be the basis of the fine varnishes which we see on coaches, and may be prepared without drying oil, by boiling the powder of amber in linseed oil, or in a mixture of linseed oil and oil of turpentine. Drying oil is commonly used by the workmen; but Dr. Lewis thinks it more eligible to take the oil unprepared, that the boiling requisite for giving it the drying quality may be employed at the same time in making it act upon the amber. It has generally been thought, that amber will not at all dissolve in oils, till it has suffered a degree of decomposition by fire. But Hoffman relates an experiment, in his *Observationes Physico-Chemicæ*, which discovers the solubility of this concrete in its natural state. Powdered amber, with twice its quantity of oil olive, was put into a wide-mouthed glass; and a digester, or strong copper vessel, being filled about one-third with water, the glass was placed in it, the cover of the digester screwed down tight, and a moderate fire continued an hour or more: when cold, the amber was found dissolved into a gelatinous, transparent mass. In Dr. Stockar's *Specimen Inaugurale de Succino*, printed at Leyden in 1760, we have an account of other experiments made by himself, in conjunction with M. Ziegler of Winterthur; from which we learn, that by continuing a simmering heat twelve hours, and confining the vapour as much as stone-ware vessels would bear without burbling, (the danger of which was avoided by making a small notch in the cork-stoppers,) powdered amber dissolved perfectly in expressed oils, in turpentine, and in balsam of copaiba: a strong copper vessel, with a cover screwed on it, seems most eligible; and for the greater security, a valve may be made in the cover, kept down by a spring, that shall give way before the confined vapour is of sufficient force to endanger burbling the vessel. Moreover, by digestion for a week in close-stopped glass vessels, in which the compressure could not be very great, solutions equally perfect were obtained. The solution in rape-seed oil, and in oil of almonds, was of a fine yellowish colour; in linseed oil, gold-coloured; in oil of poppy-seeds, yellowish-red; in oil olive, of a beautiful red; in oil of nuts, deeper coloured; and in oil of bays, of a purple-red. The solutions made with turpentine and with balsam of copaiba, were of a deep red colour, and on cooling, hardened into a brittle mass of the same colour. All the solutions mingled perfectly well with spirit of turpentine. Those made with the oils of linseed, bays, poppy-seeds, and nuts, and with balsam of copaiba and turpentine, being diluted with four times their quantity of spirit of turpentine, formed hard, tenacious, glossy varnishes, which dried sufficiently quick, and appeared greatly preferable to those made in the common manner from melted amber.

An amber varnish may also be made by boiling down some colophony, or turpentine, till it becomes black and friable, and melting this in a glazed earthen vessel, sprinkling in, by degrees, thrice as much amber in fine powder, with the addition of a little spirit or oil of turpentine now and then. When the amber is melted, sprinkle in the same quantity of sarcocolla, continuing to mix them, and to add more spirit of turpentine, till the whole becomes fluid; then strain out the

clear through a coarse hair bag, pressing it gently between hot boards. This varnish, mixed with ivory-black in fine powder, is applied, in a hot room, on the dried paper paste of which the *papier mâché* is made; which is then set in a gently heated oven, next day in a hotter oven, and the third day in a very hot one, and let stand each time till the oven is grown cold. The paste thus varnished is hard, durable, glossy, and bears liquors hot or cold. Lewis's Com. Phil. Techn. p. 367.

An amber varnish may be otherwise made by melting eight ounces of Chio turpentine, and when fluid, pouring into it, by degrees, a pound of fine powdered amber, and stirring it; and when it is properly mixed, setting it on a fire for half an hour, taking it off, and stirring it well, and adding to it two ounces of the white colophony. It is again to be put on a brisk fire, and covered close; when the mass is perfectly fluid, and taken off to cool, a pound of linseed or poppy oil, made drying, is to be poured in boiling hot, and stirred till it be incorporated with the mass; and then a quart of hot turpentine is to be added, and the whole well stirred. Let it then cool, and strain it off for use; when, if it has been properly made, it will be quite clear. See GILDING on *Enamel and Glass*.

VARNISH, *Black*, for japanning on wood or leather, is prepared by mixing lamp-black or ivory-black with a proper quantity of a strong solution of gum lac in spirit of wine. (See JAPANING.) The lamp-black is commonly preferred to the ivory-black, on account of its uniting better with the fluid, and working smoother. The thicker part of the varnish, which settles at the bottom, is used with the lamp-black for the first coatings, and the mixture applied at different times, in a hot room, one layer after another, is dry, till a full body of colour is obtained; after which, the piece is washed over in the same manner several times, with the finer part of the varnish, just tinged with the black, so as to make a coating of sufficient thickness to bear polishing with tripoli. Iron snuff-boxes, mourning buckles, &c. are coloured black, by making them considerably hot, and applying on them in this state a thick mixture of lamp-black, with a certain varnish called gold-size, consisting of drying oil, turpentine, and the pigment called Naples yellow; but the yellow might be omitted, and the varnish formed at once by mixing lamp-black with a proper quantity of turpentine and drying oil. The workmen, as Dr. Lewis says, frequently employ, as varnish for metals, a mixture of lamp-black, with the scummings, &c. of different oil paints; the mixture is applied with a pencil, and the piece afterwards baked in an oven with a heat somewhat greater than is used for the *papier mâché*. Naples yellow, a superfluous ingredient in the black varnish, is the basis of the dark-brown which we see on some iron snuff-boxes; this pigment changing to a brown in baking with the varnish. Lewis. See LACQUER.

The excellent black varnish of China and Japan, which has been hitherto but imperfectly imitated in Europe, and which was formerly thought to be an artificial composition of resinous bodies coloured with black pigments, has been discovered by the later travellers into those countries, to be a native juice, exuding from incisions made in the trunks of certain trees. Mr. Miller, in consequence of a letter from the abbé Mazeas to Dr. Hales, containing a communication of the discovery of a plant by the abbé de Sauvages, which he calls *toxicodendron Carolinianum foliis pinnatis, floribus minimis herbaceis*, and the black juice of which adheres, without the least acrimony, to cloth with more force than any other known preparation, takes occasion to shew, that this American toxicodendron is the same species of plant from which

the inhabitants of Japan procure the varnish with which they stain all their utensils; adding, that the Calicuts are also painted with the juice of this shrub. This American toxicodendron (see *Poison-Tree*) is the same plant, as he affirms, which is mentioned by Kämpfer, in his *Amœnitates Exoticæ*, by the title of *arbor vernacifera legitima, folio pinnato juglandis, fructu racemoso cicicis facie; i. e.* the true varnish-tree, with a walnut-tree leaf, and a branching fruit like cicers. It is called by the inhabitants of Japan *sitz*, or *lesitz-dju*, and also *urus*, or *urus-noki*. Kämpfer has also described the wild or spurious varnish-tree, called *safi-no-ki* by the natives, which he says agrees with the other in every part, except that the lobes of the leaves are narrower; but Mr. Miller is of opinion that this is a distinct species, if not a different genus, from the true sort; and says, that the varnish yielded by it is of little esteem. The account which the Jesuits at China have given of the manner in which the varnish is procured, is as follows: they first slit the back of the branches of the shrub, in different places, with a knife; and thus there flows out a white clammy juice, which is received into wooden vessels; and when these become dry, they tap the stems of the shrubs near the roots, so that all the juice is drawn out of them. The shrubs are then cut down to the ground, and from their roots new stems arise, which in three years will be fit for tapping. The juice turns black when exposed to the air; it heats without turning sour; but being of a poisonous nature, it is dangerous to handle it. This native varnish wants hardly any preparation; but if any dirt should happen to mix with it, it is cleansed by being strained through coarse gauze, put into wooden vessels, and covered with an oil called *toi*, and a skin, in order to prevent its evaporating. In this state it is carried over to China and Japan for sale. The shrub is chiefly cultivated in the provinces of Tsi-kocko and Figo; and the best varnish, according to Kämpfer's account, is produced about the city Jassino; but there is an ordinary sort of varnish, called *nam-rak*, brought from Siam, which is collected in the province of Corfama, and in the kingdom of Cambodia, from the tree *anacardus*, called by the inhabitants *tong*, or *tue-rak*, the fruit of which is called in our shops *anacardium*. To collect this liquor, they bore a hole in the trunk, and insert a tube. By this method they procure as much of it as is sufficient, not only to varnish all the utensils of China, Tonquin, and Japan, but it is even exported in close wooden vessels to Batavia, and other parts of India. This varnish, says Kämpfer, is not only sold quite pure, but likewise coloured, with Chinese native cinnabar, and a kind of red earth, which the Dutch formerly, but now the Chinese bring them, and also with the materials of which they make their common Japan ink. Mr. Ellis has controverted the opinion of Mr. Miller, and endeavoured to shew that the American toxicodendron is not the same with Kämpfer's *arbor vernicifera legitima*; alleging, that Kämpfer's description of the true varnish-tree does not agree with this toxicodendron; and he inclines to the opinion, that the Carolina pinnated toxicodendron, or poison-ash, is the same with the *safi-no-ki*, or spurious varnish-tree of Kämpfer. Mr. Ellis also thinks it is not improbable, that the varnish mentioned by Kämpfer, as obtained from the oriental *anacardium*, is the same with that mentioned by father d'Incarville, in the *Phil. Trans.* vol. xlvi. p. 254, called *toing-yeou*; which is so universally used in China for preserving and ornamenting their furniture. See this controversy between Mr. Miller and Mr. Ellis at large, in *Phil. Trans.* vol. xlix. part i. p. 157—166. part ii. p. 806—876. vol. l. p. 430—456. See POISON-TREE, LINEN, and JAPANING.

VARNISH, *Brown*, for Metals. See *Black VARNISH*, supra.

VARNISH,

VARNISH.

VARNISH, Copal Oil, called in France *vernis martin*, is made by pouring into a well-glazed strong earthen pot, in shape resembling a chocolate pot, and in size large enough to hold about a gallon, and made warm, four ounces of Chio or Cyprus turpentine, and when this is dissolved, eight ounces of finely powdered amber; mingling them well, and setting them on the fire for a quarter of an hour; take off the pot, and pour gently into it a pound of copal, finely bruised, but not powdered; stir the mass, and add four ounces of Chio turpentine, and a gill of warm turpentine oil; then set it on a brisk fire for about half an hour, and taking it off, stir the contents well, and add two ounces of the finest and whitest colophony. Let the pot be put on a very brisk fire, and remain till the whole is dissolved, and become as fluid as water; let it be removed from the fire, and remain for a few minutes, and then gradually pour in twenty-four ounces of poppy, nut, or linseed-oil, made drying, and boiling hot, and stir the mass with a deal stick. When the gums and oil are thoroughly incorporated, set them over the fire for a few minutes, still stirring them about, and let them boil once up; and having taken off the pot, pour into it a quart of hot turpentine; stir them together, and give them one boil up; take off the pot, and pour into it a pint more of hot turpentine, still stirring it well. If the gums are thoroughly melted, and well incorporated, the varnish is made; which, being cool, is strained through a close cloth into another vessel, and, if it be too thick, thinned with oil of turpentine, till it becomes of the consistency of linseed-oil; strain it a second time, bottle it for use, and let it stand a month, at least, before it is used. This varnish is used for coaches, cabinets, &c.; and the piece, whatever it be, after having been varnished smoothly, and dried in the intervals half a dozen times, and suffered thoroughly to dry, must be rubbed with a wet coarse rag, dipped in pumice-stone, powdered and sifted, till the streaks of the brush and all blemishes are removed. When it is perfectly smoothed, washed, and dried, the coats of varnish are to be repeated, for ten or twelve times, till there be a sufficient body. After having again used the powdered pumice-stone, and washed it off as before, let it be rubbed with fine emery, till the surface becomes even and smooth as glass; then with powder of fine rotten stone, till by passing the palm of the hand two or three times over the same place, you discover a gloss equal to that of glass: having dried it clean, dip a rag, or piece of flannel, in sweet oil, and rub the surface a few times over, and clear it off with fine dry powder, flour, or the hand; and a piece of fine flannel, dipped in flour, and rubbed over it, when cleared of the oil, will give it an excellent lustre. Between every coat of varnish it will be advisable, if the subject admits of it, to set it in a warm oven; or to heat the varnished pieces by stoves. See **COPAL**.

VARNISH, Gold-coloured. See **LACQUER**.

The composition of a gold-coloured varnish, used by the English artists for brass and silver, was communicated to some of the French academicians in 1720, by Mr. Scarlet, and in 1738 by Mr. Graham, and published in the volume of the French Memoirs for 1761. It is as follows: Take two ounces of gum lac, two ounces of yellow amber, forty grains of dragon's blood in tears, half a drachm of saffron, and forty ounces of good spirit of wine: infuse and digest in the usual manner, and then strain through a linen cloth. The piece to be varnished must be heated before the liquid is applied: it receives from the varnish a gold colour, and may be cleaned, when sullied, with warm water.

VARNISH for preserving polished Iron from Rust. See **IRON**.

Many methods have been used for preserving iron utensils from rust, as animal fats, oils, boiled oil mixed with melted lead, &c. Hornberg's salve for this purpose consists of two pounds of hog's-lard, an ounce of camphor, and as much black lead as will render the mixture of an iron-colour; when this is used, the iron must be previously heated. M. Reaumur has discovered a better composition for this purpose: it is oil, inspissated by being exposed to the air in flat shallow vessels, so as just to cover the bottom, mixed with a solution of copal in spirit of wine: this forms an elegant hard varnish, which, rubbed on polished iron, made a little hotter than the hand can bear, will cover it with a solid, thin, transparent coat, without any injury to its colour or appearance. See **RUST**.

VARNISH, Lacca, is made of gum lacca and spirit of wine, frequently shaken till the gum be dissolved, then strained, and the clear liquor decanted off.

The lacca ought to be of the kind called seed lacca. (See **LAC**.) Three ounces of this, well purified by repeated ablution of water, dried and powdered grossly, should be put into a bottle with a pint of rectified spirit of wine, so as to fill about two-thirds of it, and the bottle placed in a gentle heat; proceeding as above: though for varnishing ordinary woods, shell lacca is often used. For this purpose, five ounces of the best shell lacca should be grossly powdered, and put into a bottle, holding about three pints or two quarts, with one quart of rectified spirit of wine; and placed in a gentle heat: the mixture must be filtered through a flannel bag. To this varnish, the colours used in varnish painting may be added, and properly diluted with rectified spirit, and kept in phials, or tin vessels closely stopped for use. But this will not stand against the weather.

For various preparations of this kind, see **JAPANING** and **LACQUER**.

VARNISH, Mastich, is made by putting five ounces of powdered mastich into a proper bottle, with a pound of spirit of turpentine, and setting them to boil in balneo Mariæ, till the mastich be dissolved, and straining the solution through flannel. This varnish may be converted into a proper varnish for painting, by grinding one ounce of gum anime on a stone with water, till it becomes an impalpable powder; then drying it, and grinding it again with half an ounce of turpentine, and afterwards with the proper colours, and moistening it with the mastich varnish, till the mixture be of a due consistence for working with the pencil. It must then be kept in phials or tin vessels, and diluted, as there may be occasion, with spirit of turpentine.

VARNISH for preserving Paintings. See **PICTURE**.

For this purpose some have recommended the following composition: viz. half a pound of gum sandarac; an ounce and a half of Venice turpentine; three-quarters of an ounce of each of the gums anime and copal; half an ounce of mastich; benzoin, gum elemi, and white resin, each two drachms, and one pound of rectified spirit. The benzoin and gum anime powdered, are put with the Venice turpentine into a phial, with eight ounces of the spirit of wine; the copal and resin powdered are also put in a phial with six ounces, and the powdered gum elemi, with two ounces of spirit of wine. The several phials are frequently shaken, till the gum, &c. are dissolved; then the solutions are strained through a fine linen in one bottle, and when the mixture has stood some days, it is decanted off clear, and kept in a separate bottle for use. Some have substituted the sarcocolla for the copal. Another composition is formed, by dissolving mastich and sandarac, grossly powdered,

dered, of each six ounces, and Venice turpentine half an ounce, in a quart of highly rectified spirit of wine, and straining off the solution. If it be required harder, an equal weight of the gums anime and copal may be added, and the quantity of spirit of wine doubled. In the use of this varnish, the painting should be thoroughly dry, and it should be spread very gently with a pencil. The varnish should be laid on in a very warm place, or the picture itself warmed to a moderate degree, in order to prevent the *chilling* of the varnish; in which case another coat should be added. And, indeed, two or three coats are necessary to preserve the painting, and to bring out a due effect of its colours, if they are in that state called *sunk in*, occasioned by the attraction of the cloth on the oils mixed with them. An oil of turpentine varnish may be added by grossly powdering mastich and sandarac, of each four ounces; two ounces of white resin; and sarcocolla, anime, copal, and olibanum, of each one ounce; and putting them into a phial with two pounds of oil of turpentine, stopping the phial gently, and placing it in any heat, so that the mass may not boil, and straining off the solution for use. Or, a varnish more simple, and equally good, may be made by powdering two ounces of sandarac, mastich and olibanum, of each an ounce and a half; or three ounces of mastich, and Venice turpentine half an ounce; and dissolving them in half a pound of oil of turpentine, and proceeding as before. *Handmaid to the Arts*, vol. ii. p. 227, &c.

VARNISH for Paper-hangings. See PAPER-Hangings.

VARNISH for Printers' Ink. See PRINTING-Ink.

VARNISH, *White*, is usually made of gum sandarac and gum mastich, dissolved in spirits, left to settle two days, then strained through a linen cloth, and, after standing some time, the clear poured off, and bottled for use.

The more curious artists dissolve the two gums separately; and having made a separate varnish of each, mix them occasionally, as their work requires a stiffer or a softer varnish.

But for the *best* white varnish more gums are required; *viz.* Venice turpentine, gum copal, elemi, benzoin, anime, and white resin.

Besides these, there are *hard* and *soft* varnishes, or grounds, used by the etchers and engravers. See ETCHING.

VARNISH is also used for a kind of glossy coat, with which potter's-ware, Delf-ware, China-ware, &c. are covered, to give them a smoothness and lustre. Some preparation of lead is the varnish ordinarily used for the first; and earths for the second. See GLAZING and POTTERY.

The true varnish used by the Chinese and Japanese, to give that inimitable lustre to their porcelain, is one of the grand secrets in that manufacture; and is one of the great things wanting, to make Delf and French ware vie with the Chinese. Several have described the preparation of it, particularly Kircher: but none ever succeeded in the trial. See PORCELAIN and VARNISH, *supra*.

VARNISH is also a term applied to the colours which antique medals acquire in the earth.

The value of a medal is heightened by a beauty, which nature alone was able to give, and art has never yet attained to counterfeit: we mean the colour or varnish with which certain soils tinge the medal; some with a blue, almost as beautiful as that of a turcois; others with an inimitable vermilion colour; and others with a glossy shining brown, infinitely beyond any of our figures in bronze.

The most usual varnish, however, is a fine green, which hangs to the most delicate strokes without effacing them; much more accurately than the finest enamel does on metals. Brass alone is susceptible of it; for as to silver, the green

rust that gathers on it, always spoils it; and it must be scoured off with vinegar, or lemon juice.

There is also a *false*, or *modern* varnish; which the falsifiers of medals give to their counterfeits, to give them the air of antiquity: it is discovered by its being softer than the natural varnish, which is as hard as the metal itself.

Some lay their spurious medals under ground, where they contract the degree of varnish, that they impose on the less knowing: others use sal ammoniac, mixed with vinegar; others the acid spirit of nitre, &c.

VARODOPA, or VERODOPA, in *Ancient Geography*, a province in the environs of Macedonia, according to Eutropius. Ortelius makes it a country of Thrace, writing it *Rodopa*.

VAROE, in *Geography*. See VÆIROE.

VAROLI, COSTANZO, in *Biography*, was born at Bologna in 1542, and became a professor of physic and surgery in his native city. In 1572 he was invited by pope Gregory XIII. to settle at Rome as his first physician, and professor in the college of Sapienza. He was advancing in reputation by his anatomical discoveries, as well as in his practice of medicine and surgery, when a premature death cut him off in 1575, in the 33d year of his age. He was particularly distinguished in the anatomy of the brain, which he described in his work "De Nervis Opticis nonnullisque aliis præter communem Opinionem in Humano Capite observatis Epistola ad Hieronymum Mercurialem," Patav. 1570. Among the parts of the brain which he discovered, or more accurately described, was that known by his name, the "Pons Varoli," formed by the union of the crura cerebri and cerebelli, and the place whence several nerves originate. After his death was published "De Resolutione Corporis Humani," a work which is a compendium of anatomy, chiefly according to the ancients, but with several new observations by himself. Haller. Eloy.

VAROLI Pons, in *Anatomy*. See PONS.

VARORE, in *Geography*, a town of Hindoostan, in Baramaul; 14 miles N.N.W. of Darempoury.

VAROTARI, DARIO, in *Biography*. See PADUANINO.

VARPA, in *Geography*, an island near the N.E. coast of Sumatra, about 30 miles in circumference. S. lat. $0^{\circ} 36'$. E. long. $103^{\circ} 25'$.

VARRO, MARCUS TERENCE, in *Biography*, the most learned of the ancient Romans, received from Pompey the Great, in the piratical war, a naval crown, and joined this chief in the civil war against Cæsar; but afterwards submitting to the latter, he was employed by him in making a collection of books for the public library which he proposed to establish at Rome. The death of Cæsar prevented the accomplishment of this design; and Varro, being involved in the proscription by the triumvirates, escaped with his life, but with the loss of his library. After the restoration of tranquillity, he retired for the prosecution of his studies, and composed books till his 88th year. His life was prolonged to the age of 90, and he died about the year B. C. 27. He is highly extolled for his various talents and literary performances by ancient writers, and particularly by Cicero in his "Academics." Aulus Gellius cites a passage from Varro, in which he declares of himself, that to the 78th year of his life he had composed 490 books, and he continued to write to his 90th year. The subjects on which he wrote, as we learn from Fabricius, were grammar, eloquence, poetry, the drama, history, antiquities, philosophy, politics, agriculture, nautical affairs, architecture, and religion. He was also the first Latin author of that species of satire called the Menippean, from Menippus, a Greek, its inventor, which was written in prose, with a mixture of verse in different measures. (See MENIPEAN.)

MENIPEAN.) Such and so pre-eminent was the reputation of Varro, that when Afinius Pollio, in the reign of Augustus, opened the first public library at Rome, and placed in it the effigies of various learned persons, he was the only living writer who had the honour of this distinction. The only relics of his numerous works are six books, in an imperfect state, out of twenty-four, which he composed on the Latin language, with three books on agriculture, and a few fragments of his satires and epigrams. The former are printed among the "Auctores de Lingua Latina," and the latter among the "Auctores de Re Rusticâ."

A contemporary of the preceding, named P. TERENTIUS VARRO ATACINUS, has been confounded with him. He was a native of Atace in Gallia Narbonnensis, and wrote an esteemed poem "De Bello Sequanico," and translated into Latin verse the "Argonautics of Apollonius Rhodius." Some fragments of his poetry are published in the "Corpus Poet. Latin." Vossius. Tiraboschi. Gen. Biog.

VARRONIA, in Botany, is so called in memory of MARCUS TERENTIUS VARRO, (see that article,) whose treatise *De Re Rusticâ* has procured him this botanical tribute. The name originated with Browne, but was speedily adopted by Linnæus and Jacquin.—Browne Jam. 172. Linn. Gen. 102. Schreb. 140. Willd. Sp. Pl. v. 1. 1079. Mart. Mill. Dict. v. 4. Jacq. Amer. 40. Ait. Hort. Kew. v. 2. 11. Juss. 129. Lamarck Dict. v. 4. 262. Illustr. t. 95.—Class and order *Pentandria Monogynia*. Nat. Ord. *Asperifolia*, Linn. *Borragineæ*, Juss.

Gen. Ch. Cal. Perianth of one leaf, inferior, tubular, with five long, slender, recurved teeth, permanent. Cor. of one petal, tubular; tube cylindrical; limb in five deep spreading segments. Stam. Filaments five, awl-shaped, the length of the corolla, inserted into its tube; anthers oblong, incumbent. Pist. Germen superior, ovate; style thread-shaped, the length of the corolla; stigmas four, bristle-shaped. Peric. Drupa ovate, of one cell, inclosed in the swelling calyx, but not connected with it. Seed. Nut roundish, of four cells.

Eff. Ch. Corolla five-cleft. Calyx tubular. Drupa superior, covered with the permanent calyx. Nut of four cells.

A West Indian genus of shrubby plants, with simple, alternate, rarely almost opposite, rough leaves; and terminal, aggregate, rather ornamental, flowers. They are little known in our stoves, nor has any one species as yet been exhibited in our popular periodical works. *Varronia* is next akin to *TOURNEFORTIA* (see that article); but the less deeply divided calyx, and four slender stigmas, are sufficient to mark the present genus, without adverting to their fruits, which are not in all cases well understood.

1. *V. lineata*. Round-spiked *Varronia*. Linn. Sp. Pl. 275. Willd. n. 1. Ait. n. 1. Swartz Obs. 87. (*V. fruticosa*, foliis rugosis, ovatis, subhirsutis, ferratis, alternis, capitulis subrotundis; Browne Jam. 172. t. 13. f. 2. *V. humilis*; Jacq. Amer. 41. Ulmi angustifoliae facie Bacifera jamaicensis, foliis supernè scabris subtis villosis, floribus flavis perpusillis, fructu botryoide monospermo; Pluk. Almag. 393. Phyt. t. 328. f. 5.)—Leaves lanceolate, minutely hairy, marked with straight depressed veins. Flower-stalks mostly axillary, combined with the footstalks. Spikes globose.—Common in the lower woody lands of Jamaica. The stem is three or four feet high, with many slender, round, downy, crooked, entangled, leafy branches. Leaves spreading, or rather dependent, two inches long, taper-pointed, distantly and irregularly ferrated; roughish, like a very fine file, with minute rigid hairs, above; densely downy and hoary beneath. Footstalks hairy, a quarter of

an inch long, united for half their length, to the base of each simple, solitary, downy flower-stalk, which is about half the length of the leaf, and bears a round head of small whitish or yellowish flowers. Plukenet's figure is a much better representation of the Linnæan specimen from Browne himself, than his own plate, particularly with respect to the situation of the flowers. We cannot but suspect some error, and that the said plate may represent a species not hitherto well defined.

2. *V. bullata*. Blistered *Varronia*. Linn. Sp. Pl. 276, excluding Jacquin's synonym. Am. Acad. v. 5. 394. Willd. n. 2. Swartz Obs. 88?—Leaves ovate, veiny, rugose, rough with callous tubercles and bristles. Spikes globose, on long rough stalks, from the forks of the stem.—Native of Jamaica. The Linnæan specimen is from Browne, but does not answer to the description of either of his species. The branches are forked, extremely rough with minute warts, and rigid ascending bristles, as are likewise the footstalks and flower-stalks. Leaves an inch and a half or two inches long, about four times the length of their stalks, nearly elliptical, acute, ferrated, reticulated with copious veins, and minutely blistered in the interstices; besprinkled on the upper side with callous tubercles and bristles, which turn white by age, when the leaf becomes tawny; paler, with hairy veins, beneath. Flower-stalks from the forks of the branches, solitary, from one inch to two inches and a half long, erect, simple, very rough, quadrangular upwards. Spike globose, of six or eight flowers. Calyx corrugated, bristly, with linear recurved teeth. Corolla not much longer than the tube of the calyx, with five plaits in the limb. Fruit tuberculated. Many doubts have arisen respecting this species. What we have here, with all possible precision, described, is certainly the Linnæan authentic specimen, which we should suspect to be the *Lantana Radula* of Swartz, Ind. Occ. 1057. Willd. Sp. Pl. v. 3. 317, to judge at least by the description, not having seen the plant. Nevertheless our's has the calyx and corolla of a *Varronia*, and the habit of the plant is so near *V. mirabiloides*, as figured by Jacquin, that Linnæus may well be excused for supposing them one and the same. In the Linnæan herbarium are two other specimens, sent by Rolander, and marked likewise *V. bullata*. It must be to these that Swartz alludes, when he says, in his Obs. 88, "there is a specimen of *V. globosa* in Herb. Linn. under the name of *bullata*." Whether this be correct or not, these have never been described as *bullata*, though, by mistake, so named.

3. *V. mirabiloides*. Salver-flowered *Varronia*. Jacq. Amer. 41. t. 33. Willd. n. 3. Ait. n. 2. Swartz Ind. Occ. 465.—Leaves ovate, rough, ferrated. Spikes roundish, unequal. Corolla salver-shaped; its tube thrice the length of the calyx.—Native of Hispaniola, even in hedges near the town of Port-au-Prince. Jacquin. The most elegant of its genus, often twelve feet high. Leaves two inches long, rough on both sides. Flower-stalks lateral and terminal, measuring three or four inches, and bearing each a simple or divided round-headed spike, of numerous white inodorous flowers, very handsome, the size of Marvel of Peru. Segments of the calyx small, ovate, ending in long bristles. Drupa red, the size of a pea, full of sweet glutinous pulp. Nut depressed. Such is the plant of Jacquin, and we must suppose Swartz's the same, in spite of some slight incongruities of description. We have never seen either.

4. *V. martinicensis*. Martinico *Varronia*. Jacq. Amer. 41. t. 32. Willd. n. 4. Ait. n. 3.—Leaves ovate, pointed. Spikes oblong, dense. Calyx-teeth linear, half the length

of the tube.—Native of Martinico. Sent to Kew by Sir Joseph Banks, in 1795. It is said to flower in the stove about August and September.—A *shrub* as tall as a man; the young *branches* only roughish with close-pressed hairs. *Leaves* three inches long, sharply serrated; rough above, with minute depressed hairs; soft and downy at the back. *Flower-stalks* solitary, a little above each fork of the branch, silky, an inch and a half long, each bearing a dense *spike*, about an inch long, of many funnel-shaped, probably white, *flowers*. *Calyx* silky, with broader and shorter teeth than any of the foregoing.

5. *V. globosa*. Globose Varronia. Linn. Sp. Pl. 276. Willd. n. 5. Jacq. Amer. 41. — “Leaves lanceolate-oblong. Stem forked. Flower-stalks axillary, elongated, naked. Spikes globose.—Native of the West Indies. An obscure species, of which we can give only the Linnæan specific character, the author of which adds *pedunculus e dichotomiâ nudus*; meaning, probably, that whenever a *stalk* springs from the fork of the *stem*, it is unaccompanied by a leaf. Linnæus further says, that the *calyx-teeth* are long, linear, and recurved. Whether the specimen above-mentioned from Rolander (see n. 2.) be this species or not, we have no authority to say. Sir Joseph Banks has favoured us with what he considers as *V. globosa*, from Von Rohr, which may be the same; the *leaves* and serratures are much blunter, but hardly enough to make a specific distinction.—In this the *leaves* are scarcely above an inch long, rough and rather hoary, especially beneath, as are also the *branches* and *footstalks*. *Flowers* numerous, in dense, globular, silky, stalked heads, either from the forks of the younger branches, or each opposite to a leaf. *Calyx-teeth* as described by Linnæus.

6. *V. curassavica*. Long-spiked Varronia. Linn. Sp. Pl. 276. Willd. n. 6. Jacq. Amer. 40. n. 1. Swartz Obs. 88? (*V. affurgens* farmentosa, foliis et capitulis oblongis; Browne Jam. 172?)—Leaves elliptic-oblong, minutely toothed. Spikes oblong. *Calyx-teeth* triangular, slightly pointed.—Sent by Von Rohr from the West Indies, and given us by the late Mr. Dryander, as the authentic plant of Jacquin, compared doubtless with his specimen. Yet the *calyx-teeth* have less evident points than he describes, and the *spikes* are rather lax. Whatever our intelligent friend Dr. Swartz may have had for *V. curassavica*, we can assert that our's is certainly distinct from *martinicensis*. (See his Obs. 88.) Jacquin describes it fifteen feet high, with round rough *branches*, rusty when old. *Flowers* small, white, without scent, in dense terminal *spikes*, two or three inches long. *Drupa* small, red.

7. *V. angustifolia*. Narrow-leaved Varronia. Willd. n. 7. “West. St. Cruc. 202.”—“Leaves linear, rough, somewhat toothed. Spikes linear-oblong.”—Native of Santa Cruz. A *shrub*. *Leaves* lanceolate-linear, obtuse, revolute, rough above; downy beneath. *Willdenow*.

8. *V. alba*. White-fruited Varronia. Linn. Sp. Pl. 276. Jacq. Amer. 41. Willd. n. 8. (*Mespilus americana*, alni vel coryli foliis, fructu mucaginoso albo; Comm. Hort. v. 1. 155. t. 80.)—Leaves heart-shaped, pointed, flowers cymose.—Native of South America, about Carthagen and in Curassow. A *tree*, often thirty feet high, with an ample spreading head, and a trunk six inches in diameter; though in hedges it is scarcely more than a *shrub*. *Leaves* four or five inches long, serrated, rough; somewhat heart-shaped at the base. *Cymes* large, not uncommonly extending six inches, of numerous, whitish, scentless *flowers*. *Calyx* at first entire, but, as the *corolla* protrudes, it is pushed aside horizontally, splitting into two valves, the upper withering, the under permanent, and the margin is seen to have five

very slight teeth. Limb of the *corolla* bell-shaped. *Drupa* oblong, measuring half an inch, whitish, semipellucid, sweet, but inlipid and glutinous, eaten by the inhabitants of Curassow. *Nut* oblong, striated, black.

9. *V. monosperma*. Single-seeded Varronia. Jacq. Hort. Schoenbr. v. 1. 18. t. 39. Willd. n. 9.—Leaves ovate; entire at the base. *Cymes* lateral. *Flowers* capitate.—Native of the Caraccas. It flowered in the stove at Schoenbrun all summer long, and bore fruit. The *stem* is twelve feet high. *Leaves* three inches in length, stalked, serrated from about the middle only. *Flowers* small, white, in little globular heads, collected into stalked cymes, which spring laterally from the branches, about half way between the leaves. *Calyx-teeth* triangular, scarcely pointed. *Corolla* bell-shaped, abrupt, crenate. *Stigmas* dilated, obtuse. *Drupa* scarlet, the size of a pea. There being but one kernel, is probably owing to the plant not being in a natural situation, and therefore is wisely omitted by Willdenow in the specific character. For the same reason, the name may probably prove exceptionable.

In studying this genus, we cannot but observe that the species are not so distinctly known, nor so well defined, as could be wished, nor do we pretend to have placed them all beyond the reach of uncertainty, our materials being, in several instances, defective on the score of authority.

VARRONIAN SATIRE. See SATIRE.

VARS, in *Geography*, a town of France, in the department of the Charente; 6 miles N. of Angouleme.

VARSAKA, a town of Imiretta; 10 miles S.E. of Cotatis.

VARSETCH, a town of Istria; 8 miles E. of Pedena.

VARSHNEYA, in *Mythology*, a name of the Hindoo deity *Krishna*; which see.

VARSOVIA, in *Geography*. See WARSAW.

VARU, an island in the Caribbean sea, near the coast of South America, about sixteen miles long, and three broad. N. lat. 10° 12'. W. long. 75° 25'.

VARVELS, in *Falconry*, small rings about a hawk's leg, with the owner's name on them.

VARUNA, in *Hindoo Mythology*, is the genius or regent of the waters, corresponding with the Neptune of western heathens. As light is thought to be excluded from the deep, Varunâ is also deemed the governor of the night, or of darkness; in this character, as well as in that of lord of punishment, coalescing with the Hindoo Pluto, who is named *Tama*; which see. Still he is one of the twelve suns, called Aditya, of which see under our article SURYA. As lord of punishment, the wealth of criminals is directed to be offered to him; or, in other words, thrown into the waters; or it may, instead, be bestowed on a learned priest. The latter, we may suppose, is likely, on most occasions, to outshare the deity. In the Institutes of Menu, ch. ix. v. 243, 4, 5, these texts occur. “Let no virtuous prince appropriate the wealth of a criminal in the highest degree; for he who appropriates it through covetousness, is contaminated with the same guilt. Having thrown such a fine into the waters, let him offer it to Varuna; or let him bestow it on some priest of eminent learning in the scripture. Varuna is the lord of punishment; he holds a rod even over kings, and a priest who has gone through the whole Veda, is equal to a sovereign of the world.” In another text, c. ix. v. 308, it is said that “Varuna most assuredly binds the guilty in fatal cords.” Like other Hindoo deities, Varuna has a consort, or fakti, assigned him. She is called *Varuni*; which see. He has likewise a terrestrial palace or paradise, situated far in the West,

West, named *Subhavati*; which see. He has also had a terrestrial incarnation, under the name of Samvarna.

VARUNI, the consort of the Hindoo Neptune, who is named *Varuna*; which see. As well as his consort, she is said to be his daughter; a double relationship not uncommon with the gods both of India and Greece.

VARUS, or VARUM FLUMEN, *the Var*, in *Ancient Geography*, a river, which, in the time of Strabo and Pliny, separated the Gauls from Italy.

VARUSA, a river of Italy, in Gallia Cisalpina, which discharged itself into the Po, near the confluence of this river with the Ticini.

VARUTHA, a town of Asia, in the Greater Armenia. Ptolemy.

VARY, in *Geography*, a town of Hungary; 10 miles S. of Munkacs.

VARZEA, a town of Portugal, in the province of Beira; 9 miles S.S.W. of Lamego.

VARZESKOI, a lake of Russia, in the government of Archangel; 60 miles E. of Mezen.

VARZY, a town of France, in the department of the Nièvre; 7 miles S.S.W. of Clamecy.

VAS, VESSEL. See VESSEL, VESICULA, and ANGIOLOGY.

Hence, in the style of anatomists, the *vasa adiposa, præparantia*, &c.

VAS *Chyliferum*, in *Anatomy*, the thoracic duct. See ABSORBENTS.

VAS *Deferens*, the excretory tube of the testis. See GENERATION.

VASA *Brevia*, the short arterial and venous ramifications proceeding from the splenic trunks to the great end of the stomach. See ARTERY, and VEIN.

VASA *Efferentia* and *Inferentia*; the latter are the lymphatic vessels, which enter an absorbing gland; and the former, those which go out of it. See ABSORBENTS.

The tubes which pass from the upper end of the testis, and unite to form the epididymis, are also called *vasa efferentia*. See GENERATION.

VASA *Lactea*, or *Vena Lactea*, the absorbents which take up the chyle from the small intestine. See ABSORBENTS, and INTESTINE.

VASA *Vasorum*, the vessels which belong to the coats of vessels. See HEART.

VASA *Concordia*, in *Hydraulics*, are two vessels, so constructed, as that one of them, though full of wine, will not run a drop; unless the other, being full of water, do run also. Their structure and apparatus may be seen in Wolfius, *Element. Mathes. tom. ii. Hydraul.*

VASA, in *Geography*, a town of Turkestan, on the Sirt; 70 miles W. of Taraz.

VASA, or *Wasa*. See WASA.

VASAGUDA, or VAZAGUDA, in *Ancient Geography*, a town of Africa, in Mauritania Cæsariensis. Ptol.

VASANTA, in *Hindoo Mythology*, is the name of the bosom friend of their Kama, god of love. Among the Mahrattas and low people he is called Bessant, Bessent, or Bussunt. He is a personification of the season of spring; and songs in his honour are chanted by minstrels of both sexes at vernal and other festivals. See under KAMA for some mention of his inseparable attendant.

VASARHELY, in *Geography*, a town of Hungary, on a small river, which runs into the Theysse; 50 miles N.N.W. of Temeswar. N. lat. 46° 27'. E. long. 20° 33'. —Also, a town of Hungary; 22 miles E. of Caschau. —Also, a town of Transylvania; 40 miles E. of Colosvar. N. lat. 46° 37'. E. long. 25° 5'.

VASARI, GIORGIO, in *Biography*, was born at Arezzo in 1512, and was first instructed in design by a glass-painter, called Il Prete Gallo, but afterwards, being taken to Florence by the cardinal Passerini, studied under M. Angelo and Del Sarto. Another friendly cardinal conveyed him to Rome, the cardinal Ippolito di Medici; and under his protection he acquired riches and honours. In Rome he laboured assiduously, attaching himself particularly to M. Angelo, of whom he appears; by several letters preserved by Bottari, to have been very sincerely esteemed. He was employed in several public works at Rome, both as a painter and an architect, particularly in the Vatican, in the Sala della Cancellaria, where he painted, by the direction of the cardinal Farnese, a series of frescoes, representing the principal actions of Paul III.; and in the church of S. Giovanni Dicollato, he painted for the principal altar the martyrdom of that saint, one of his most highly esteemed performances.

He was invited by Cosmo I. to Florence in 1553, and employed by that prince as superintendent of the important works then going on in the Palazzo Vecchio, where he executed, with the help of numerous disciples, the decoration of the principal apartments. Of his paintings there, pope Clement VII. crowning the emperor Charles V. was the most important, and it was accompanied, in other compartments in the same hall, by representations of the actions of that monarch.

There are many other works of Vasari scattered about Italy, as at Bologna, Arezzo, and Rimini, &c.; but after all he was a tame copyist of Michael Angelo's manner, and a very indifferent colourist. He is far more endeared to us by his writings than his pictures. His work, entitled "Lives of the most excellent Painters, Sculptors, and Architects, from the Period of Cimabue till his own Time," is the fountain of knowledge concerning the greater part of them: and though in many points he appears to have been too facile of belief, and to have related histories without sufficient inquiry into their correctness, yet upon the whole the world is indebted to him for an ingenious and useful work; without which, the history of the art would not now have been so distinctly understood, nor the profession so justly known and honoured. It was first published at Florence, in two volumes, in 1550, and afterwards republished with considerable additions, and heads engraved in wood of most of the artists mentioned, in 1568, and has since been re-edited with copious notes by Bottari. Vasari died at Florence in 1576, at the age of 64.

VASAVA, in *Mythology*, a name of the Hindoo god *Indra*; which see.

VASBARIA, in *Ancient Geography*, a town of Africa, in the interior of Mauritania Cæsariensis. Ptolemy.

VASBUHL, in *Geography*, a town of the duchy of Wurzburg; 4 miles N.E. of Arnstein.

VASCO, or VASTORUM CIVITAS, in *Ancient Geography*, a town of Gallia Narbonensis, according to Ptolemy and Pliny.

VASCONES, a people of Hispania Citerior, at the foot of the Pyrenées. These people, who in later times passed into Gaul, where they assumed the name of Gascons, lay to the east of the Cantabri, in the country now called Navarre: and they extended from the Pyrenées as far as the Iberus towards the south. Their principal towns were Pompelo, Calaguris, and Graccuris.

VASCULAR, VASCULARIS, in *Anatomy*, is applied to any thing consisting of divers vessels, veins, arteries, &c.

We say, the vascular and valvular texture of the lungs.

All the flesh, in an animal body, is found to be vascular, none of it parenchymous, as the ancients imagined.

VASCULAR Glands. See **GLAND.**

VASCULAR, Vascularius, in *Antiquity*, was the denomination of a kind of artificers among the ancient Romans; who made silver and gold vessels without reliefs, or figures embossed on them.

Hence, according to Salmasius, it is, that Cicero, in his sixth oration against Verres, distinguished *vascularius* from *celator*, engraver.

In the art called by the Greeks *εμπαρισμω*, which was the art of superadding ornaments of precious stones, or rich metals, to vases of other metals; the *vascularii* and *celatores* were different; the first being the goldsmiths who made the vase; the second, the sculptors who added the ornaments. But in the art called *τοκευτικη*, or the art of cutting bas-reliefs, or stamping figures on metal, the *vascularii* were also *celators*, or engravers; that is, they who made the vase, made also the reliefs, or figures, with which it was enriched.

VASCULIFEROUS PLANTS, in *Agriculture* and *Gardening*, are all such the seeds of which are contained in vessels, divided in the cells. There are several of these in both these departments. See **SEED.**

VASE, a term of equal import with the Latin *vas*, whence it is formed; and with the English *vessel*; which see.

It is applied to the ancient vessels dug from under ground, or otherwise found, and preserved in cabinets, &c. as vessels of sacrifice, urns, &c.; and to other more modern vessels, which are rather of curiosity and show than use; as those of crystal, porcelain, &c.

In the curious collection of ornamental works, made by Messrs. Wedgwood and Bentley, after the antique, there are vases of various kinds; some formed of a composition of *terra cotta*, resembling agate, jasper, porphyry, and other variegated stones, of the vitrescent or crystalline kind; others of black porcelain, or artificial basalt, highly finished, with bas-relief ornaments; others of the painted Etruscan kind; and others again ornamented with encaustic paintings. The art of painting vases in the manner of the Etruscans has been lost for ages: however, these ingenious manufacturers set themselves to revive it; and, having carefully examined the original Etruscan vases, and having perused with attention the writings of the late count Caylus upon Etruscan antiquities, they were convinced that the colours of the figures could not be successfully imitated with enamel; and that their success must chiefly depend upon the discovery of a new kind of enamel colours, to be made upon other principles, and to have effects essentially different from those that were then in use, and are of the nature of glass: the Etruscan colours being burnt in, smooth and durable, but without any glassy lustre. In consequence of this observation, and by a great variety of experiments, they invented a set of encaustic colours, not only sufficient to imitate the paintings upon the Etruscan vases, but to give the beauty of design the advantages of light and shade in various colours; and to render paintings durable, without the defect of a varnished or glassy surface. These encaustic colours may be applied with great ease and certainty; they change very little in the fire, are not liable to run out of drawing, are perfectly durable, and not glassy, and possess the advantages of enamel, without its essential defects. Catalogue of Cameos, &c. by Wedgwood and Bentley, 1773.

VASES, in *Architecture*, are ornaments of sculpture, placed on foci, or pedestals, representing the vessels of the ancients;

particularly those used in sacrifice, as the *præfericulum simpulum*, incense-pots, flower-pots, &c. and occasionally enriched with basso-reliefs.

They are commonly placed there to crown or finish façades, or frontispieces. They are frequently also called *acroteria*; and are usually insulate.

In forming and decorating vases, fancy has great scope. Many excellent inventions of these ornaments are transmitted to us from the ancients. A vase differs from an urn, as it is in general of a more elegant contour, and is lofty; whereas an urn should be low and wide, and always covered.

Vitruvius mentions a kind of *theatrical* vases, made of brass, or earthen-ware, called *ecbeia*, *ηχηρα*, (see *ECHEDIA* and *VITRUVIUS*); which they disposed in private places, under the steps and seats of the theatres, to aid and increase the reflection and resonance of the actors' voices, &c. It is said, there are also vases of this kind in the cathedral church of Milan.

VASE is particularly used in architecture to signify the body of the Corinthian and Composite capital; called also the *tambour*, or *drum*; and sometimes the *campana*, or *bell*.

VASE is also sometimes used among *Florists*, for what they otherwise call the *calyx*.

The vase, or rather calyx of a tulip, is the top or head of a tulip; the leaves of which form a kind of vase, or cup.

Goldsmiths, brasiers, &c. also use vase for the middle of a church-candlestick; which is usually of a roundish figure, bordering somewhat on that of a vase.

VASE River, in *Geography*, a river of America, which runs into the Mississippi, 55 miles above the mouth of the Ohio.

VASEN. See **WESEN.**

VASH, a river of Grand Bucharia, which gives name to the country it waters; and runs into the Gihon near Termed.—Also, a province of Great Bucharia; which see.

VASHAVAN, a town of Hindoostan; 30 miles S.W. of Dindigul.

VASHGERD, a town of Grand Bucharia, and principal town of a district watered by the Vash; 200 miles S.E. of Samarcand. N. lat. 38° 25'. E. long. 67° 50'.

VASHON'S ISLAND, an island near the west coast of America, at the bottom of the Admiralty Inlet, and eastern branch of the gulf of Georgia. N. lat. 47° 10'. E. long. 237° 25'.

VASIL, a town of Russia, in the government of Nizgorod, on the Volga; 60 miles E. of Niznei Novgorod. N. lat. 56° 16'. E. long. 45° 44'.

VASILICA. See **BASILICA.**

VASILKOV, a fort of Russia, in the government of Kiev; 28 miles S.S.W. of Kiev.

VASINA, a town of the island of Corsica; 4 miles N. of Bastia.

VASIR. See **SIRVENT.**

VASISHT'HA, in *Biography*, is the name of a celebrated person of Hindoo history and mythology: one of a class called Rishi, meaning a sage. Of these divine persons we have given a list, and some remarks, under the articles **RISHI** and **KRITIKA**; the latter being the Pleiades of the Hindoos, who have many very curious tales of their "shedding sweet influences." Vasisht'ha is a character frequently mentioned in the romantic histories of the Hindoos, as being resorted to for advice by royal and other persons requiring spiritual or other consolation. He is, indeed, called the preceptor of the inferior gods. A very celebrated commentary on the Veda, the Hindoo scripture, is ascribed to Vasisht'ha. It is in prose, with poetry intermixed; and is quoted as high law authority. (See **VEDA.**)

His wife, named Arundhati, is represented to have been exemplary in regard to holiness and sanctity, and to have been translated to the skies with her sapient husband : she is still quoted as proverbial for virtue and constancy. Vasisht'ha is a star of the second magnitude, in N. lat. 60° , and Arundhati is a smaller star near it.

In the Agni Purana, a hymn is addressed to Vasisht'ha ; affording some clue to the relative antiquity of the poetical romances bearing the common denomination of *Purana* ; which see.

VASIT, or WASIT, in *Geography*, a town of the Arabian Irak, on the Tigris. This town was built in the beginning of the eighth century, by Al Hejâj, the Arabian general. A mint was established, and in 707, money was coined there by order of the caliph. In 1401 it was plundered by Timur Bec ; 96 miles S.E. of Bagdad. N. lat. $32^{\circ} 18'$. E. long. $45^{\circ} 38'$.

VASKINA, a gulf or bay of Russia, on the south coast of the island of Kalguev.

VASKOVNIA, a town of Russia, in the government of Pskov ; 120 miles S.S.E. of Pskov.

VASLUI, a town of European Turkey, in Moldavia, on the Birlat ; 32 miles S. of Jassy. N. lat. $46^{\circ} 40'$. E. long. $27^{\circ} 45'$.

VASOKY, in Hindoo mythological *Legend*, is a name of a mighty serpent, more commonly called *Seha* ; which see. The name of Vasoky, however, frequently occurs in the extravagant legends of the East. See KALIYA and KURMAVATARA.

VASON, in *Geography*, a town and castle of Hungary ; 20 miles W.S.W. of Stuhl Weissenburg.

VASPINGE, a town of Persia, in the province of Adirbeitzan, containing about 600 houses ; 9 miles from Tauris.

VASQUEZ, a town of the island of Cuba ; 66 miles N.W. of Villa del Principe.—Also, a river of Mexico, which runs into the Spanish Main, N. lat. $11^{\circ} 30'$.

VASSAL, VASSALLUS, in our *Ancient Customs*, a person who vowed fidelity and homage to a lord, on account of some land, &c. which he held of him in fee.

Du-Cange will have the word to come from *vassus*, which anciently signified a *servant* or *domestic* of a prince, and sometimes also the *comites*, or *assessores*, in public trials. Menage, after Cujas, takes vassal to have been formed of *geffel*, an ancient German word, signifying *companion*. Caneuue derives it from the Gaulish *geffus*, a *brave man*, from *geffo*, or *geffum*, or *jesum*, a kind of javelin used among them. Vossius derives vassal from *vas*, *vadis*, *pledge* ; whence also he will have it to be, that they are sometimes called *fideles*.

The vassal was also called *piratus*, *lord's-man*, and *see-man* ; but now the denomination is changed into that of *tenant in fee*.

Accordingly the vassal, or feudatory, was only another name for the tenant or holder of the lands ; though, on account of the prejudices we have justly conceived against the doctrines that were afterwards grafted on this system, we now use the word vassal opprobriously, as synonymous to slave or bondman. The manner of the grant, on the part of the proprietor or lord, who retained the dominion, or ultimate property of the feud, or fee, was by words of gratuitous and pure donation, *dedi et concessi* ; which are still the operative words in our modern infeodations, or deeds of feoffment. This was perfected by the ceremony of corporal investiture, or open and notorious delivery of possession, in the presence of the other vassals, which perpetuated among them the era of the new acquisition, at a time when the art of writing was very little known ; and, therefore, the evidence

of property was reposed in the memory of the neighbourhood : who, in case of a disputed title, were afterwards called upon to decide the difference, not only according to external proofs, adduced by the parties litigant, but also by the internal testimony of their own private knowledge.

They sometimes also used the term *vassour* for vassal ; whence *vavassour*.

If a vassal offended his lord grievously, either in person or in honour, he committed the crime of felony ; which carried with it a confiscation of his fee.

VASSAL, a *Rear*, is he who holds of a lord, who himself is vassal of another lord.

VASSAL was anciently used for soldier ; by reason fees, at first, were given to none but military men.

VASSALAGE, the state of a vassal ; or a servitude and dependency on a superior lord.

Anciently, they distinguished between *liege vassalage*, and *simple vassalage*.

Liege vassalage only belonged to the king ; as carrying with it an obligation on the side of the vassal to serve his lord in war, against all persons whatever. See *LIEGE*.

In all *simple vassalage*, the fealty, or liege vassalage, was still reserved to the king.

Some also distinguish *active vassalage*, and *passive* : the first is the right of fealty residing in the lord ; the second, the service and duties incumbent on the tenant.

VASSALBOROUGH, in *Geography*, a town of the province of Maine, on the Kennebeck ; 204 miles N.E. of Boston.

VASSEN, or WAESSEN, a town of Holland, in the department of Guelderland ; 12 miles S. of Hattem.

VASSIETTE, a river of America, which runs into lake Michigan, N. lat. $44^{\circ} 38'$. W. long. $85^{\circ} 18'$.

VASSY, a town of France, in the department of the Calvados ; 8 miles E. of Vire.—Also, a town of France, and seat of a tribunal, in the department of the Upper Marne. In the year 1562, a bloody persecution against the Protestants began in this town ; 9 miles S. of St. Dizier. N. lat. $48^{\circ} 30'$. E. long. $5^{\circ} 2'$.

VASTAN, a town of Curdistan, on lake Van. In 1386, it was taken by Timur Bec ; 20 miles S.W. of Van.

VASTANFORS, a town of Sweden, in Westmanland ; 32 miles N.N.W. of Stroemsholm.

VASTAUNA, in *Ancient Geography*, a town of Asia, situated in the S.E. part of the lake Arisfa, towards the 38th degree of latitude.

VASTO, in *Law*, a writ that lies against the tenant for life, or years, for making waste.

VASTUS, in *Anatomy*, the name of two very large muscles belonging to the thigh. The body of the femur is completely enveloped, except at the *linea aspera*, by a thick muscular mass : this may be distinguished at its origin into three portions, which soon become blended together, so as not to admit of separation. The part which covers the outside of the bone is called *vastus externus* ; that which covers the inside, *vastus internus* ; and the middle, *cruralis*, or *cruræus*. These have usually been described as three distinct muscles ; but some modern anatomists have more properly considered them as one, under the name of *triceps femoris* : they form the *tri-femoro-rotulien* of Dumas.

The *triceps cruris* then is a very thick fleshy mass, of a rounded or convex figure, covering the thigh-bone, and extending from the hæs of the trochanters to the patella and tibia.

The anterior surface is covered, towards the outside, by the tendon of the *gluteus maximus*, the *tenor vaginæ*, the *fascia*

fascia lata, and the short portion of the biceps; at the middle, by the iliacus internus, rectus extensor cruris, and the external circumflex vessels; on the inside, by the sartorius, the femoral artery, and the fascia. The posterior surface covers the body of the femur, with the exception of the linea aspera; it is attached to the anterior, external and internal surfaces of the bone, from the bases of the trochanters to within four fingers breadth of the knee; then it is separated from the femur by a loose and fatty cellular substance, and lastly, it covers the synovial membrane of the knee-joint.

The outer margin is fixed to the rough line, which descends from the great trochanter to the linea aspera, together with the gluteus maximus, to which it is closely connected: it is then fixed to the external edge of the linea aspera, in its whole length, and to the upper two-thirds of that line, which descends from the linea aspera to the external condyle of the femur, being connected in the latter situation with the fascia lata. The internal edge is fixed to the corresponding inner edge of the linea aspera, from the trochanter minor downwards; and to the upper two-thirds of the line descending from it to the external condyle, being connected here with the tendon of the triceps adductor. Its upper extremity is divided into the three portions already mentioned. The external (vastus externus) and most considerable is fixed to the circumference of the basis of the great trochanter; it descends on the outside of the thigh, increasing in size to the middle of the limb, and then diminishing again. At first it is separated from the middle portion by a thin stratum of cellular substance; but they are soon confounded in one mass. The internal portion (vastus internus) is not in general very distinct from the middle. Commencing at the root of the little trochanter, it descends on the inside of the femur, first increasing in size, and then diminishing again. On its outside it is separated from the middle portion, if at all, by a very slight cellular line, for about an inch or two, after which they are confounded in one mass. The middle and smallest division (cruralis) commences at the basis of the neck of the thigh-bone, by an attachment to the rough line, which reaches from the great to the small trochanter: it descends perpendicularly, increasing in size, separated at first from the lateral portions, but soon inseparably joined with them into one mass, surrounding the body of the femur, and ending in a tendinous extremity, attached to the basis and sides of the patella, and to the tuberosities of the tibia.

The last-mentioned attachment is effected by means of a broad and thick tendon, connected in front to that of the rectus extensor cruris, and expanded laterally into aponeuroses fixed to the tuberosities of the tibia. Of these aponeuroses, the outer is closely connected to the fascia lata. The tendon of the triceps is divided above into three broad portions, which ascend on the three divisions of the muscle. A thick and broad aponeurotic sheet commences from the basis of the trochanter major and the linea aspera, and covers the upper half of the vastus externus: a similar but smaller aponeurosis descends from the linea aspera on the vastus internus. The muscular fibres of the vastus externus pass obliquely downwards and forwards from its superior aponeurosis, and from the aponeurotic septum, which separates it from the short head of the biceps to the inferior tendon. Of these fibres, the upper are the longest and most perpendicular; the succeeding ones become more and more oblique, and the lowest approach to the transverse direction, accompanying the tendon to within an inch of its insertion.

The fleshy fibres of the vastus internus pass with a corre-

sponding obliquity between the two aponeuroses; the inner or anterior being the longest and straightest, the lower shorter, and more transverse. Of the middle portion, the muscular fibres are parallel to the axis of the thigh, arising from the anterior and lateral surfaces of the bone, and terminating in the lower tendon.

A prolongation of the synovial membrane of the knee extends for some distance behind this portion, above the patella, and thus supplies the place of a bursa mucosa. The lateral portions of the inferior tendon adhere very closely to the synovial membrane of the knee.

The triceps femoris straightens the knee-joint, either by moving the leg forwards on the thigh, or the thigh on the leg. These are very important muscles in progression, when they bring the thigh forwards on the leg of the advanced limb. When we are descending an inclined surface, and the heels slip, they make a great effort, by drawing forwards the thighs, to prevent the body from falling: in this exertion the patella is sometimes fractured. In standing, they preserve the thigh-bones perpendicular over the legs. They extend the leg on the thigh, where the limb left behind in progression is advanced in its turn in front of the foot which has just reached the ground.

VASU, in *Hindoo Mythology*, a name of the regent of the winds, more commonly called *Pavana*; which see. But the word occurs more frequently in the plural, when "the Vafus" seem to imply the eight winds collectively; the Hindoos having many fables connected with this number of winds. It is not easy to discriminate at all times between the Vafus and the Maruts of the Hindoos. See *MARUT*.

VASUDEVA is the name of the mortal father of their god Krishna: his mother was Devaky. (See *KRISHNA*.) The name Vasudeva is said to mean *giver of wealth*. Krishna himself is sometimes called by this name.

VASUGAN, in *Geography*, a river of Russia, which runs into the Oby, N. lat. 59°. E. long. 80° 14'.

VAT, in *Commerce*, &c. See *FAT*.

VAT, an oil measure of Holland, containing of oil of olives 717 mingels, and weighing 1730 lbs. avoirdupois. Train-oil is sold in quartels of 18 or 21 stekans; also in vats of 12 stekans, or 192 mingels: the mingel of 2 pints, or 8 musies of rain-water, weighs about 2 lbs. 4½ oz. Amsterdam weight. The aam, by which Rhine and Moselle wine, and also spirits distilled from corn are sold, contains 4 ankers, 8 stekans, 21 viertels, 64 stoops, 128 mingels, 256 pints, or 1024 musies: and holds 8966 Dutch, 7705 French, or 9351 English cubic inches, or about 40½ English wine gallons. A vat of French wine contains 4 oxhoofdens, or 6 tierces. The oxhoofden should hold 200 mingels, but is commonly reckoned at 180 mingels, and the tierce at 120.

VAT, or *Vate*, in *Minerology*, denotes a square hollow place on the back of a calcining furnace, in which they lay the next serving of tin-ore to dry, before it is let down into the furnace, into which it passes through a plug-hole in the bottom of this vat, or *dry*.

VATABLE, or *GASTEBLED*, FRANCIS, in *Biography*, was born at Gamache, a village in Picardy, and having first distinguished himself in Greek literature, and by a translation into Latin of Aristotle's "Parva Naturalia," devoted himself to the study of the Hebrew language, in which he excelled, and which he restored in France. He was appointed Regius professor of Hebrew at Paris by Francis I., in 1531, and the lectures which he made on the Old Testament were delivered to large audiences. His brief and clear explanations of the literal meaning of the texts were preserved

preserved by some of his hearers, collected by Robert Stephens, and added to his publication in 1545, of Leo Judæ's Latin version of the Bible. But as they contained some free passages, they were condemned by the doctors of the theological faculty in Paris, who, imperfectly acquainted with Hebrew, reposed their confidence in the Vulgate. However, the university of Salamanca reprinted the text and notes in Spain, R. Stephens defended them against the Paris theologians, and they have since been approved by men of learning. He not only encouraged Clement Marot to translate the Psalms into French verse, but assisted him in the undertaking. Vatable, though suspected of heresy, was an orthodox Catholic, and opposed the discipline and opinions of the Calvinists. He died in 1547, possessed of the abbacy of Bellocane. Dupin.

VATAN, in *Geography*, a town of France, in the department of the Indre; 11 miles N.W. of Issoudun. N. lat. $47^{\circ} 5'$. E. long. $1^{\circ} 54'$.

VATERIA, in *Botany*, was so named by Linnæus, in honour of Abraham Vater, professor of Medicine at Wittenberg, and author of *Catalogus Horti Wittenbergensis*, (a mere catalogue,) as well as of some botanical dissertations, on the Balsam of Mecca, on *Hippopane*, &c. This gentleman was born in 1684, and died in 1751. He succeeded his father in the professorship, who died in 1732, aged eighty-one, and was also a naturalist.—Linn. Gen. 269. Schreb. 359. Mart. Mill. Dict. v. 4. Juss. 258. Lamarck Illustr. t. 475.—Class and order, *Polyandria Monogynia*. Nat. Ord. akin to *Guttifera*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, in five acute segments, permanent, at length reflexed. *Cor.* Petals five, ovate, thick, entire, spreading. *Stam.* Filaments numerous, very short; anthers vertical, awl-shaped, much longer than the filaments, with two capillary points. *Pist.* Germen superior, roundish; style simple, short; stigma capitate. *Peric.* Capsule turbinate, coriaceous, seated on the reflexed calyx, marked with three furrows, separating into three valves, with one cell. *Seed* solitary, ovate, with a reddish skin.

Ess. Ch. Petals five, undivided. Calyx five-cleft, permanent. Capsule coriaceous, of three valves and one cell. Seed solitary.

Obs. Retzius and Vahl have removed this plant to *ELÆOCARPUS*, see that article; but without giving any sufficient reason. On the contrary, they describe the *petals* as entire; nor have they thrown any light upon the *fruit*, which, as described in the *Hortus Malabaricus*, cannot accord with *Elæocarpus*. The large figure, on the right hand, in that book, cannot be reconciled with the rest, unless it be a seed vegetating. Jussieu seems staggered as to the character of this fruit, by finding the rudiments of three *seeds* in the germen. But this may very well be, and yet only one may ever come to perfection. The same learned author remarks, that Linnæus, in his *Syſtema*, attributes three *seeds* to *Vateria*. This is true; but we believe it a typographical error, originating in the tenth edition of *Syſt. Nat.* especially as the synoptical table, at the head of the class, remains with the character of a single seed. This contradiction, whichever of the two characters be correct, is heedlessly perpetuated through every following edition. On the whole, there appears more reason to retain than to abolish the genus in question.

1. *V. indica*. Copal *Vateria*. Linn. Sp. Pl. 734. (*Elæocarpus copalliferus*; Retz. Obs. fasc. 4. 27. Vahl Symb. v. 3. 67. Willd. n. 5. Pænoc; Rheede Hort. Malab. v. 4. 33. t. 15.)—Native of Malabar and Ceylon. A tall and handsome tree, generally sixty feet high, with wide extended branches, and a thick bark, which when wounded

discharges a clear, pellucid, fragrant resin, acrid and bitter to the taste, at length becoming yellow and brittle like glass. This, according to Kœnig, is one kind of *COPAL*; see that article. Persons experienced in the use of this gum, so useful for varnishing anatomical preparations, know that there are, as Kœnig says, several different things imported under the same name, which are not all equally soluble, even in oil of lavender. The *leaves* of this tree are alternate, stalked, a span long, elliptical, acute, coriaceous, entire, smooth. *Flowers* in large terminal, downy panicles, white with yellow *stamens*; their scent sweet, like a lily. *Fruit* the size of a walnut in its green coat, swelling and blunt at the extremity, dark purple; its kernel white, bitterish and rather astringent, inclosed in a reddish skin, like that of a filberd. This description, taken from the *Hortus Malabaricus*, is precise; and as nothing is said of any hard shell, we do not see how the *fruit* can agree with that of *Elæocarpus*. The above-mentioned kernel, triturated with hot water, is reckoned strengthening to the stomach, and is given to stop vomiting or nausea.

Having formerly examined at sir Joseph Banks's a specimen of *Vateria*, in order to distinguish this genus from *VATICA*, (see that article,) we have corrected the generic characters from observations then made, particularly respecting the *anthers*, of which Retzius and Vahl have also given a faithful account. Linnæus had no specimen, but described the genus from one in Hermann's herbarium, now at sir Joseph Banks's. Vahl is surely mistaken in saying the *corolla* and *fruit* agree with *Elæocarpus*!

VATES, in *Mythology*, the name of a class of Druids.

VATHI, in *Geography*, a town on the north coast of the island of Samos, in a bay called the Gulf of Vathi. N. lat. $37^{\circ} 40'$. E. long. $26^{\circ} 54'$.

VATHIA, or BERBATHI, anciently *Tyrinx*, a town of European Turkey, in the Morea; 16 miles N.E. of Napoli di Romania.

VATI, a town of the island of Siphanto. N. lat. $36^{\circ} 57'$. E. long. $24^{\circ} 46'$.

VATICA, in *Botany*, an unexplained name of Linnæus, apparently derived from the same source as *vaticinatio*, a prophesying. Hence the writer of the present article ventured to suggest, as a query, whether the plant might have any superstitious use among the Chinese, from whose country it is said to have been brought. This conjecture appears in the form of a general opinion in *De Theis*, strengthened by a reference to Boehmer's *Lexicon*, p. 208, a book not within our reach. Notwithstanding all this, there is great doubt whether the plant comes from China, the specimens being marked India, just like many others, known to have been received from Java by Linnæus. In fact, these specimens are so like *VATERIA* (see that article) in appearance and character, that if it were possible to suppose the anthers could vary so remarkably, we should suspect these plants might be only sexual differences of one species. Having started this difficulty without having the means of overcoming it, we proceed to describe *Vatica*.—Linn. Mant. 2. 152. Schreb. Gen. 318. 831. Willd. Sp. Pl. v. 2. 847. Mart. Mill. Dict. v. 4. Sm. Plant. Ic. 36. Juss. 259. Lamarck Illustr. t. 397.—Class and order, *Dodecandria Monogynia*. Nat. Ord. akin to *Guttifera*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, in five deep, erect, ovato-lanceolate, acute segments. *Cor.* Petals five, sessile, obovate, entire, thrice the length of the calyx, folded over each other, in some flowers to the left, in others to the right; their inner surface smooth; outer, in the exposed half, hoary. *Stam.* Filaments none; anthers fifteen, sessile, three on the base of each petal, small, ovate, smooth, of four

four obtuse cells, the two outer cells terminated by a small, intermediate, upright spine, the two inner but half as long, without any spine. *Pist.* Germen superior, conical, with five angles, obtuse, hoary; style cylindrical, with five angles, twisted; stigma bluntish, obscurely three-lobed. *Peric.* unknown, but the germen has three cells, with the rudiment of a solitary seed in each.

Eff. Ch. Petals five, undivided. Calyx five-cleft. Anthers fifteen, sessile, of four cells.

1. *V. chinensis.* Chinese Vatica. Linn. Mant. 2. 242. Willd. n. 1. Sm. Plant. Ic. t. 36.—Native of China, according to Linnæus, but his authority, as we have said, does not appear. This seems to be a tree, very near *Vateria indica*, from which it chiefly differs in the number and form of the *stamens*. As to the *fruit*, Jussieu's having found three cells and as many *seeds*, in the *germen* of *Vateria*, renders the supposed distinction in the ripe *fruit* very doubtful. The *leaves*, *inflorescence*, &c. discover no difference, and the *flower-stalks* and *calyx*, as well as *footstalks*, are clothed with the same fine, short, close, hoary pubescence, in both. It is much to be wished that some East Indian botanist would clear up these doubts respecting two very fine, and hitherto little-known plants. We must add, that if this be *Vateria*, nothing can be more distinct in its *petals* from *Eleocarpus*; for instead of the thin texture, and curiously lacinated margin, appropriate to the latter, their thick undivided substance, and partial hoariness at the back, prove that those genera ought never to be confounded together.

VATICA, in *Geography*, a sea-port town of European Turkey, in the Morea, situated in a large bay, to which it gives name; 44 miles S.E. of Misitra.

VATICAN, VATICANUS, is properly the name of one of the seven hills on which Rome stands: on the foot of this is the famous church of St. Peter, hence called the Vatican; and a magnificent palace of the pope, which has the same denomination. Hence arise divers figurative expressions; as *the thunderbolt of the Vatican*, *q. d.* the pope's anathema, &c.

The word, according to Aulus Gellius, is derived from *vaticinium*, *prophecy*; by reason of the oracles and predictions which were used to be delivered there by the inspiration of an ancient deity, called *Vaticanus*; who was supposed to unbind the organs of speech in new-born children; and whom others will have to be no other than Jupiter, considered in that capacity.

VATICAN, *The Library of the*, is one of the most celebrated in the world: it is particularly remarkable for its manuscripts. It was first erected, according to Petavius (*Rat. Temp. lib. ix. cap. 9.*) by pope Nicholas V., who succeeded to the papal chair in 1447. It was re-established, after the books had been dispersed, under the pontificate of Calixtus III., by Sixtus IV.; and after having been almost entirely destroyed by the army of Charles V. it was not only restored to its former state by Sixtus V., but greatly enriched with books and manuscripts. It was finally fixed in the Vatican, under the pontificate of Martin V.

Towards the beginning of the 17th century, it was greatly augmented by the addition of that of the elector palatine. It is open to all the world three or four times a week. In it are shewn a Virgil, Terence, &c. above a thousand years old; as also the manuscript on which the edition of the Septuagint was made; and abundance of rabbinical manuscripts.

VATICAN *Manuscript*, is one of the most celebrated manuscripts of the Greek version of the Bible now extant in the world. It was polished at Rome by cardinal Carafa, at the command of Sixtus Quintus, in 1587; and in the preface, it is said to have been written *ante millesemum ducentum*

tesimum annum, *i. e.* before 387; but Blanchini supposes it a few years later. A Latin edition from this manuscript, with notes, was printed at Rome in 1588, by Flam. Nobilius; and an edition, with the Greek and Latin, with the division of the verses according to the Vulgate, and Nobilius's Latin notes, and the Greek scholia of Carafa, by J. Morinus, at Paris, in 1628. This manuscript is written in large or text letters, and has no distinguishing chapters, verses, words, nor any marks of accents. It is mutilated both at the beginning and end; and wants the first forty-six chapters of Genesis, thirty-two Psalms, *viz.* from the 105th to the 137th, and the latter part of the Epistle to the Hebrews, from chap. ix. ver. 14. with the other Epistles of Paul to Timothy, Titus, and Philemon, and the whole book of Revelation. It appears also, that the whole manuscript has been repaired, with fresh ink laid over the letters which were disappearing through age. In the edition of Carafa, the mutilated passages have been supplied from other copies.

It has been asserted, by two eye-witnesses, that this manuscript has undergone some alterations by a later hand. See *Le Long's Biblioth. Sacra*, cap. 3. sect. 4. and Wetstein's *Prolegomena*, Nov. Test. p. 24.

It is difficult to estimate the comparative value of this and the Alexandrian manuscript, in which thirty Psalms, a few chapters, and a few verses, are now lost, as well as parts of verses in different places; and in which there have been some rasures and insertions, as Grabe allows. If, as Grabe states it, that manuscript be the most respectable, which comes the nearest to the Hexaplar copy, the Alexandrian manuscript seems to claim that merit in preference to its rival. But if it be thought a matter of superior honour to come nearer the old Greek version, unaltered by Origen, that merit seems to belong to the Vatican. For farther particulars, see the *Prolegomena* of Walton, Grabe, Wetstein, Mills, and *Le Long*, *ubi supra*.

VATICANÆ PILULÆ, the name of an old form of medicine, intended as a purge. The recipe is in the old London Pharmacopœia; but the late ones have discarded it.

VATICANO, CAPE, in *Geography*, a cape on the W. coast of Calabria Ultra. N. lat. 38° 40'. E. long. 16° 52'.

VATICINATION, VATICINATIO, the act of prophesying, or divining. See DIVINATION, and PROPHECY.

VATIMONT, in *Geography*, a town of France, in the department of the Moselle; 8 miles W.N.W. of Morhange.

VATISA, or FATISA, a town of Asiatic Turkey, in the government of Sivas; 90 miles N. of Sivas.

VATO, a town on the W. coast of the island of Negropont. N. lat. 38° 20'. E. long. 24° 2'.

VATRANDEL, a town of Hindoostan, in the Carnatic; 4 miles N. of Vellore.

VATTIER, PETER, in *Biography*, an Arabic scholar, was born at Lizieux, in Normandy, and having been educated for the medical profession, was appointed physician and counsellor to Gaston, duke of Orleans, brother of Lewis XIII. To an extensive acquaintance with the ancient naturalists and physicians, both Greek and Latin, he added a peculiar attachment to Arabic writers, and translated many of their works. Among these are "The Mahometan History, or the Forty-nine Caliphs of Elmacin;" "The History of the Great Tamerlane, from the Arabic of Achamed, Son of Guerafpo;" "The Egypt of Mur-tadi;" "The Elegy of Tograi, with some Sentences from the Arabian Poets," &c. He also wrote a work, entitled "Nouvelles Persées sur la Nature des Passions," 1659, 4to. The time of his death is not known. Moreri.

VAVANGA, in *Botany*. See VANGUERIA.

VAVAO, or VAVOU, in *Geography*, one of the Friendly islands, in the South Pacific ocean, seen by Perouse in 1787, who says, "this island, which Capt. Cook never visited, is almost equal in size to Tongataboo, and has the advantage of being never in want of water, with a good harbour." It had been before discovered by the Spanish pilot Maurelle, and with a number of islands almost as considerable as those already explored by Capt. Cook, which he called the islands of Majorca. S. lat. 18° 34' of the western point. See TONGA.

VAVASOR, VALVASOR, *Vavafour*, or *Valvafour*, in our *Ancient Customs*, a diminutive of *vassal*, or *vassour*; signifying a *vassal of a vassal*, or one who held a fee of another vassal.

Yet Camden, and others, hold vavafor to be a dignity, next below that of a baron: he adds, that the word is formed of *vas sortitum ad valetudinem*, a vessel chosen for safety and health. Others derive it à *valvis*, *quasi obligatus sit adflare ad valvas domini, vel indignus sit eas intrare*; as being a person obliged to wait at his lord's door, or as unworthy to enter thereat; but this etymology is ridiculous enough.

Du-Cange distinguishes two sorts of vassals under this denomination: the *great*, called *valvasores*, who held of a king; such were counts and barons: and the *lesser*, called *valvasini*, who held of the former.

The valvasors are mentioned by our ancient lawyers as *virī magnæ dignitatis*; and sir Edward Coke speaks highly of them. But they are now quite out of use; and our legal antiquarians are not agreed upon even their original or ancient office.

VAVASORY, VAVASORIA, the quality of the land, or fee held by a vavafor.

"Quod dicitur de baronia non est observandum in vavatoria, vel aliis minoribus feodis quam baronia, quia caput non habent sicut baronia." Braët. lib. ii. cap. 39.

There are *base* vavafories, and *frank* or *noble* vavafories; according as it has pleased the lord to make his vavafor. *Base* vavafories are those for which the lord of the fee owes fummage, light-horse, rents, or other services. *Free* vavafories are such as are exempt from these services.

VAVASSEUR, FRANCIS, in *Biography*, was born in 1605, at Paray, in the diocese of Autun; and entering into the society of the Jesuits in 1621, and acting as regent in the schools for some years, he was called to Paris to occupy the chair of positive theology, the duties of which he discharged honourably for thirty-six years; and he died in this city in 1681, aged seventy-six years. He has been reckoned one of the most elegant and correct Latin writers, and wrote several theological pieces, some against Janseuism, and one of a singular subject, "On the personal Beauty of Jesus Christ;" and also poems chiefly on sacred subjects. The work which has chiefly distinguished him is a treatise "De Ludicra Dictione," or on the burlesque style, dedicated to Balzac. He also wrote a treatise "On the Epigram;" and "Remarks on the Poetics of Father Rapin." Moreri.

VAUBAN, SEBASTIAN LE PRESTRE, *Seigneur de*, marshal of France, and an eminent engineer, was born in 1633, and began to bear arms at the age of seventeen under the prince of Condé, general of the Spanish army. Being taken prisoner by a French party, he was engaged by cardinal Mazarin on the royal side, and employed in 1653 at the second siege of St. Menchoud, by which it was recovered to France. He also acted as engineer in the five following years at several other sieges. After the peace of the Pyrenées, he was employed in demolishing some places and fortifying others; and he also sug-

gested a variety of ideas, by the maturity and development of which he contributed in a high degree to the improvement of the science of fortification. On the renewal of the war in 1667, he conducted several sieges, at which Lewis XIV. attended in person, and he was commissioned to fortify several places, and in 1668 nominated governor of the citadel of Lille, which he had constructed. After the peace of Aix-la-Chapelle, he visited Piedmont, and gave designs to the duke of Savoy for some important fortresses. In the war of 1672 he again distinguished himself, particularly at the siege of Maeltricht, in which he introduced his famous method of attack by parallels and places of arms; and also on other occasions, when an opportunity offered for the display of his inventive genius. In carrying his schemes into execution he was anxious for saving life, and therefore preferred a slow and regular advance in sieges. The peace of Nimeguen afforded him leisure for fortifying towns; and of these, his master-piece was the port of Dunkirk. On the commencement of war, he again resumed his active services, and had the honour of taking Luxemburg, which was regarded as impregnable. Upon the whole, he fortified one hundred old places, constructed thirty-three new fortresses, and had the principal direction of fifty-three sieges. In recompence of his various exertions, he was advanced to several posts of honour, and in 1703 appointed marshal of France. At Dunkirk, whither he was sent in a state of great alarm, he died of a fluxion in his lungs, in March 1707, at the age of seventy-four years.

The character of Vauban, as a man and a citizen, was no less estimable than his superior talents and achievements in his professional capacity. Loyal and faithful to his sovereign, he studied to serve more than to please, and he manifested on all occasions an inviolable attachment to truth. As a liberal and zealous patriot, he made such observations, and collected such facts in his various travels, as contributed most effectually to the improvement and prosperity of his country. These were comprised in twelve large MS. volumes, which he modestly denominated "Mes Oisivetés;" and Fontenelle observes of him in relation to these, that if all his projects could be executed, his "idleness" would be more useful than his labours. In 1699, he was nominated an honorary member of the Academy of Sciences. The following works were either written by himself, or in consequence of ideas which he suggested: *viz.* "Manière de Fortifier, par M. de Vauban, mise en ordre par le Chevalier de Cambrai," Amst. 1689 and 1692, printed at Paris under the title of "L'Ingenieur François," with notes by Hebert, professor of mathematics; and afterwards with notes by the Abbé du Fay; "Nouveau Traité de l'Attaque et de la Defence des Places, suivant le Systeme de M. de Vauban, par M. Desprez de Saint-Sevin," Paris 1736; "Essais sur la Fortification, par M. de Vauban," Paris 1740; "Projet d'un Dime Royale," Rouen, 1707, often reprinted. This last work is attributed by Voltaire to Bois-Guillebert, author of a "Testament Politique" in the name of Vauban. Fontenelle Eloge. Moreri.

VAUBECOURT, in *Geography*, a town of France, in the department of the Meuse; 9 miles N. of Bar-le-Duc.

VAUCHERIA, in *Botany*, was so named by M. Decandolle, in his *Flore Française*, in honour of the discoverer of the genus, the Rev. M. Vaucher of Geneva, author of an excellent work in quarto, entitled *Histoire des Conservees d'Eau douce*, where this genus is established by the name of *Ethosperma*. The latter appellation has very properly given way to the above, previously chosen by M. Decandolle.—Sm. Engl. Bot. v. 25. 1765. "Decand. Rapport sur les Conservees,

ferves, Soc. Phil. 15." De Theis 478. Vauch. Conf. 25.
—Class and order, *Cryptogamia Algæ*. Nat. Ord. *Algæ*.

Eff. Ch. Anther solitary, awl-shaped, incurved. Capsules adjoining to the anther, ovate, single-seeded, in pairs or solitary.

1. *V. fœffilis*. Sessile-fruited Vaucheria. Engl. Bot. t. 1765. (*Ectosperma fœffilis*; Vauch. Conf. 31. t. 2. f. 7. *Conferva vesicata*; Dillw. Conf. t. 74, without the anther. *Ceramium cœspitosum*; Roth Catal. v. 3. 120.)—Floating. Capsules in pairs and solitary, sessile on each side of the anther.—Found floating on the surface of pools, in large green patches, about February; and consisting of capillary, branched, smooth, rather elastic, tubular filaments, filled with a green pulpy substance, which separates in oblong portions, giving the filament a jointed appearance. Capsules lateral, sessile, pellucid, commonly in pairs, each containing one large green seed, and having next to them an awl-shaped body, asserted by Vaucher to be the anther. Yet sometimes this body seems to shoot out into a branch. Vesicles are often found on the branches, perhaps of the nature of galls, inhabited by the aquatic animalcule called by Muller *Cyclops Lupula*, in considerable numbers, with one dark-coloured animal besides.

2. *V. geminata*. Twin-stalked Vaucheria. Engl. Bot. t. 1766. (*Ectosperma geminata*; Vauch. Conf. 29. t. 2. f. 5.)—Floating. Capsules in pairs and solitary, on opposite partial stalks, growing out of one common stalk with the anther.—Sent by Mr. W. Borrer, along with the preceding, from Suffex. The habit is the same in both, but the *fructification*, furnished with partial stalks, and with a common stalk for both organs, appears to afford a good specific character. Some botanists nevertheless, and among them, if we mistake not, Mr. Dillwyn, consider these two plants as mere varieties of each other.

3. *V. velutina*. Velvet Vaucheria. (*Conferva velutina*; Engl. Bot. t. 1556. Dillw. Conf. t. 77. *Byssus velutina*; Linn. Sp. Pl. 1638. *B. tenerima viridis*, *velutum referens*; Dill. in Raii Syn. 56. Musc. 7. t. 1. f. 14. *B. terrestris viridis herbacea et mollissima*, *filamentis ramosis et non ramosis*; Mich. Gen. 211. t. 89. f. 5.)—Erect, tufted. Filaments beaded, somewhat rigid. Capsules sessile.—This covers the earth, in moist shady places, with a most beautiful fine green velvet carpet, fragrant like several of the *Jungermannia*, even for a long time after it is dried. It appears to be perennial, occurring in summer as well as winter, but has been thought more common than it really is, because Dillenius and others have confounded with this plant a much more general one, *Conferva muralis*, Engl. Bot. t. 1554, which is prostrate, resembling satin rather than velvet, and has no sweet scent. M. Vaucher is our authority for removing this species hither. Micheli has but imperfectly figured the capsules, and in such a manner that they may belong either to those *Confervæ* which make Roth's genus of *Ceramium*, or to *Vaucheria*. Of the anther we know nothing.

We have here limited ourselves to the British species, which may possibly prove but a small part of the genus, when the subject has been sufficiently examined.

VAUCLAIN, LE, in *Geography*, a town of the island of Martinico, situated in a bay on the N.E. coast. N. lat. 14° 36'. W. long. 60° 46'.

VAUCLUSE, a town of France, in the department of the Doubs; 8 miles S.W. of St. Hypolite.

VAUCLUSE, formerly Venaissin, and the principality of Orange, on the left hand of the Rhone, in N. lat. 44°, one of the twelve departments of the S.E. region of France,

bounded on the N. by the departments of the Drôme and Ardèche, on the E. by the department of the Lower Alps, on the S. by the department of the Mouths of the Rhone, and on the W. by that of the Gard. It derives its appellation from the fountain of Vacluse, (see FONTAINE de *Vacluse*;) which is the source of the river Sorgues, and made memorable by the near residence of Petrarch and Laura. Its territorial extent is 3700 kilometres, or 186 square leagues, and its population consists of 190,180 inhabitants. It is divided into 4 circles or districts, 22 cantons, and 150 communes. The circles are, Orange, including 54,293; Avignon, 47,351; Carpentras, 39,714; and Apt, 48,822 inhabitants. According to Hassenfratz, its length in French leagues is 15, and its breadth 10: its circles are 4, its cantons 52, and its population consists of 200,500 persons. Its capital is Avignon. Its contributions, in the eleventh year of the French era, amounted to 1,367,701 francs; and its charges, administrative, judiciary, and for public instruction, were 227,109 francs, 14 cents. This department consists of plains, marshes, gentle eminences, and hills. Mont-Ventoux is upwards of 6000 feet above the level of the sea. The soil is various, and indifferently cultivated. The products are grain, silk, fruits, and roots. In this department are coal impregnated with sulphur, a few metallic substances, potter's-earth, mineral springs, &c.

VAUCOULEURS, a town of France, and principal place of a district, in the department of the Meuse; 8 miles N.E. of Gondrecourt. N. lat. 48° 36'. E. long. 5° 44'.

VAUD, PAYS DE, a country of Switzerland, of which travellers and historians speak with rapture, particularly of that part which borders on the lake of Geneva. It is almost wholly a gradual ascent from the edge of the lake, richly laid out in vineyards, corn-fields, and luxuriant meadows, and chequered with continued hamlets, villages, and towns: the shores are generally of the clearest gravel, and the water of the finest transparency. This country is one of the two great divisions into which the canton of Berne is divided; the other being the German district. The Pays de Vaud, after the decline of the Roman empire, made a part of the kingdom of Burgundy, from which it fell to the empire of Germany, under which the dukes of Zaringen held it as a fief, and at the extinction of that family, it became annexed to the estates of the counts of Savoy. It was conquered from the house of Savoy by the canton of Berne in 1536, and in this year the reformation was introduced. From that period the whole Pays de Vaud, excepting the common bailliages of Grenchon, Orbe, and a small portion of it which was ceded to Friburgh, has been subject to Berne, and forms a part of that canton. The German district was gained by conquest from the estates of the empire. In each of these divisions justice is administered and taxes regulated by peculiar laws and customs. Each division has its treasurer and chamber of appeal resident in the capital; the chamber of appeal belonging to the Pays de Vaud judges in the last resort; but the inhabitants of the German district may appeal to the sovereign council. During the French revolution, the Pays de Vaud was separated from the canton of Berne, and formed into an independent republic under the protection of France, in January 1798. In the new division of Switzerland, it forms the canton or department of Leman, of which Lausanne is the capital. The Pays de Vaud is estimated to be about 60 miles long, and as many broad; bounded on the N. by the county of Neuchâtel, on the E. by the canton of Friburgh, on the S. by the lake of Geneva and the river Rhône, and on the W. by France. It includes the towns and bailiwicks of Lausanne, Yverdon, Moudon, Avenche, Vevey, Morges, and several others.

VAUDEMONT, a town of France, in the department of the Meurte; 4 miles S. of Vezelize.

VAUDEVILLE, a song sung in the streets by ballad-singers, the subject of which is generally jocose or satirical. The origin of this little kind of poem is traced up to the time of Charlemagne. But according to the more general opinion, it was invented by a certain man of the name of Basselin, Foulon de Vere in Normandy; and in order to dance, as people used to assemble in the Val de Vire, they were called Vaux de Vire, and afterwards, by corruption, *Vaudevilles*.

The air of these Vaudevilles is generally very unmusical. But as people merely listen to the words, the tune only helps to enforce the voice and render the words more audible. But, as music, there is in general neither taste, melody, nor measure in their tunes. The Vaudeville, with respect to the words, belongs exclusively to the French, and they are sometimes very piquant and pleasant. Rousseau.

VAUDIER, in *Geography*, a town of France, in the department of the Stura, late in the province of Coni; 5 miles S.E. of Demont.

VAUDOIS, **VALDENSES**, or *Waldenses*, in *Ecclesiastical History*, a name given to a sect of reformers, who made their first appearance about the year 1160.

Of all the sects that arose in this century, none was more distinguished by the reputation it acquired, by the multitude of its votaries, and the testimony which its bitterest enemies bore to the probity and innocence of its members, than that of the *Waldenses*, so called, says Mosheim, from their parent and founder Peter Waldus, or Valdis. They were also called *Leonists*, from Leonz, the ancient name of Lyons, where their sect took its rise. The more eminent persons of that sect manifested their progress towards perfection by the simplicity and meanness of their external appearance: hence, among other things, they wore wooden shoes, which, in the French language, are termed *sabots*, and had imprinted upon these shoes the sign of the cross, to distinguish themselves from other Christians; and on these accounts they acquired the denomination of *Sabbatati* and *Insabbatati*.

The origin of this famous sect, according to Mosheim, was as follows: Peter, an opulent merchant of Lyons, furnished Valdenfis, or Validifius, from Vaux, or Waldum, a town in the marquisate of Lyons, being extremely zealous for the advancement of true piety and Christian knowledge, employed a certain priest, called Stephanus de Evifa, about the year 1160, in translating from Latin into French the four Gospels, with other books of Holy Scripture, and the most remarkable sentences of the ancient doctors, which were so highly esteemed in this century. But no sooner had he perused these sacred books with a proper degree of attention, than he perceived that the religion, which was now taught in the Roman church, differed totally from that which was originally inculcated by Christ and his apostles. Struck with this glaring contradiction between the doctrines of the pontiffs, and the truths of the Gospel, and animated with zeal, he abandoned his mercantile vocation, distributed his riches among the poor (whence the Waldenses were called *poor men of Lyons*), and forming an association with other pious men, who had adopted his sentiments and his turn of devotion, he began, in the year 1180, to assume the quality of a public teacher, and to instruct the multitude in the doctrines and precepts of Christianity.

Beza, and other writers of note, who are followed by Dr. Maclean, the learned translator of Mosheim's History, give different accounts of the origin of the Waldenses; alleging, that it seems evident from the best records, that Valdis derived his name from the true Waldenses of Piedmont,

whose doctrine he adopted, and who were known by the names of Vaudois and Waldenses, before he or his immediate followers existed. If the Waldenses or Waldenses had derived their name from an eminent teacher, it would probably have been from Valdo, who was remarkable for the purity of his doctrine in the eleventh century, and was the contemporary and chief counsellor of Berengarius. But the truth is, that they derive their name from the *valleys* in Piedmont, which in their language were called *vaux*, and hence *Vaudois*, their true name; hence also Peter, or, as others call him, John of Lyons, was called in Latin *Valdis*, because he had adopted their doctrine; and hence the term *Waldenses* or *Waldenses*, used, by those who write in English or Latin, in the place of *Vaudois*. The bloody inquisitor, Reinerus Sacco, who exerted such a furious zeal for the destruction of the Waldenses, lived but eighty years after Valdis of Lyons, and must, therefore, be supposed to know whether or not he was the real founder of the Waldenses or Leonists; and yet it is remarkable, that he speaks of the Leonists as a sect that had flourished above five hundred years; and mentions authors of note to make their antiquity ascend to the apostolic age. See the account given of Sacco's book by the jesuit Gretler, in the *Bibliotheca Patrum*. See also Leger's *Histoire Gen. des Eglises Vaudoises*, cap. 2. 25, 26, 27.

But to return to the history of Peter Valdis. Soon after Peter had assumed the exercise of his ministry, the archbishop of Lyons, and the other rulers of the church in that province, vigorously opposed him. However, their opposition was unsuccessful; for the purity and simplicity of that religion which these good men taught, the spotless innocence that shone forth in their lives and actions, and the noble contempt of riches and honours, which was conspicuous in the whole of their conduct and conversation, appeared so engaging to all such as had any sense of true piety, that the number of their followers daily increased. They accordingly formed religious assemblies in France, and afterwards in Lombardy, from whence they propagated their sect throughout the other provinces of Europe with incredible rapidity, and with such invincible fortitude, that neither fire, nor sword, nor the most cruel inventions of merciless persecution, could damp their zeal, or entirely ruin their cause.

The attempts of Peter Waldus, and his followers, were neither employed nor designed to introduce new doctrines into the church, nor to propose new articles of faith to Christians. All they aimed at was, to reduce the form of ecclesiastical government, and the manners both of the clergy and people, to that amiable simplicity, and primitive sanctity, that characterized the apostolic ages, and which appear so strongly recommended in the precepts and injunctions of the divine Author of our holy religion. In consequence of this design, they complained that the Roman church had degenerated, under Constantine the Great, from its primitive purity and sanctity. They denied the supremacy of the Roman pontiff; and maintained, that the rulers and ministers of the church were obliged, by their vocation, to imitate the poverty of the apostles, and to procure for themselves a subsistence by the work of their hands. They considered every Christian as, in a certain measure, qualified and authorized to instruct, exhort, and confirm the brethren in their Christian course, and demanded the restoration of the ancient penitential discipline of the church, *i. e.* the expiation of transgressions by prayer, fasting, and alms, which the new-invented doctrine of indulgences had almost totally abolished. They, at the same time, affirmed, that every pious Christian was qualified and entitled to prescribe to the penitent the kind or degree of satisfaction or

expiation that their transgressions required; the confession made to priests was by no means necessary, since the humble offender might acknowledge his sins, and testify his repentance to any true believer, and might expect from such the counsel and admonition which his case demanded. They maintained, that the power of delivering sinners from the guilt and punishment of their offences belonged to God alone; and that indulgences, of consequence, were the criminal inventions of fordid avarice. They looked upon the prayers and other ceremonies that were instituted in behalf of the dead, as vain, useless, and absurd, and denied the existence of departed souls in an intermediate state of purification; affirming, that they were immediately upon their separation from the body, received into heaven, or thrust down to hell. These, and other tenets of a like nature, composed the system of doctrine propagated by the Waldenses. It is also said, that several of the Waldenses denied the obligation of infant-baptism, and that others rejected water-baptism entirely; but Wall has laboured to prove, that infant-baptism was generally practised among them. *Hist. of Infant-Baptism*, p. 387, &c.

Their rules of practice were extremely austere; for they adopted, as the model of their moral discipline, the sermon of Christ in the mount, which they interpreted and explained in the most rigorous and literal manner, and, consequently, prohibited and condemned in their society all wars, and suits of law, and all attempts towards the acquisition of wealth, the inflicting of capital punishments, self-defence against unjust violence, and oaths of all kinds.

The government of the church was committed by the Waldenses to bishops, called also *majorales* or elders, presbyters, and deacons; for they acknowledged that these three ecclesiastical orders were instituted by Christ himself. But they thought it absolutely necessary that these orders should resemble the apostles of Christ, and be, like them, unlearned, poor, and furnished with some laborious trade or vocation, in order to gain by constant industry their daily subsistence; and indeed most of the Waldenses gained their livelihood by weaving; whence in some places the whole sect was called the *sect of the weavers*. The laity were divided into two classes, *viz.* the perfect and the imperfect Christians: the former divested themselves of all worldly possessions, manifested in the wretchedness of their apparel, their extreme poverty, and emaciated their bodies by frequent fasting: the latter were less austere, and approached nearer to the method of living generally received, though they abstained from all appearance of pomp and luxury.

The Waldenses were not without intestine divisions; for such of them as lived in Italy differed considerably in opinion from those who dwelt in France, and the other European nations. The former considered the church of Rome as the church of Christ, though much corrupted; they acknowledged, moreover, the validity of its seven sacraments, and solemnly declared they would continue always in communion with it, provided that they might be allowed to live as they thought proper, without molestation or restraint. The latter affirmed, on the contrary, that the church of Rome had apostatized from Christ, was deprived of the Holy Spirit, and was in reality, that whore of Babylon mentioned in the Revelation of St. John. They were also divided in their sentiments concerning the possession of worldly goods. In the fourteenth century, the Waldenses, though they were every where exposed to the fury of the inquisitors and monks, baffled all the attempts that were made to extirpate them. Many of them fled out of Italy, France, and Germany, into Bohemia, and other adjacent countries, where they afterwards associated with the Hussites, and

other separatists from the church of Rome. In the fifteenth century they subsisted in several European provinces, more especially in Pomerania, Brandenburg, the district of Magdeburg, and Thuringia, where they had a considerable number of friends and followers; though, it is said, that many adherents of this sect, in the countries now mentioned, were discovered by the inquisitors, and delivered over by them to the civil magistrates, who committed them to the flames. After the Reformation, in the sixteenth century, the descendants of the Waldenses, who lived shut up in the valleys of Piedmont, were naturally led, by their situation in the neighbourhood of the French, and of the republic of Geneva, to embrace the doctrines and rites of the reformed church. So far down, however, as the year 1630, they retained a considerable part of their ancient discipline and tenets; but being much reduced by the plague in that year, and deprived of many of their clergy, they applied to the French churches for spiritual succour; and the new teachers, sent from thence, introduced several changes into the discipline and doctrine of the Waldenses, and rendered them conformable, in every respect, to those of the Protestant churches in France. In this century they suffered much from the persecution of Philibert Emanuel, duke of Savoy, who at the solicitation of the pope resolved to force his subjects to return to the communion of the church of Rome; and in 1561 sent a Dominican friar, as an inquisitor, with forces to effect his purpose. After ineffectual supplications, they took up arms, and so far prevailed, after enduring very severe distress, as to obtain some degree of liberty and peace.

During the greatest part of the seventeenth century, those of them who lived in the valleys of Piedmont, and who had embraced the doctrine, discipline, and worship of the church of Geneva, were oppressed and persecuted, in the most barbarous and inhuman manner, by the ministers of Rome. This persecution was carried on with peculiar marks of rage and enormity in the years 1655, 1656, and 1696, and seemed to portend nothing less than the total extinction of that unhappy nation. The most horrid scenes of violence and bloodshed were exhibited in this theatre of papal tyranny; and the few Waldenses that survived, were indebted for their existence and support to the intercession made for them by the English and Dutch governments, and also by the Swiss cantons, who solicited the clemency of the duke of Savoy in their behalf. *Mosheim's Eccl. Hist.* vol. ii. iii. iv. *Eng. ed.* 8vo. *Dupin's Eccl. Hist. of the Sixteenth Century*, vol. ii. p. 414.

VAUDREVANGE, in *Geography*, a town of France, in the department of the Meurthe, on the Sarre; formerly a considerable town, but ruined by the wars in Lorraine; 3 miles N. of Sar-Louis.

VAUDREUIL, a town of France, in the department of the Eure. In 1195, the king of France besieged it, and Richard I. king of England, advancing to its relief, a battle ensued, in which the latter had the victory. Vaudreuil had formerly a royal palace; 4 miles N. of Louviers.

VAUGELAS, in *Biography*. See *Claude FAVRE*.

VAUGIRARD, in *Geography*, a town of France, in the department of Paris; 2 miles S.W. of Paris.

VAUGNERAY, a town of France, in the department of the Rhône and Loire; 8 miles W.S.W. of Lyons.

VAULT, FORNIX, in *Architecture*, an arched roof, so contrived, as that the several stones of which it consists, do, by their disposition, sustain each other.

Vaults are to be preferred, on many occasions, to soffits, or flat ceilings, as they give a greater rise and elevation; and, besides, are more firm and durable.

The ancients, Salmafius obferves, had only three kinds of vaults: the firft, the *fornix*, made cradle-wife; the fecond, the *teftitudo*, tortoise-wife, called by the French *cul de four*, or oven-wife; the third, the *concha*, made fhell-wife.

But the moderns fubdivide thefe three forts into a great many more, to which they give different names, according to their figures and ufe; fome are *circular*, others *elliptical*, &c.

The fweeps of fome, again, are larger, and others lefs portions of a fphere: all above hemifpheres are called *high*, or *furmounted* vaults; all that are lefs than hemifpheres, are *low*, or *furbafed* vaults, &c.

In fome, the height is greater than the diameter; in others, it is lefs: there are others, again, quite flat, only made with haunfes; others oven-like, or in form of a *cul de four*, &c. and others growing wider, as they lengthen, like a trumpet.

Of vaults, fome are *single*, others *double*, *cross*, *diagonal*, *horizontal*, *afcending*, *defcending*, *angular*, *oblique*, *pendent*, &c. There are likewife *Gothic* vaults, with *pendentives*, &c.

VAULTS, *Mafter*, are thofe which cover the principal parts of buildings; in contradiftinction to the *lefs*, or fubordinate vaults, which only cover fome little part, as a paffage, a gate, &c.

VAULT, *Double*, is fuch an one as, being built over another, to make the exterior decoration range with the interior, leaves a fpace between the convexity of the one and the concavity of the other: as in the dome of St. Paul's at London, and that of St. Peter's at Rome.

VAULTS with Compartments, are fuch whofe fweep, or inner face, is enriched with pannels of fculpture, feparated by platbands: thefe compartments, which are of different figures, according to the vaults, and are ufually gilt on a white ground, are made with flucco, on brick vaults; as in the church of St. Peter's at Rome; and with plaifter, on timber vaults.

VAULTS, *Theory of*. A femicircular arch, or vault, ftanding on two piedroits, or impofts, and all the ftones that compofe it being cut and placed in fuch manner, as that their joints, or beds, being prolonged, do all meet in the centre of the vault; it is evident, all the ftones muft be in form of wedges, *i. e.* they muft be wider and bigger at top than at bottom; by virtue of which they fustain each other, and mutually oppofe the effort of their weight, which determines them to fall.

The ftone in the middle of the vault, which is perpendicular to the horizon, and is called the *key* of the vault, is fupported on each fide by the two contiguous ftones, juft as by two inclined planes; and of confequence, the effort it makes to fall, is not equal to its weight.

But ftill that effort is greater, as the inclined planes are lefs inclined; fo that if they were infinitely little inclined, *i. e.* if they were perpendicular to the horizon, as well as the key, it would tend to fall with its whole weight, and would actually fall, but for the mortar.

The fecond ftone, which is on the right or left of the key-ftone, is fupported by a third; which, by virtue of the figure of the vault, is neceffarily more inclined to the fecond, than the fecond is to the firft; and, of confequence, the fecond, in the effort it makes to fall, employs a lefs part of its weight than the firft.

For the fame reafon, all the ftones, reckoning from the key-ftone, employ ftill a lefs and lefs part of their weight to the laft; which refting on an horizontal plane, employs no part of its weight; or, which is the fame thing, makes no effort to fall; as being entirely fupported by the impoft.

Now, in vaults, a great point to be aimed at is, that all the feveral ftones make an equal effort in order to fall: to effect this, it is vifible, that as each (reckoning from the key to the impoft) employs a ftill lefs and lefs part of its whole weight; the firft, for inftance, only employing one-half; the fecond, one-third; the third, one-fourth, &c.; there is no other way to make thofe different parts equal, but by a proportionable augmentation of the whole, *i. e.* the fecond ftone muft be heavier than the firft; the third, than the fecond, &c. to the laft; which fhould be vailtly heavier.

M. de la Hire demonftrates what that proportion is, in which the weights of the ftones of a femicircular arch muft be increafed, to be in equilibrio, or to tend with equal forces to fall; which gives the firmeft difpofition a vault can have.

Before him, architects had no certain rule to conduct themfelves by; but did all at random. Reckoning the degrees of the quadrant of the circle from the key-ftone to the impoft; the extremity of each ftone will take up fo much the greater arch, as it is farther from the key.

M. de la Hire's rule is, to augment the weight of each ftone above that of the key-ftone, as much as the tangent of the arch of the ftone exceeds the tangent of the arch of half the key. Now, the tangent of the laft ftone, of neceffity, becomes infinite, and of confequence, its weight fhould be fo too; but as infinity has no place in practice, the rule amounts to this, that the laft ftones be loaded as much as poffible, that they may the better refift the effort which the vault makes to feparate them; which is called the *shoot*, or *drift*, of the vault.

M. Parent has fince determined the curve, or figure, which the extrados, or outfide of a vault, whofe intrados, or infide, is fpherical, ought to have, that all the ftones may be in equilibrio. See ARCH.

VAULT, *Key of a*. See KEY and VOUSOIR.

VAULT, *Reins* or *Fillings-up of a*, are the fides which fustain it.

VAULT, *Pendentive of a*. See PENDENTIVE.

VAULT, *Impoft of a*, is the ftone on which the firft vouffoir, or arch-ftone of the vault, is laid. See IMPOSTS.

VAULT, in the *Manege*. To vault a horfe-shoe, is to forge it hollow, for horfes that have high and round foles; to the end that the shoe, thus hollowed or vaulted, may not bear upon the fole that is higher than the hoof; but after all, this fort of shoe fpoils the feet; for the fole, being tenderer than the shoe, affumes the form of the shoe, and becomes every day rounder and rounder. In Mr. Solleyfel's Complete Horfeman, may be feen the true method of shoeing high and round foles. See SHOE and SHOEING.

VAULT, or *Volte*. See VOLTE.

VAULT, *Going to the*, a term ufed by fportsmen for a hare's taking the ground like a coney, which fhe fometimes does.

VAULT, *Le*, in *Geography*, a town of France, in the department of the Yonne; 3 miles W. of Avallon.

VAULX, a town of France, in the department of the Straits of Calais; 4 miles N.E. of Bapaum.

VAULX Milieux, a town of France, in the department of the Here; 12 miles N.E. of Vienne.

VAUNIA, in *Ancient Geography*, a town of Italy, belonging to the Bechuni. Ptolemy.

VAUNING, in *Mineralogy*. See VAN, VANNING-SHovel, and TIN.

VAUNT, or *VANT*. See VAN.

VAUNT-Lay, among *Hunters*, a fetting of hounds, or beagles, in a readinefs where the chafe is to pafs; and calling them off before the reft of the kennel come in.

VAUQUE-

VAUQUELIN, in *Biography*. See IVETEAUX.

VAUQUELINIA, in *Botany*, a genus dedicated by M. Correa de Serra, now the Portuguese minister to the United States of America, to the honour of the celebrated French chemist M. Vauquelin, whose discoveries have been extended to the vegetable kingdom. Humboldt and Bonpland, *Plantes equinoxiales*, fasc. 6. De Theis 478. We regret that we are furnished with no further account of this genus, nor with any of its characters.

VAUS, in *Geography*, a river of West Florida, which runs into the St. Mark, N. lat. $30^{\circ} 10'$. W. long. $84^{\circ} 36'$.

VAUVENARGUES, a town of France, in the department of the Mouths of the Rhône; 6 miles E.N.E. of Aix.

VAUVERT, a town of France, in the department of the Gard; 9 miles S. of Nismes.

VAUVILLE, a small seaport-town of France, in the department of the Channel, on a bay to which it gives name; 9 miles W. of Cherbourg. N. lat. $49^{\circ} 39'$. W. long. $1^{\circ} 37'$.

VAUVILLERS, a town of France, in the department of the Upper Saône; 12 miles N.W. of Luxeuil.

VAUVINCOURT, a town of France, in the department of the Meuse; 5 miles N. of Bar-le-Duc.

VAUX, LA, a district of Switzerland, in the Pays de Vaud, between Laufan and Vevay, which contains the two pleasant little towns of Lutry and Cully, with the villages of St. Saphorin and Corsier. This district is entirely hilly, rising abruptly from the lake; above the vineyards are rich meadows and a continued forest. In the church of St. Saphorin is an ancient Roman mile-stone with an inscription, which contains two circumstances often questioned; viz. that the banks of the lake of Geneva, which border this part of Switzerland, were comprised within a Roman province, even so early as the time of Claudius, and also that Aventicum was the chief town of this part of Helvetia; for the mile-stones always referred to the capital of the province in which they were placed, and the distance from St. Saphorin to Avenches is nearly 37,000 paces. The inscription is as follows:

TI. CLAUDIUS. DRUSI. F.
CÆS. AUG. GERM.
PONT. MAX. TRIB. POT. VII.
IMP. XII. P. P. COS. III.
F. A.
XXXVII.

VAUXHALL GARDENS, a well-known place of public amusement in the parish of Lambeth and county of Surrey, which belonged, in 1615, to Jane, widow of John Vaux, between whose two daughters the estate was divided, and passed through various hands, till both moieties were purchased, about the middle of the last century, by Jonathan Tyers, esq. It does not appear at what time this place was first opened for public resort; but we are led to conclude from a paper in the *Spectator* (No. 388.), and another in the *Connoisseur* (No. 68.), that it must have been so appropriated in or before the time of queen Anne. Mr. Tyers, who held the premises on lease many years before he bought the estate, opened the Spring Gardens, as they were then denominated, in 1730, and expended large sums in embellishing them. After his death they fell into the possession of several proprietors, of whom the principal is Mr. Barratt. These gardens were, till of late years, opened every evening during a great part of the summer, for the reception of company; but they are now admitted only

three times a week. The entertainments consist of music, vocal and instrumental, illuminations, and fire-works, and other exhibitions. See LAMBETH and TYERS.

VAUZ, in *Geography*, a town of Pennsylvania, on the Susquehanna; 12 miles N.N.W. of Harrisburg.

VAYHINGEN, a town of Wurtemberg, on the Entz, with a castle. This town had formerly counts of its own; 11 miles N.W. of Stuttgart. N. lat. $48^{\circ} 58'$. E. long. $8^{\circ} 59'$.

VAYLOOR, a town of Hindoostan, in Baramaul; 11 miles S.S.W. of Namacul.

VAYPAR, a town of Hindoostan, in the province of Madura; 25 miles E. of Coilpetta.

VAYRÈS, a town of France, in the department of the Gironde; 3 miles S.W. of Libourne.

VAYU, in *Hindoo Mythology*, is a name of the regent of the winds, more commonly called *Pavana*; which see. Vayu is the Eolus of the East. One of the Puranas is named after him, being called Vayu Purana. (See PURANA.) Yah is another of his names.

VAYVODE, or VAIVODE. See WAYWODE.

VAZABU, in the *Materia Medica*, a name by which some authors have called the *acorus Asiaticus*, or Asiatic sweet-flag.

VAZCUSE, in *Geography*, a river of Louisiana, which runs into the Mississippi, N. lat. $38^{\circ} 31'$. W. long. $94^{\circ} 5'$.

VAZUA, in *Ancient Geography*, a town of Africa Propria, between the river Bagradas and the town of Thabraca, according to Ptolemy.

UBALDI, GUIDO, in *Biography*, an eminent mathematician of noble extraction from a branch of the family of Bourbon, studied under Condamine, and made early as well as rapid proficiency. Mathematics and mechanics were his favourite objects; but in the latter science he published a work, entitled "Mecanicorum Liber, in quo hæc continentur:—de Libra, Vestæ, Trochlea, Axe in Peritrochio, Cuneo, Cochlea," Venetiis, 1615, fol. In this work he reduces all machines to the lever, applying the same principle with advantage to some of the other mechanical powers, and particularly to the pulley and its combinations. He also explained the structure of the screw of Archimedes, and its application to the rise of water, in a treatise "De Cochlea, Libri quatuor," Venet. 1615, fol. He illustrated the principles and practice of perspective more fully and clearly than other preceding writers had done, but with needless prolixity, in his "Perspectiva, Libri sex," Pisauri, 1600, fol. His other works, mentioned by Küstner, are "Guidi Ubaldi e Marchionibus Montes (of the Marquisses del Monte) in duos Archimedis Æquiponderantium Libros Paraphrasis, scholiis illustrata," Pisauri, 1588, fol.; "Problematum Astronomicorum Libri septem," Venet. 1508, fol. The time of his birth and also of his death is unknown. Montucla.

UBAMBA, in *Geography*, a town of Brasil, near the coast of the Atlantic; 80 miles S.W. of Rio Janeiro.

UBARCO, CAPE, a cape on the N.W. coast of the island of Iviça. N. lat. $39^{\circ} 5'$. E. long. $1^{\circ} 18'$.

UBATA, in *Ancient Geography*, a town of Africa, S. of Adrumetum. Ptolemy.

UBATUBA, in *Geography*, a river of Brasil, which runs into the Atlantic, S. lat. $23^{\circ} 20'$.

UBAYE, a river of France, which runs into the Durance, near Embrun.

UBEDA, a city of Spain, in the province of Jaen, containing 10 parishes, 8 convents, and about 2900 inhabitants. In 1233, Ubeda was taken from the Moors; 3 miles E. of Jaen. N. lat. $38^{\circ} 3'$. W. long. $3^{\circ} 31'$.

UBENITZ,

UBENITZ, a town of Bohemia, in the circle of Prachatz; 7 miles E. of Prachatz.

UBERAU, a town of Hesse Darmstadt; 6 miles S.E. of Darmstadt.

UBERE, a town of Sweden, in West Gothland; 15 miles S.W. of Skara.

UBERKINGEN, a town of Bavaria, in the territory of Ulm; 13 miles S.W. of Ulm.

UBERLINGEN, a town of Baden, situated on a rock, in a bay of the lake of Constance, which takes its name from it, and its moats are formed of so many stone-quarries. This town is divided into three parts; viz. the Lower Town, the Upper Town, and the Gallenberg; in the last of which are vineyards. It contains in it a collegiate church, a house of the order of St. John, a hospital, three convents, and two other churches. Near the town is a good mineral spring. Uberlingen was an imperial town so early as the time of the emperors of Swabia. Charles IV. and Wenceslaus engaged to maintain it in its immediate independency on the empire; but in 1802, it was given to the duke of Baden; 22 miles N.W. of Lindau. N. lat. 47° 43'. E. long. 8° 49'.

UBERSKO, a town of Bohemia, in the circle of Chrudim; 10 miles E.N.E. of Chrudim.

UBERTI, FAZIO, (BONIFACIO,) *Degli*, in *Biography*, an Italian poet, born at Florence, who flourished in the 14th century. His character is represented as amiable, allowing for his disposition to frequent the courts of tyrants and to pay adulation to the great; but his poverty in a state of exile, as one of the Ghibelline party, has been adduced as an apology for his conduct. He wrote various poems, and according to the account given of him by Villani, he was the first who employed with effect that species of poetical composition called by the vulgar "frottole," or ballads. His principal work, however, written in his advanced age, was a description of the world in verse, intitled "Ditta Mondo." This is divided into six books, but was left in an unfinished state, though written at different periods from the year 1355 to 1364. It was first printed at Verona, and afterwards at Venice in 1501. He is reckoned superior to the Italian poets of his time in energy of style. Some of his Canzone have been published in collections. He died and was interred at Verona.

UBES, St., in *Geography*. (See SETUVAL.) This town would be more considerable if it were not so near to Lisbon, and the trade carried on through Lisbon houses; for here, it is said, there are only fifteen mercantile firms. Its trade consists in wine, of which various kinds are exported. Oranges are likewise exported: but the best commercial article of St. Ubes is salt, which is taken principally by Danish and Swedish ships. The salt-pans lie in great numbers along the Sado or Sandao, and its branches, being called in Portuguese "marinhas." They are dug square, about three feet deep, and salt-water is introduced on one side from the sea, at flood, through canals which extend in innumerable branches, and are shut when the pans are full. The water is often previously collected in large reservoirs called "governos," from which it is afterwards distributed into the marinhas, where being evaporated, the salt is collected in the month of June, and kept either in wooden sheds, or in heaps, which are protected from the rain by rushes. This salt is large-grained, becomes but little moist by the air, and excels in purity the marine salt collected in other provinces of the south of Europe, or in other parts of Portugal. The fishery of St. Ubes was formerly celebrated, but has of late much declined.

Opposite to St. Ubes, on the narrow strip of land that forms the entrance of the harbour, are the remains of an ancient city, called Troya. Tradition reports that this place was buried in sand; and that the inhabitants removed and built St. Ubes on the opposite side.

UBI, or UBY, an island in the East Indian ocean, in the gulf of Siam, near the coast of Cambodia; about 21 miles in circumference, with plenty of wood and good water. N. lat. 8° 26'. E. long. 105° 56'.

UBIGAU, a town of Saxony; 6 miles N.W. of Liebenwerda. N. lat. 51° 34'. E. long. 12° 20'.

UBII, in *Ancient Geography*, a people whose first abode was on the other side of the Rhine, being separated from Gaul by the river. Being afterwards pressed by the Suevi, they had recourse to Cæsar. Agrippa passed the Rhine, according to Dion Cassius, and transported them to the hither bank of the river and established them, with a view to the security of the adjoining frontier of the empire. Under the reign of Claudius, an Agrippine colony was founded among them, and they voluntarily assumed the name of Agrippinenses, as their attachment to the Romans excited the enmity of Civilis. Their territory extended along the Rhine, from the Treveri to the borders of the Gugerni, who had been a branch of the Menapii. The Ubians, on the right bank of the Rhine, were continually harassed by the Sicambri, and in order to avoid the hostility of such neighbours, they were induced to cross the river. Agrippa caused them to build a town, which was called "Civitas Ubiorum," in which he planted a Roman colony, denominated "Colonia Agrippina." This town is the present Cologne. The Ubii formed a part of the Germanic body, which they abandoned in order to enter into a league with the Celtic people. This separation of the Ubians is referred to about the thirty-seventh year before our era. They worshipped the god Mars.

UBIQUISTS, UBIQUITARIES, or UBIQUITARIANS, formed from *ubique*, every where, in *Ecclesiastical History*, a sect of Lutherans, which rose and spread itself in Germany; and whose distinguishing doctrine was, that the body of Jesus Christ is every where, or in every place.

Brentius, one of the earliest reformers, is said to have first broached this error, in 1560. Luther himself, in his controversy with Zuinglius, had thrown out some unguarded expressions, that seemed to imply a belief of the omnipresence of the body of Christ; but he became sensible afterwards, that this opinion was attended with great difficulties, and particularly that it ought not to be made use of as a proof of Christ's corporal presence in the eucharist. (Luther, Oper. tom. viii. p. 375. ed. Jenens.) However, after the death of Luther, this absurd hypothesis was renewed, and dressed up, in a specious and plausible form, by Brentius, Chemnitius, and Andræas, who maintained the communication of the properties of Christ's divinity to his human nature.

Melancthon declared against it; maintaining that it introduced, with the Eutychians, a kind of confusion into the two natures of Jesus Christ; and protested, that he would oppose it as long as he lived.

On the other hand, Andræas, Flacius Illyrius, Schmidelin, Oslander, &c. espoused Brentius's party; and asserted the body of Jesus Christ to be every where.

The universities of Leipzig and Wirtemberg, and the generality of Protestants, set themselves against this new heresy, but in vain: the Ubiquitarians grew stronger and stronger. Six of their leaders, Andræas, Selnecker, Musculus, Chemnitius, Chytræus, and Cornerus, having a meeting in 1576, in the monastery of Berg, they there composed

posed a kind of credo, or formula of faith, called the "Form of Concord;" wherein the ubiquity was established as an article. See *Form of CONCORD*.

Musculus, one of these leaders, and the most zealous advocate of the ubiquity, expressly maintains, that the ascension of Christ into heaven was nothing more than a ceasing to be visible, and that it is not performed by any physical motion, or change of place: and in 1575 he published a book to prove that it is by no means necessary, that the glorious body of Christ should physically fill up any space. And he declares in a sermon in 1564, that they who teach that Jesus Christ died only as to his human nature, belong to the devil, both body and soul; and that the true doctrine is, that he died as to his human and divine nature. Hofpin. *Histor. Sacram. part ii. p. 492. ad ann. 1561. Idem ibid. p. 553. ad ann. 1564. Idem ibid. p. 600. Bayle, art Musculus.*

All the Ubiquists, however, are not agreed: some of them, and among the rest the Swedes, hold that Jesus Christ, even during his mortal life, was every where: others maintain, that it is only since his ascension that his body is every where.

G. Hornius only allows Brentius the honour of being the first propagator of ubiquitism; its first inventor, according to him, was John of Westphalia, or Westphalus, a minister of Hamburg, in 1552.

But according to Hofpinian, Westphalus opposed the opinion concerning the ubiquity advanced by Brentius and Schmidelin. Bayle, art. *Westphalus*.

UBUIST, in the *University of Paris*, is a term applied to such doctors in theology, as are not restrained to any particular house; either to that of Navarre, or Sorbonne.

The Ubiquists are called, simply, *doctors in theology*; whereas the others add, *of the house of Sorbonne*, or *Navarre*, &c. See *SORBONNE*.

UBUIQUITY, OMNIPRESENCE; an attribute of the God-head, whereby he is always intimately present to all things; gives the esse to all things; and knows, preserves, and does all in all things.

For since God cannot be said to exist in all places, as placed therein, (because, then, he would need something to his existence, viz. place; and would have extension, parts, &c.) he must be conceived to be every where, or in all things, as a first, universal, efficient cause, in all his effects.

He is present, therefore, to all his creatures, as a pure act, or an exercise of an active virtue, which knows, preserves, governs, &c. every thing. Nor are even finite minds present otherwise than by operation. See *GOD*.

UBUIQUITY of the King. See *KING*.

UBIRRE, in *Ichthyology*, a name given by some to the anguilla marina, or small sea-eel.

UBIUM, in *Botany*, altered by Rumphius, Herb. Amboin. book 9. 346, from the Malay name *Ubi*, a synonym of some species of *Dioscorea*; see that article. Forster declares all the kinds of *Ubi*, mentioned by Rumphius, to belong to *D. alata*. These differ chiefly in the shape of the roots, and in the stems being furnished or not with fleshy buds, or bulbs, of different forms. These roots constitute one of the most important articles of food, in the remote islands of India and the South Seas.

UBNI, in *Geography*, a town of Walachia; 10 miles N. of Vidin.

UBOA, a town on the west coast of the island of Luçon. N. lat. 16° 57'. E. long. 120° 48'.

UBRAYE, a town of France, in the department of the Lower Alps; 9 miles N.E. of Castellane.

UBRILEN, a town of the Arabian Irak; 5 miles S.E. of Bassora.

UBRIX, in *Ancient Geography*, a town of Africa, on the coast of Libya. Ptolemy.

UCA, a town of Asia, in the interior of Media. Ptolemy.

UCANNO, in *Geography*, a town of Portugal, in the province of Beira; 2 miles N. of Lamego.

UCAYALE, UCAIAL, or YCAYALE, a river of South America, formed by the union of the Apurimac and Ene, in S. lat. 10° 50'. It pursues a northerly course to S. lat. 4° 15', where it joins the Marañon, near St. Joachim de Omaguas, and then takes the name of the Amazons. See *MARAÑON*.

UCENA, in *Ancient Geography*, a town of Asia, in Galatia, belonging to the Trochmi. Ptolemy.

UCENI, a people placed by the inscription on the trophy of the Alps, mentioned by Pliny, near the Medulli and the Caturiges, and supposed by Sanson to be the same with the Siconii or Iconii, mentioned by Strabo.

UCETIA, a town of Gallia Narbonensis.—Also, a town of Gallia Transpadana. Strabo.

UCHALIGES, a people of Africa, in Libya Interior. Ptolemy.

UCHENDGE, in *Geography*, a town of the principality of Georgia, and chief place of a district, situated to the east of Teflis. In 1395, this town was taken by Timur Bee, and the whole garrison put to the sword.

UCHINCHIR, one of the small Kurile islands, in the North Pacific ocean. N. lat. 48° 30'. E. long. 153° 44'.

UCHKILISSA, a town of Persian Armenia; 18 miles N.W. of Erivan.

UCHT, a river of Brandenburg, which runs into the Aland, near Osterburg.

UCHTLHAUSEN, a town of the duchy of Wurzburg; 6 miles E. of Schweinfurt.

UCIBI, in *Ancient Geography*, a town of Africa Pro-pria, in Numidia Nova. Ptolemy.

UCIMATH, a town of Africa, in Libya Interior, upon the northern bank of the river Gir. Ptolemy.

UCKER, in *Geography*, a river of Pomerania, which empties itself into the Frische-Haff, 1 mile N. of Ucker-munde.

UCKER Mark. See *BRANDENBURG*.

UCKER See, a considerable lake of Brandenburg, in the Ucker Mark, situated to the south of Prenzlau.

UCKERMUNDE, a town of Anterior Pomerania, situated on the river Ucker, near its entrance into the Frische-Haff. This town was surrounded with walls in 1190. In the 17th century it suffered greatly by sieges, and the vicissitudes of war; and in 1713, was sacked by the Russians. It has good fisheries, pastures, and woods; 29 miles N.N.W. of Old Stettin. N. lat. 53° 48'. E. long. 13° 57'.

UCKEWALLISTS, in *Ecclesiastical History*, a sect of rigid Anabaptists, so called after its founder Uke Wallis, a native of Friesland. This sectary not only exhorted his followers to maintain the primitive and austere doctrine of Menno, but took it into his head to propagate, in connection with one John Leus, in 1637, a singular opinion concerning the salvation of Judas, and the rest of Christ's murderers; alleging, that the period of time, which extended from the birth of Christ to the descent of the Holy Ghost, and was, as it were, the distinctive term that separated the Jewish from the Christian dispensation, was a time of profound ignorance, during which the Jews were destitute both of light and divine succour; and that, consequently,

quently, the sins and enormities, that were committed during this interval, were in a great measure excusable, and could not merit the severest displays of the divine justice. This idle fiction met with no indulgence either from the Mennonites, who excluded its inventor from their communion, or from the magistrates of Groningen, who banished him from the city. In East Friesland he drew after him a considerable number of disciples, whose descendants still subsist in the neighbourhood of Groningen, Friesland, and also in Lithuania and Prussia, and have their own religious assemblies, separate from those of the other Mennonites. They re-baptize all who leave other Christian churches to embrace their communion: they studiously avoid every appearance of elegance or ornament; suffering their beards to grow to an uncommon length, and their hair to lie uncombed over their shoulders: their countenances are marked with melancholy; and their houses only adapted to answer the demands of necessity. Their inspectors or bishops, whom they distinguish from the ministers whose office is to teach, are chosen by an assembly composed of all the congregations of the sect. The ceremony of washing the feet of strangers is considered by them as a rite of divine institution. They carefully avoid even the aspect of learning and science, and thus prevent all attempts to alter or modify their religious discipline. Mosheim's *Eccles. Hist.* vol. v. 8vo.

UCLES, in *Geography*, a town of Spain, in New Castile. In 1108, a battle was fought near this place between the Christians and the Moors, in which the former were defeated with great loss; 20 miles S.W. of Huete.

UCO, a town of Chili; 9 miles E.S.E. of St. Yago.

UCRIA, a town of Sicily, in the valley of Demona; 8 miles W.S.W. of Pati.

UCRIANA, in *Botany*, so called by Willdenow, in honour of Signor Bernardi di Ucria, a distinguished botanist of Palermo.—Willd. *Sp. Pl.* v. 1. 961. (Tocoyena; *Publ. Guian.* 131. *Juss.* 201. Lamarck *Illustr.* t. 163.)—Class and order, *Pentandria Monogynia*. Nat. Ord. *Rubiaceae*, *Juss.*

Gen. Ch. *Cal.* Perianth superior, of one leaf, short, cup-shaped, with five angles, and five small, erect, acute teeth, permanent. *Cor.* of one petal, tubular; tube extremely long and slender, cylindrical, pervious; limb bell-shaped, with five rather short, ovate, acute, equal, slightly spreading, marginal segments. *Stam.* Filaments five, very short, inserted into the limb between the segments; anthers incumbent, oblong, pointed, of two cells. *Pist.* Germen inferior, elliptical; style the length of the tube of the corolla, thread-shaped; swelling and hairy at the top; stigma of two rounded lobes. *Peric.* Berry elliptical, fleshy, of two cells, crowned by the permanent calyx. *Seeds* numerous, roundish, inserted into the middle of the partition at each side, and surrounded with viscid pulp.

Eff. Ch. Calyx superior, with five teeth, permanent. Corolla with a very long cylindrical tube, and five-cleft, bell-shaped limb. Anthers nearly sessile. Style club-shaped, hairy. Stigma of two flat lobes. Berry of two cells, with many seeds.

1. *U. speciosa*. Willd. n. 1. (Tocoyena longiflora; *Aubl.* t. 50.)—Native of woods in Guiana, bearing flowers as well as fruit in August. *Stem* shrubby, simple, about three feet high, obtusely quadrangular, leafy. *Leaves* opposite, stalked, fifteen inches long, lanceolate, acute, entire, smooth, contracted at the base, with one rib and many transverse veins. *Stipulas* in pairs, intrafoliaceous, ovate. *Flowers* about fourteen, crowded at the top of the stem, sessile, opposite, erect, very fragrant, white, with a yellowish tube, nine inches and a half long, the thickness of a goose-quill. *Calyx* very small. *Berry* yellow, an inch in length.

This plant comes very near to *Gardenia*, or at least to Thunberg's *Rotmannia*. (See *GARDENIA*.) We do not profess to have had sufficient opportunities of comparing them and their allies, to form an accurate judgment. Willdenow has changed the specific name without any authority or reason.

UCUBIS, in *Ancient Geography*, a town of Spain, in Bætica.

UDA, in *Geography*, a river of Russia, which runs into the Velika, 12 miles N.W. of Onegka, in the government of Pskov.—Also, a river of Russia, which joins the Tchiuna, N. lat. 55° 50'. E. long. 99° 22'.—Also, a river of Russia, which runs into the Selenga, near Verch Udiuk.—Also, a river of Russia, which runs into the sea of Ochotz, N. lat. 55° 15'. E. long. 136° 44'.

UDACENSES, in *Ancient Geography*, mountains of Asia, in Corduena, south of the lake Arsilisa, lat. 37° 30'.

UDAL. See *ODHAL*.

UDASSA, in *Geography*, a town of Hindoostan, in Goondwana; 12 miles N.W. of Nagpour.

UDAWANTANAGUR, a town of Hindoostan, in Bahar; 5 miles S.S.W. of Arrah.

UDDALAKA, in *Hindoo Mythology*, is the name sometimes given to a theologian, who is said to be the son of Aruna, the charioteer of the sun. He is not often read of. Respecting his parent, who corresponds with the Aurora of western fable, notice will be found under our article *SURVA*, the common name of the Hindoo Phæbus.

In the theogonies of the Puranas (see *PURANA*), when describing the process of churning the ocean, as mentioned in our article *KURMAVATARA*, a goddess, named Jyeshtha, was produced. She is deemed the goddess of poverty and misfortune, and having rose from the sea earlier than Lakshmi, the goddess of riches and fortune, is called her elder sister. Vishnu, enamoured of the latter, wished to espouse her; but she objected, saying her elder sister, agreeably to the injunctions of the Veda, ought to be married first. And this we may remark, in passing, is a rule in force at this day, though not invariably observed. Vishnu, after much difficulty, prevailed on Uddalaka the Rishi, who was unmarried, to take the undesirable damsel to wife; and Sagara, her father, sealed the nuptial ceremony by pouring water into the hands of the Rishi. (See *SAGARA*.) Jyeshtha, like Lakshmi, is called the daughter of the ocean, and is celebrated as being ever faithful to her consort. She is sometimes called Sreshta.

Under the article *RISHI* will be found an account of the holy men so designated. One of them taking the goddess of poverty to wife, means, we may suppose, the usual profession of poverty by pious persons. It was no small sacrifice of comfort to be linked to such a rib: for Jyeshtha is described to have arisen in black garments, with yellow hair, red eyes, wanting many teeth, those remaining of repelling appearance, her tongue lolling out of her mouth, pot-bellied, &c. &c.; so that gods and demons were amazed at the sight of such a figure. Such a one is described, from an image in the East India House, in our article *KALI*. Her younger sister, on the contrary, is described as superlatively fascinating, but fickle; being a personification of Fortune.

UDDEN, in *Geography*, a town of Arabia, in the province of Yemen; 44 miles E.S.E. of Zebid. N. lat. 13° 58'. E. long. 43° 50'.

UDDER, in *Rural Economy*, a term applied to the glandular organ which is destined for the preparation and secretion of the milk in cows, mares, ewes, fows, or any other kinds of domestic animals, and which is often much subject to disease.

It is to be noticed, that the udders of young cows which are in a high condition, are sometimes very greatly swollen and inflamed for several days before they calve; in which cases, it is mostly proper to milk them frequently in repetition, and alternately to anoint the distended parts, in some severe instances, with a saturnine cooling ointment, and brandy, or some other quickly evaporating spirit; as, by such means, these swellings are often speedily removed, without much danger or inconvenience. But, besides these sorts of swellings, the udders of cows are liable to injuries, which are often of a more serious consequence, as from falls, blows, the wounds of sharp instruments, or such as are pointed, and the violent sucking of calves, as well as from the injudicious or rough treatment of harsh and inexperienced milkers. In all such cases, while the inflammation in the glands remains in a hard and indolent state, the parts so affected should be repeatedly anointed in the course of the day with some gentle cooling substance, such as fresh lard, or with a solution consisting of one ounce of Castile soap, dissolved in a pint and a half of new milk, over a moderate fire, constantly stirring it until it becomes thoroughly mixed and incorporated. An ointment, too, prepared from the juice of the leaves of the common thorn-apple, by mixing it with fresh hog's-lard, is said by some to be an excellent application in cases of this nature. Such tumours may likewise, in many instances, be anointed with a little of a composition, consisting of camphor dissolved in spirit and blue ointment, with great benefit; and about half a drachm of calomel may be given in a hornful of treacle and warm beer, three or four mornings together, if the swelling should continue to increase. Where, however, the udder and teats are considerably inflamed and swelled, other internal remedies may be had recourse to; for which purpose, it has been recommended to mix four ounces of nitre with one pound of common salt, and to give two table spoonfuls of the powder in a gallon of thin water-gruel every three hours. But in case the affection, in such instances, should have made, from neglect, such progress as to display large hardish tumours in the parts, fomentations of the sort given below may often be applied with advantage. Boil in a sufficient quantity of water one handful of the leaves of common hemlock, the same quantity of the dwarf or round-leaved mallow, and an equal proportion of common melilot, and diligently apply the liquid, by means of cloths wrung out of it, to the part or parts, as warm as the beast can bear it. As soon as the tumour or tumours, in this case, bursts or opens, the wound should be well and properly cleaned, and then covered with a pledget of lint, and a plaster of common cerate or basilicon laid over all.

The remedy directed below, it is said, has been employed with great success in very obstinate cases of ulcerated cattle udders: one ounce of gum ammoniacum, the same quantities each of gum galbanum, Castile soap, and extract of hemlock; reduce the gums into powder, and form them with the soap and extract into eight small balls, one of which is to be given to the beast every night and morning. In cases where the teats only are sore, they may first be washed well with clean warm soap-suds, and then rubbed with an ointment, composed of finely powdered ceruse or white lead, which has previously been saturated with brandy, and well mixed and united with a proper quantity of elder ointment or goose-grease.

In the case of sheep too, these parts are often much affected, when the lambs are yeaned in the ewes, the lactiferous ducts in the udders of which are liable to become attacked with various obstructions, which are the consequence of hard tumours or swellings being formed, which are accompanied with inflammation, and which, if not speedily relieved, will terminate in mortification, not unfrequently in the course of twenty-four hours. As soon as such swellings or tumours are discovered, the wool should be shorn off closely in a careful manner, and the part affected be frequently wetted and rubbed well with camphorated spirit of wine. If, however, suppuration should ensue, the part should be laid open by a strong lancet or sharp knife, and the matter be discharged, when a pledget of lint should be laid over the part, and secured by a plaster spread with some soft ointment, or the common cerate rubbed with a little oil. Ewes, when thus affected, should be kept separate from the rest of the flock, and though one of the nipples may be lost, they may be allowed to suckle their lambs; but in cases where both are affected, there is, of course, no alternative but that of fattening them off for sale, and to bring up their lambs by hand in the best manner possible.

The udders and nipples of ewes are likewise very apt to be heated, chafed, and fretted, by which the lambs are prevented from being let suck in a proper and ready manner; consequently, in all such cases, the parts so affected should be kept as cool as possible, and be well washed with a weak solution of white vitriol in rain-water, or be anointed with some mild softening ointment, such as that of elder, or common cerate softened with oil, once or twice in the day; care being taken to have them well removed by the use of warm water and a little soft soap, before the lambs be again admitted to them for suckling.

The diseases of the udders, in the other sorts of domestic animals, are, for the most part, to be treated in a similar manner, according as the nature of them may be; always having the parts carefully cleaned, before the young are suckled.

UDDER-Locking, a term used in the management of sheep, to signify the practice of clearing away the locks of wool from about the udders, and other parts, where the lambs suck, in ewes. Some sheep-farmers have a very high opinion of the necessity and utility of this custom, while others as strongly condemn it, and consider it to be quite unnecessary, as well as dangerous and hurtful both to the ewes and the lambs. It may, however, be useful in different cases and circumstances. The former, or those in favour of the practice, recommend that, immediately before the ewes begin to drop their lambs, they should be carefully driven into the yards, folds, or pens, and have a small part of the locky wool pulled off from about their udders, in order to give the lambs more easy and ready access to the teats or nipples, by which they come forward faster, and succeed better. But the latter, or those who object to the custom, think that they have seen instances where it occasioned not only the death of nearly one-twentieth part of the ewes, but that many of those which survived it lambed dead lambs at the danger and hazard of their own lives. They suppose that there is naturally a sufficient space left bare about these parts, so as to enable the young lambs to find the dugs or nipples; and that the uncovering more, or or a larger extent of parts, serves only to starve and expose the ewes in the most tender and delicate parts; as, although they have been engaged among sheep the whole of their lives, they have never seen a single lamb die from the want of its dam or mother being udder-locked, even though she

may have been ever so young, or ever so rough in such parts: nor have they ever met with any persons who could be certain that they had seen any. How far some breeds of sheep, as those of the Cheviot, may have their lambs more readily or more easily killed or destroyed in this way, or whether it may not be owing to the shape of the udders in their dams, which being more full and exposed in such parts, is not by any means well known; but far less injury or exposure, in this or in any other way, will make that breed of sheep lamb dead lambs, it is said, than in the forest, or probably some other breeds.

But though this practice may often be found prejudicial in the more northern parts of the kingdom, in the southern sheep districts it may not unfrequently be had recourse to with very considerable utility and advantage in different respects.

UDDEVALLA, in *Geography*, a sea-port town of Sweden, in the province of Bahus, with a strong fort and convenient harbour. The inhabitants carry on a considerable trade in iron, planks, and herrings; their number is about 9000; 205 miles W.S.W. of Stockholm. N. lat. $58^{\circ} 21'$. E. long. $11^{\circ} 45'$.

UDEBODE, a town of the island of Ceylon; 60 miles S. of Candi.

UDEGHERRY, a town of Hindoostan, in the Carnatic; 43 miles N.W. of Nellore. N. lat. $14^{\circ} 43'$. E. long. $79^{\circ} 16'$.

UDEM, a town of France, in the department of the Roer; 7 miles S.S.E. of Cleves.

UDERIPCONDA, a town of Hindoostan, in Myfore; 20 miles N.W. of Anantpour.

UDERWANGEN, a town of Prussia, in Natangen; 12 miles S.S.E. of Konigsberg.

UDI, a town of Egypt; 10 miles N. of Atfieh.

UDJARMA, a town of the principality of Georgia, in the province of Kaketi; 24 miles E. of Teflis.

UDICA denotes the projecting part of a barge's stern, on which its name, &c. is printed.

UDINA, or UDINE, in *Geography*, a town of Italy, and capital of Friuli; to which, on the decline of Acquileia, the patriarch removed his seat. It has several churches, convents, and hospitals, a college for the study of law, and a military academy: and it is said to contain between 17,000 and 18,000 inhabitants; 35 miles N.W. of Trieste. N. lat. $46^{\circ} 10'$. E. long. $13^{\circ} 14'$.

UDINE, GIOVANNI DA, in *Biography*, was the cognomen of an assistant of Raffaele in the works of the Vatican, whose real name was Nanni. His family resided at Udine, (where he was born in 1494,) and had there followed the occupation of embroiderers with so much excellence, as at length almost to have lost their own name in that of Ricamatori, by which Vafari often calls him. His father, become rich, amused himself with hunting; and his son Giovanni found his sport, at a very early period of his life, in drawing the animals, birds, &c. brought him from the chase. This indication of taste for painting was encouraged, and the youth was placed under the tuition of Giorgione, at Venice, with whom he acquired a knowledge of colour and chiaro-scuro. About the time of the death of Giorgione he went to Rome, and being furnished by his protector, the patriarch Grimani, with letters to count Baldisare Castiglione, he was introduced to Raffaele, who admitted him into his school, and employed him in painting the grotesque and ornamental accessories of his larger works. The imagination of his master Raffaele, and of himself, was led to the introduction of this species of ornament, by the discovery of the painted chambers in the baths of Titus, then recently

opened, when Giovanni was employed in making designs of the beautiful ornaments in stucco found there, and thence denominated *grotesque*. In pursuing these studies, he discovered the composition of the stucco upon or rather in which they were painted; and with the same materials he, by order of Raffaele, prepared the walls and ceilings of the Loggia, and painted upon it the beautiful series of ornamental combinations of flowers, fruit, animals, vases, &c. since then so much employed in adorning the dwellings of the rich and great. This part of the work was entirely entrusted to Giovanni da Udine, under whose directions a number of ingenious young men were employed; and the taste and ability, the freedom and truth, without minuteness, with which the whole is managed, has ever since been a constant subject of praise and admiration. After the death of Raffaele, he was employed by Clement VII., in conjunction with Pierino del Vaga, to ornament that part of the Vatican called the Torre di Borgia. When he was compelled to leave Rome by the sacking of that city, he was employed for a time at his native place, and afterwards was engaged at Florence in adorning the palace of the Medici; and returning to Rome in the pontificate of Pius IV., left in various places there mementos of his admirable ingenuity. He died there, at the age of seventy, in 1564, and had the honour to be buried in the church of La Rotonda, (the Pantheon,) near the tomb of his renowned master.

UDINE, MARTINO DA, called Pellegrino di San Daniello, was born at the castle of San Daniello, near Udine, about the year 1480, and was a disciple of Giovanni Bellini. He pursued the style of that master in the many religious subjects he treated for altar-pieces at Udine and his native place, where his works are principally to be found; though it is said, in addition to his fame, that something of Giorgione's breadth may be discovered in his latter productions. He died about 1545.

UDINSK, NIZNEL, in *Geography*, a town of Russia, in the government of Irkutsk, situated on the river Uda; 260 miles N.W. of Irkutsk. N. lat. $54^{\circ} 15'$. E. long. $98^{\circ} 50'$.

UDINSK, *Verchnei*, a town of Russia, in the government of Irkutsk, on the Selenga; 88 miles E. of Irkutsk. N. lat. $51^{\circ} 50'$. E. long. $107^{\circ} 20'$.

UDINSKA, a town of Russia, in the government of Irkutsk, at the conflux of the Uda and the Angara; 140 miles W.N.W. of Irkutsk. N. lat. $54^{\circ} 12'$. E. long. $103^{\circ} 14'$.

UDINSKA, *Nov*, a town of Russia, in the government of Irkutsk, on the Uda; 24 miles S.E. of Udinsk.

UDITTA, in *Ancient Geography*, a town of Africa Pro-pria, between the Two Syrtes. Ptolemy.

UDNON, in *Botany*, the name by which Theophrastus and Dioscorides have called the truffle commonly used at table in their times; but we find that they were not acquainted with a better kind of truffle, which we cultivate at present.

This smooth reddish-coated truffle is common in Italy at this time, and is esteemed of no value, and called the wild truffle: the sort that is eaten there, and in all other parts of Europe, is the blackish and rough-coated kind. In Africa they have a yet finer kind than our's: it has a white coat, and is of the most delicious flavour. The Greeks were also acquainted with this, and denominated it Cyrenean, as they did almost all the things they had from Africa: they also gave it the name *nissy*.

UDO, in the *Materia Medica*, a name given by the Portuguese to the lignum aloes.

It seems only a corruption of the monosyllable *ud*, by which

which the Arabian physicians have called that drug; and even this *ud* possibly was only a contraction of the orthography of the word *heud*; which seems to have been the original name of this drug among the Arabs.

UDO, in *Geography*, a town of Japan, in the island of Niphon; 60 miles W.N.W. of Jedo.—Also, a town of Japan, in the island of Ximo. N. lat. $32^{\circ} 30'$. E. long. $132^{\circ} 30'$.

UDON, in *Ancient Geography*, a river of Asiatic Sarmatia; the mouth of which, according to Ptolemy, was in the Caspian sea, between that of Alontas and that of Rha.

UDRIGILL HEAD, in *Geography*, a cape of Scotland, on the W. coast of the county of Ross. N. lat. $57^{\circ} 54'$. W. long. $5^{\circ} 31'$.

UDSL, a town of Japan, in the island of Niphon; 15 miles S.W. of Meaco.

UDSKOI, a town of Russia, in the government of Irkutsk, on the Uda; 1100 miles E.N.E. of Irkutsk. N. lat. $55^{\circ} 16'$. E. long. $135^{\circ} 50'$.

UDSTEIN, a small island near the coast of Norway; 9 miles N.W. of Stavanger.

UDUAR, a town of the island of Ceylon; 26 miles S.S.E. of Colombo.

UDVARHELY, a town of Transylvania; 22 miles N.E. of Schesburg. N. lat. $46^{\circ} 30'$. E. long. $24^{\circ} 54'$.

UDUMNAEVSKOI, a fort of Russia, in the government of Irkutsk; 88 miles S.W. of Nertchinsk.

UDURA, in *Ancient Geography*, a town of Hispania Citerior, belonging to the Taccetani. Ptolemy.

VEA, in *Geography*, a town of Persia, in the province of Segestan; 52 miles N. of Zareng.

VEADAR, in *Chronology*, the thirteenth month of the Jewish ecclesiastical year, answering commonly to our March: this month was intercalated, to prevent the beginning of Nisan from being removed to the end of February.

VEAGUES, in *Geography*, a town of France, in the department of the Cher; 6 miles S.W. of Sancerre.

VEAL TOWN, a town of New Jersey; 14 miles N.N.W. of New Brunswick.

VEAS, a town of Spain, in the province of Seville, on the Odier; 8 miles N.N.E. of Gibrleon.

VEASCIUM, in *Ancient Geography*, a town of Italy, allied to the Romans: it was attacked by the Gauls on their departure from Rome, but they were surpris'd and routed by Camillus. Plutarch says, that the Gauls, on leaving Rome, encamped eight miles from this town in Latium.

VEBRON, in *Geography*, a town of France, in the department of the Lozere; 6 miles S. of Florac.

VECCHI, ORAZIO, in *Biography*, born at Milan, and many years maestro di capella at Mantua, gained great reputation, not only as an able musician, but a poet. His numerous canzonets for three and four voices, published at Milan and Venice, from 1580 to 1613, were reprinted and sung all over Europe. Our countryman, Peacham, who had received instructions in music from this composer, during his residence in Italy, speaks of him in the following manner: "I bring you now mine own master, Horatio Vecchi, of Modena, who, beside goodness of aire, was most pleasing of all other for his conceipt and variety, wherewith all his works are singularly beautified, as well his madrigals of five and six parts, as those his canzonets, printed at Norimberge." (Complete Gentleman, p. 102.) He then instances and points out the beauties of several of his compositions, that were most in favour during that time. Besides secular music,

Vecchi composed two books of sacred songs, in five, six, seven, and eight parts; masses of six and eight voices; and four-part lamentations.

Vecchi has been erroneously supposed by many of his countrymen the inventor of the burletta or comic opera in Italy; and it was the opinion of the learned Muratori (La Perfetta Poesia, lib. iii. cap. 4.), that a musical drama or farce, called Anfiparnaso, written and set by the celebrated Orazio Vecchi, and acted and printed at Venice, 1597, was the origin of the OPERA Buffa; which see.

VECCHIA, PIETRO, born at Venice in 1605, was a painter, educated in the school of Paduanino, but more an imitator of Giorgione and Pordenone; and some of his pictures have been mistaken for works of those masters. Sandrardt relates a story of his having been deceived by a picture of Vecchia, which he mistook for one by Giorgione. From this talent of imitating others, the doge and senate of Venice employed him to copy the ancient works in mosaic which are preserved in the church of St. Marc. And in that church are also two original and very able pictures by him, representing the Crucifixion, and Christ driving the money-changers from the temple. His colouring is rich and warm, and his execution free and full, but sometimes apt to be incorrect. He died in 1678, aged seventy-three.

VECELLI, TIZIANO. See TITIAN.

VECELLI, ORAZIO, son of Titian, born at Venice in 1540, practis'd the art of painting under his father's tuition, but became distinguished only as a painter of portraits, some of which were esteemed as little inferior to those of his father. He died in the same year with his father, 1576.

VECELLI, MARCO, called Marco da Tiziano, was the nephew and disciple of Titian, and born at Venice in 1545. He appears to have been regarded by his great instructor with peculiar favour, and certainly his talent gave him the fairest claim to such distinction; for he approached the nearest to Titian, both in colour and composition, of all his disciples, and has left several original works, very deservedly esteemed, in the Palazzo di San Marco. He also executed several considerable works for the churches in Venice, Trevigi, and in the Friuli. He died in 1611, leaving a son, known by the name of Il Tizianello, who obtained much repute by his paintings, but they are in a loose and mannered style: his best productions are his portraits.

VECHT, in *Geography*, a river which rises in the bishopric of Munster, about six miles N.E. of Coesfeld, crosses Bentheim and Overissel, and runs into the Zuyder See at Gelmuyden.—Also, a river which passes by Utrecht, and runs into the Zuyder See at Mnyden.

VECHTA, a town and fortrefs of Germany, in the bishopric of Munster; 60 miles N.E. of Munster. N. lat. $52^{\circ} 43'$. E. long. $8^{\circ} 18'$.

VECS, a town of Transylvania; 16 miles E.S.E. of Bistritz.

VECTIS, in *Ancient Geography*, an island of the British ocean, S. of the Portus Magnus, or Great Haven, according to Ptolemy and Pliny.

VECTIS, in *Mechanics*, one of the powers, more usually called the lever; which see.

VECTIS, *Heterodromus*. See HETERODROMUS.

VECTOR, in *Astronomy*, a line supposed to be drawn from any planet moving round a centre, or the focus of an ellipsis, to that centre, or focus.

This, by some writers of the new astronomy, is called *vector*, or *radius vector*, because it is that line by which the planet

planet seems to be carried round its centre; and with which it describes areas proportional to the times.

VEDA, the name by which the Hindoos designate the collective body of their scripture. They enumerate eighteen parts of true knowledge, as follow: four Vedas, four Upavedas, six Angas, and four Upangas. The prefixure *up* infers a work deduced from its principal; like our *sub*, implying inferiority.

The first four, according to a native writer, quoted by Sir W. Jones, are the immortal Vedas, evidently revealed by God, which are entitled, in one compound word, *Rig-yajushsamatharva*; or, in separate words, *Rig*, *Yajush*, *Saman*, and *Atharvan*. The Rigveda consists of five sections; the Yajurveda, of eighty-six; the Samaveda, of a thousand; and the Atharvaveda, of nine; with eleven hundred *shuklas*, or branches, in various divisions and subdivisions. The Vedas in truth are infinite; but were reduced by Vyasa to this number and order. The principal part of them is that which explains the duties of man in a methodical arrangement; and in the fourth is a system of divine ordinances.

From these are deduced the four Upavedas; viz. *Ayush*, *Gandharva*, *Danush*, and *Sthapatya*. The first of which was delivered to mankind by Brahma, Indra, Dhanwantari, and five other deities; and comprises the theory of disorders and medicines, with the practical methods of curing diseases. The second, on music, was invented and explained by Bharata: it is chiefly useful in raising the mind by devotion to the felicity of the divine nature. The third Upaveda was composed by Viswamitra, on the fabrication and use of arms, and implements handled in war by the tribe of Kshetriya. Viswakarma revealed the fourth, in various treatises on sixty-four mechanical arts, for the improvement of such as exercise them. Of the personages named above, viz. Brahma, Indra, Viswakarma, Viswamitra, and Vyasa, see under those words respectively. Of Dhanwantari, some mention is made under our article KURMAVATARA.

The six Angas, or bodies of learning, are also, according to the same native authority, derived from the same source. We omit their names and contents: their subjects chiefly are, 1. Of the pronunciation of vocal sounds. 2. Detail of religious acts and ceremonies. 3. Grammar. 4. Prosody. 5. Astronomy. 6. On the signification of difficult words and phrases in the Vedas.

Lastly, continues the same author, there are four Upangas, called *Purana*, *Nyaya*, *Mimansa*, and *Dhermafaitra*. (See PURANA, NYAYA, and MIMANSA.) Eighteen Puranas were composed by Vyasa, for the instruction and entertainment of mankind in general. *Nyaya* is a collection of treatises in two parts, on metaphysics, logic, philosophy, &c. *Mimansa* is similarly divided into two parts; the latter, abounding in questions on the divine nature, and other sublime speculations, was composed by Vyasa in four chapters and sixteen sections. It may be considered as the spring of all the Angas; it exposes the heretical opinions of sophists; and, in a manner suited to the comprehension of adepts, it treats on the true nature of *Ganefa*, *Bhaskara* or the sun, *Nilakantha*, *Lakshmi*, and other forms of *One Divine Being*. Of *Ganefa*, the god of prudence and sagacity, see under POLLEAR. *Bhaskara* is a name of *Surya*. *Nilakantha* is a name of *Siva*, the same as *Shitakoonta*. *Lakshmi* is the consort of *Vishnu*.

The body of law, called *Smriti*, consists of eighteen books, &c. delivered for the instruction of the human species by *Menu*, and other sacred personages. As to

ethics, the Vedas contain all that relates to the duties of kings, the Puranas, what belong to the relation of husband and wife; and the duties of friendship and society (which complete the triple division) are taught succinctly in both. This double division of Angas and Upangas may be considered as denoting the double benefit arising from them in theory and practice.

To the above native account of the Vedas, Sir W. Jones adds an ingenious commentary. He says that the Vedas consist of three *kandas*, or general heads; viz. *Karma*, *Jnyana*, and *Upasana*; or works, faith, and worship. To the first of which, the author of the *Vidyaderasa*, or *View of Learning*, a rare Sanscrit book, wisely gives the preference; as *Menu* himself prefers universal benevolence to the ceremonies of religion.

After all, continues this instructive writer, the books on divine knowledge, called *Veda*, or what is *known*, and *Sruti*, or what has been *heard* from revelation, are still supposed to be very numerous; and the four here mentioned are thought to have been selected as containing all the information necessary for man. It must not be omitted, that the commentaries on the Hindoo scriptures, among which that of *Vasistha* (see VASISTHA) seems to be reputed the most excellent, are innumerable.

From the Vedas are immediately deduced the practical arts of surgery and medicine, music and dancing; archery, which comprises the whole art of war; and architecture, under which the system of mechanical arts is introduced.

Next in order to these are the six Vedangas: three of which belong to grammar; one relates to religious ceremonies; a fifth, to the whole compass of mathematics; and the sixth, to the explanation of obscure words or phrases in the Vedas. Subordinate to these Angas, though the reason of the arrangement is not obvious, are the series of sacred poems (see PURANA), the body of law, and the six philosophical *sastras* or *shastras*. See PHILOSOPHY of the Hindoos, and SHASTAH.

In the commentary whence we quote parts of this article, Sir William Jones gives some of the reasons that induced him and Mr. Wilkins to believe, notwithstanding the mythological fable of Brahma's four mouths, each of which uttered a Veda, that the fourth, or Atharva, was written or collected after the other three; but Mr. Colebrooke, in the eighth volume of the Asiatic Researches, after noticing some texts and arguments on which that belief might be reasonably grounded, gives his own reasons and proofs in support of a contrary opinion. He thinks it probable that some portion at least of the Atharvana, is as ancient as the compilation of the three others; and its name, like theirs, is anterior to Vyasa's arrangement of them; but the same, he adds, must be admitted of the portion called *Itahava* and *Purana*, which constitute a fifth Veda, as the Atharvana does a fourth.

The Hindoos believe that the original Veda was revealed by Brahma, and to have been preserved by tradition until it was arranged in its present form by a sage, who thence obtained the name of Vyasa, or the compiler; or Vedavyasa, that is, compiler of the Vedas. He distributed the Indian scripture into four parts, as already enumerated; each bearing the common denomination of Veda.

With the Hindoos it is an article of their creed, that the Vedas were composed by no human author. It must be understood, therefore, that in affirming the primeval existence of their scripture, they deny these works to be the original composition of the editor (Vyasa), but believe them to have been gradually revealed to inspired writers.

It appeared to Mr. Colebrooke from several other passages, and from the received opinion of the Hindoos themselves, that the Rich, Yajush, and Saman, are the three principal portions of the Veda; and the Atharvana is commonly admitted as a fourth; and that divers mythological poems, entitled Itahafa and Purana, are reckoned a supplement to the scripture, and as such constitute a fifth Veda.

The Vedas are a compilation of prayers, called Mantra; with a collection of precepts and maxims, entitled Brahmana: from which last portion, that called Upanishad is extracted. The prayers are properly the Veda, and apparently preceded the Brahmana. Each Veda consists thus of two parts, the Mantras and the Brahmanas; or prayers and precepts. The complete collection of the hymns, prayers, and invocations belonging to one Veda, is called its Sanhita: every other portion of Indian scripture is included under the general head of divinity (Brahmana): this comprises *precepts*, which inculcate religious duties; *maxims*, which explain those precepts; and *arguments*, which relate to theology. But in the present arrangement of the Vedas, the portion which contains passages called Brahmana, includes many which are strictly prayers, or Mantras. The theology of the Indian scripture, comprehending the argumentative portion entitled Vedanta, is contained in the tracts denominated Upanishad; some of which are portions of the Brahmana, properly so called: others are found only in a detached form; and one is a part of a Sanhita.

Prayers, employed at solemn rites, called Yajnya, have been placed in the three first Vedas: those in prose are named Yajush; such as are in metre are denominated Rich; and some which are intended to be chanted are called Saman; and those names, as distinguishing different portions of the Vedas, are anterior to their separation in Vyasa's compilation. But the Atharvana, not being used at the religious ceremonies above-mentioned, and containing prayers employed at lustrations, at rites conciliating the deities, and as imprecations on enemies, is essentially different from the other Vedas. This is adduced by Mr. Colebrooke as the true reason why the three first Vedas are often mentioned without any notice of the fourth; which must be sought, he says, not in their different origin and antiquity, but in the difference of their use and purport. The fourth, or Atharvana, is known to contain many forms of imprecation for the destruction of enemies. These are called *Mantra* (see that article), but it must not be inferred that such is the chief subject of that Veda; for it contains also a great number of prayers for safety, and for the averting of calamities; and, like the other Vedas, numerous hymns to the gods, with prayers to be used at solemn rites and religious ceremonies, excepting, as above-mentioned, such as are named Yajnya.

Mr. Colebrooke gives a passage from that part of the second, distinguished by the title of the *White* Yajurveda, the other being called the *Black*, confirming his opinions as above indicated, and important, as containing an enumeration of the Vedas, and of the various sorts of passages which they comprise: "As smoke and various substances separately issue from fire lighted with moist wood, so from this Great Being were reformed the Rigveda, the Yajurveda, the Sama-veda, and the Atharva and Angiras; the Itahafa and Purana; the sciences and Upanishads; the verses and aphorisms; the expositions and illustrations: all these were breathed forth by Him."

The commentators remark, that four sorts of prayers (Mantra), and eight kinds of precepts (Brahmana), are here stated. The fourth description of prayers comprehends such as were revealed to, or discovered by Atharvan and Angiras, meaning the Atharvana Veda. The Itahafa designate such

passages, in the second part of the Vedas, as narrate a story. The Purana intends those which relate to the creation, and similar topics. "*Sciences*" are meant of religious worship; "*verses*" are memorial lines; "*aphorisms*" are short sentences in a concise style; "*expositions*," interpret such sentences; and "*illustrations*" elucidate the meaning of the prayers.

The Puranas here meant are not the mythological poems bearing the same title; but, as already mentioned, certain passages interspersed throughout that part of the Vedas called Brahmana, or divine precepts. This distinction is important. Under our article PURANA a pretty full account of those mythological romances will be found.

The subjects and uses of the prayers contained in the Vedas, differ more than the deities which are invoked, or the titles by which they are addressed: every line is replete with allusions to mythology, and to the Indian notions of the divine nature and of celestial spirits. For the numerous ceremonies to be performed by a householder, and still more for those endless rites enjoined to hermits and ascetics, a choice of prayers is offered in every stage of the celebration. It may be here sufficient to observe, that Indra, or the firmament, fire, the sun, the moon, water, air, the spirits, the atmosphere, and the earth, are the objects most frequently addressed; and the various and repeated sacrifices with fire, and the drinking of the milky juice of the moon-plant, or acid asclepias (see SOMALATA), furnish abundant occasions for numerous prayers adapted to the many stages of those religious rites.

In describing the Vedas so replete with mythological allusions, Mr. Colebrooke does not mean a mythology which avowedly exalts deified heroes, as in the Puranas; but one which personifies the elements and planets; and which peoples heaven, and the world below, with various orders of beings. He observed, however, in many places, the groundwork of legends which are familiar in mythological poems; such, for example, as the demon Vritra, slain by Indra, who is thence surnamed *Vritraban* (which see,) but he did not remark any thing, except some detached portions, the genuineness of which appeared doubtful, that corresponds with the favourite legends of those sects which worship either the Linga or Sakti, or else Rama or Krishna. Such portions, he reasonably suspects to have been composed in more modern times, when compared with the other parts of the Vedas. This suspicion is chiefly grounded on the opinion, that the sects which now worship Rama and Krishna as incarnations of Vishnu, are comparatively new: he did not find in any other part of the Vedas the least trace of such a worship. The real doctrine of the whole Indian scripture is the *Unity of the Deity*, in whom the universe is comprehended; and the seeming polytheism which it exhibits, offer the elements, and stars, and planets as gods. The three principal manifestations of the Divinity, with other personified attributes and energies, and most of the other gods of Hindoo mythology, are indeed mentioned, or at least indicated, in the Vedas. But the worship of deified heroes is no part of that system; nor are the incarnations of deities suggested in any other portion of the text which he had seen, though such are hinted at by the commentators.

On the point of unity in doctrine, inculcated with great sublimity and purity, we may refer to some translations from the Vedas by sir W. Jones, in the last volume of his Works.

After giving strong reason for believing the Vedas to be genuine compositions, in opposition to some assertions of their being forgeries, or grossly interpolated, Mr. Colebrooke avows his opinion, that the greater part of the books received by the learned among the Hindoos will assuredly be found genuine;

mine; and has no doubt but the Vedas will appear to be of this description. In pronouncing them genuine, he means to say that they are the same compositions, which, under the same title of Veda, have been revered by Hindoos for hundreds, if not thousands of years. He thinks it probable they were compiled by Dwapayana, the person who is said to have collected them; and who is thence named Vyasa, or the compiler. See VYASA.

The following is the concluding paragraph of Mr. Colebrooke's very instructive paper on the Vedas, in the eighth volume of the Asiatic Researches, to which we have already acknowledged our obligations for a portion of this article.

"The preceding description may serve to convey some notion of the Vedas. They are too voluminous for a complete translation of the whole; and what they contain would hardly reward the labour of the reader; much less that of the translator. The ancient dialect in which they are composed, especially that of the three first Vedas, is extremely difficult and obscure; and though curious, as the parent of a more polished and refined dialect (the classical Sanscrit), its difficulties must long continue to prevent such an examination of the whole Vedas as would be requisite for extracting all that is remarkable and important in those voluminous works: but they deserve to be occasionally consulted by the Oriental scholar." See SHANSKRIT.

We shall now proceed to notice, as briefly as we can, the fabled and believed origin of the Vedas; the reverence in which they are held by Hindoos; their supposed antiquity; and some other points that may incidentally arise in the course of such considerations.

In the Institutes of Menu, chap. i. v. 23, it is laid down, that "from fire, from air, and from the sun, He (the Supreme Ruler) milked out, as it were, the three primordial Vedas, named Rich, Yajush, and Saman, for the due performance of the sacrifice."

Chap. iv. 124. "The Rigveda is held sacred to the gods; the Yajurveda relates to mankind; the Samaveda concerns the manes of ancestors; and the sound of it, when chanted, raises therefore a notion of something impure."

A commentator on the first of these texts explains it by remarking, that the Rigveda opens with a hymn to fire, and the Yajurveda with one in which air is mentioned. Another commentator has recourse to the popular notions respecting the renovations of the universe, at the end of the periods called Kalpa. "In one Kalpa the Vedas proceeded from fire, air, and the sun; in another, from Brahma at his allegorical immolation." See KALPA and PARUSHA.

The most general belief is, that the four Vedas issued from the four mouths of Brahma, as the like number of individuals did in whom originated the four grand civil sects, from appropriate parts of his body (see SECTS of Hindoos); the Brahman, or divine, from his mouth. Now Brahma is fabled to have once had five heads, and in this article we have noticed a fifth Veda. Siva, in one of his forms, is also five-headed; hence called *Panchamuki*; which see. (See also SIVA.) Some authorities attribute the Vedas generally to Pavaka, the god of fire. (See PAVAKA.) Others to Saraswati, the goddess of literature, &c. consort of Brahma. (See SARASWATI.) No female, however, is permitted to read the holy volumes. Sir W. Jones tells us (Af. Ref. vol. iii.), that "the Veda is called also *Agama*; but this title refers more particularly to a mysterious book, or set of books, so named from having come from the mouth of Siva, as the Vedas proceeded severally from the four mouths of Brahma. The same word means also the Veda." The word *Agama*, and similar words in other tongues, seem to imply something mysterious. See OGHAM and O'M.

The idea of impurity arising from the chanting of the Samaveda, is not uniformly held. Mr. Colebrooke informs us, "that a peculiar degree of holiness seems to be attached, according to Indian notions, to the Samaveda, if reliance may be placed on the inference suggested by the etymology of its name, which is expounded as denoting something which *defroys sin*." And this inference, we may remark, is countenanced by the circumstance of Krishna, when enumerating, in the Bhagavat Gita, various orders of beings and things, to the chief of which he compares himself, declaring, that "among the Vedas, I am the Saman." It may be said, however, that this Veda more especially relating to music, over which Krishna, the Hindoo Apollo, presides, he may advert only to its harmonious pre-eminence.

iv. 125. "Let the learned," Menu commands, "read the Veda on every lawful day, having first repeated in order the pure essence of the three Vedas, namely, the Pranava, the Yajhritis, and the Gayatri." Of these see under O'M.

xi. 262. "A priest who should retain in his memory the whole Rigveda, should be absolved from guilt, even if he had slain the inhabitants of the three worlds, and had eaten food from the foulest hands."

263. "By thrice repeating the Mantras and Brahmanas of the Rig, or those of the Yajush, or those of the Saman, with the Upanishads, he shall perfectly be cleansed from every possible sin."

264. "As a clod of earth, cast into a great lake, sinks into it, thus is every sinful act submerged in the triple Veda."

266. "The primary trilateral syllable, in which the three Vedas themselves are comprised, must be kept as secret as another triple Veda: he knows the Veda, who knows the mystic sense of that word." Of which see under O'M.

In the above texts from Menu, we see the propensity of the Hindoos to bring every thing into a ternary arrangement. The three Vedas, and the triple Veda, are ever recurring. In a hymn by Sir W. Jones to the sun, or rather to its ruler, Surya, he says,

"Nor e'en the Vedas three to man explain
Thy mystic orb triform, though Brahma tun'd the strain."

See SURYA. See also TRIMURTI for many instances of this disposition for triune classification.

The philosophical writers and their disciples, who profess to adhere closely to the doctrines of the Veda, are called *Vedantia*; which see.

On the age of the Vedas, we have to observe, that Sir W. Jones (Af. Ref. vol. i.) rejects their claim to the very high antiquity that some warm advocates were disposed to assign to them: he could never believe that they were actually written before the flood; but ventures to assert, that they are far older than any other Sanscrit composition. And in vol. ii. he says, that he "firmly believes, from internal and external evidences, that three of the Vedas are more than three thousand years old." And in vol. iii. that they appear to stand next in antiquity to the five books of Moses. In the preface to the Institutes of Menu, the learned translator deems the three first Vedas to have been composed about three hundred years before the Institutes, and about six hundred before the Puranas, which he is fully persuaded were not the production of Vyasa. The Institutes he supposes to have received their present form about 880 years before Christ's birth. By one mode of reckoning, the highest age of the Yajurveda is carried to 1580 years before the birth of our Saviour, (which would make it older than the Pentateuch,) and the Institutes must then be assigned to about 1280 years before the same epoch: but Sir W. Jones deemed the former date of 880 years
B. C.

B. C. for the Institutes the more probable. This would give the Yajurveda an age, in 1815, of about 2995 years.

Mr. Colebrooke (As. Ref. vol. vii.) infers, from several data there given, the probability that the Vedas were not arranged in their present form earlier than the 14th century before the Christian era; but cautiously marks the inference as vague and conjectural: about 3200 would hence be assumed as the maximum of elapsed years since the present arrangement of the Vedas. And deducing, by Sir William Jones's method, the comparative age of the Puranas, they will be 2500 or 2600 years old at most; and the Institutes 2800. See PURANA and MENU.

As to the relative age of the different Vedas, some differences of opinion will have been seen to exist. We shall only remark farther, that Mr. Wilkins, in the preface to the Gita, observes, that Krishna throughout the whole makes mention of three Vedas only; and those, the three first in their present order; the fourth, proving itself a posterior work, mentions him. On this being noticed to some Pandits who assisted in the translation, they expressed great astonishment at it, as it had escaped all the numerous commentators on the Gita. It may be remarked, in passing, that Menu is often mentioned in the Veda, and the Veda by Menu; a proof of interpolation somewhere.

It is evident that the Vedas are anterior to the heresy or reformation of Budha; one of his leading innovations being the condemnation of the practice of killing and eating animals, as enjoined in the Veda, and by Menu. See SECTS of *Hindoos*, and SRADHA.

So holy are the Vedas esteemed by the Brahmans, that no individual of the fourth, or servile tribe of Sudra, is permitted to read them. In this interdiction are included several other divine works. Both the poems entitled "Mahabarat" and "Ramayana," are likewise esteemed to contain passages and descriptions too awful for the eye of a Sudra: he may bear them read by a Brahman, who is likely to be careful as to what he communicates. Of this see under MAHABARAT, RAMAYANA, SECTS of *Hindoos*, SUDRA, and VAIDYA.

The Yajurveda is declared by Menu, in a text quoted above, to "relate to mankind." It is, as already noticed, ascribed to a celestial physician: it contains an entire Upanishad on the internal parts of the human body; with an enumeration of nerves, veins, and arteries, a description of the heart, spleen, and liver, and various disquisitions on the formation and growth of the fœtus. From this, and from many texts of Menu, we may perceive that the ancient Hindoos were fond of reasoning, in their way, on the mysteries of animal generation; and on the comparative influence of the sexes in the production of perfect offspring. The physiological disputes on this latter point exacerbated, by mythological warmth, appear to have led to violent schisms in religion, and even to bloody wars. See SARASWATI and YONI.

There can be little doubt but the learned world would thankfully receive a faithful uninterpolated translation of such portions of the Vedas as tend to throw light on the state of knowledge among a people who so early engaged in such disquisitions as are contained in the Yajurveda, above indicated. These would, doubtless, be valuable, and are, indeed, necessary to complete the history of universal philosophy, and to supply the scholars of Europe with authentic materials for an account of the opinions anciently formed on this head by the philosophers of Asia. We will not say how far the Atharvana Veda may deserve the honour of translation. It contains a most complete system of

incantations and magical devices; and would be so far curious, as to evince that, both in antiquity and ingenuity, the demagogues of Europe are vastly outstripped by their sapient brethren of the East.

We are not able to state the exact size or extent of the Hindoo scripture, or Veda. The following is as near an estimate as can be made.

The first, or Rig-Veda, contains about 10,000 verses, or rather stanzas, of various measures. The second, or Yajur-Veda, is divided into two; the *white* and the *black* together, they include about 9000 verses. The third, or Sama-Veda, about 3000. The fourth, or Atharva-Veda, about 6000. Of glosses, or commentaries, it is not easy to form any but a vague estimate: but we are, we think, warranted in the opinion, that, supposing the whole could be collected and printed in the manner of our dictionary, they would form a work larger than this!

In all Hindoo writings connected in the least with theology, and, indeed, in many others, extracts from, and allusions to, the Veda, frequently occur. Several articles in this work contain such, and are farther explanatory of the contents of those revered volumes. Those, therefore, desirous of more information hereon, are referred to the following; IDOLATRY, KRISHNA, MATSYAVATARA, SARASWATI, (in which is an extract of some length descriptive of the powers or energies of that goddess,) SHASTAH, SUTTEE, SECTS of *Hindoos*, SITANTA, SRADHA, SUDRA, SURYA, SURYA, TRIMURTI, UPANISHAD.

Veda is the correct way of writing the title of the Hindoo scripture collectively. In different parts of India it is variously pronounced; and it is variously spelt by European writers. Vedam and Bedam are occasionally seen: these are the modes of pronunciation in the Carnatic. Among the Mahrattas, Bede, or Bhade, is not uncommon: and its reputed compiler is called Beafs, and Beafs Muni. (See MUNI.) The Bengal alphabet having no *v*, Bed or Beda is the usual pronunciation in that quarter.

VEDAM, a name sometimes given to the *Veda*; which see.

VEDANGA, in *Hindoo Mythology*, a name of the sun, more commonly called *Surya*; which see. The name of Vedanga seldom occurs, as of the sun; but it is applied to certain portions of books of divine knowledge, as they call them, derived from the Vedas. Of this see under our article VEDA.

VEDANTA, in *Philosophy*, a sect among the Hindoos, so named from their theory being professedly founded on the doctrines contained in the Veda, or scripture, in a degree exceeding that of any other of the philosophical schools or systems. (See VEDA.) The fundamental tenet of this school consists, not in denying the existence of matter, but in correcting the popular notion of it; and in contending that it has no existence independent of mental perception; that existence and perceptibility are convertible terms; that external appearances and sensations are illusory, and would vanish into nothing, if the divine energy, which alone sustains them, were suspended but for a moment. This opinion seems to have been adopted by Epicharmus and Plato, and was maintained in the last century by a writer of our own nation. The founder of this school is named *Vyasa* (which see), and his theory is comprised in a little treatise in four chapters. An attempt has been made to elucidate the obscurity of this writer by the judicious and learned Sankara, in his commentary on the Vedanta. (See some account of him under the article SANKARACHARYA.) His esteemed work is entitled "Bashea." Sir W. Jones, after reading this commentary with great attention,

tion, affirms that it is not possible to speak in too high terms of so excellent a work; and that until an accurate translation of it shall appear in some European language, the general history of philosophy must remain incomplete. See MIMANSA.

The elegant author whom we have already named, touching on the Indian metaphysics of *natural bodies*, according to the most celebrated of the Asiatic schools, from which the Pythagoreans are supposed to have borrowed many of their opinions, remarks, that as the old sages of Europe had, as we learn from Cicero, an idea of centripetal force, and a principle of universal gravitation, which indeed they never attempted to demonstrate; so he would venture to affirm, without meaning to pluck a leaf from the never-fading laurels of our immortal Newton, that the whole of his theology, and part of his philosophy, may be found in the Vedas, and even in the works of the Sufis. (See SUFI.) That *most subtle spirit*, which he suspected to pervade natural bodies, and, lying concealed in them, to cause attraction and repulsion; the emission, reflection, and refraction of light; electricity; calcification; sensation and muscular motion, is described by the Hindoos as a *subtle element*, and endued with those very powers. The Vedas abound with allusions to a force universally attractive, which they chiefly ascribe to the sun, thence called "Aditya," or the *Attractor*.

Sir W. Jones, in his instructive essay on the philosophy of the Asiatics, proceeds to observe, that from all the properties of men and of nature, from all the various branches of science, from all the deductions of human reason, the general corollary admitted by Hindoos, Arabs, and Tartars, by Persians and by Chinese, is the supremacy of an all-creating and all-preserving spirit, infinitely wise, good, and powerful, but infinitely removed from the comprehension of his most exalted creatures. Nor are there in any language (the ancient Hebrew always excepted) more pious and sublime addresses to the Being of beings, more splendid enumerations of his attributes, or more beautiful descriptions of his visible works, than in Arabic, Persian, and Sanscrit, especially in the four Vedas, and in many parts of the Puranas. But supplication and praise would not satisfy the boundless imagination of the Vedanti and Sufi theologists; who, blending uncertain metaphysics with undoubted principles of religion, have presumed to reason confidently on the very nature and essence of the Divine Spirit, and asserted in a very remote age, what multitudes of Hindoos and Mussulmans assert at this hour, that all spirit is homogeneous; that the spirit of God is in *kind* the same with that of man, though differing from it infinitely in *degree*; and that, as material substance is mere illusion, there exists in this universe only one generic spiritual substance, the sole primary cause, efficient, substantial, and formal, of all secondary causes, and of all appearances whatever; but endued, in its highest degree, with a sublime providential wisdom, and proceeding by ways incomprehensible to the spirits which emanate from it.

This doctrine, as it is grounded on the belief of an immaterial Creator supremely wise, and a constant preserver supremely benevolent, differs widely from the pantheism of Spinoza and Toland. Our limits will not allow our enlarging on the principles of the Vedanta philosophy.

We have already noticed the admirable commentary by Sankaracharya on the Vedanta doctrines of Vyasa. In Bengal this work is highly esteemed; but on the western side of India, it is rivalled, in the estimation of the learned, by a more concise gloss, entitled Panchadahi, thought to be not inferior in clearness and accuracy to the *Baheea* of Sankara.

From a statement of the fundamental doctrine maintained by the disciples of the Vedanta school, it has been inferred that their philosophy is founded on the contemplation of one infinite Being, existing under two states or modifications. The first is that of a pure, simple, abstract Essence, immovable and quiescent; the second is that of a Being displaying motion or active qualities. Under the first modification he is called *Brimh*, or the Great Being, and *Kutasth*, or He who sitteth on high; under the second, he is named *Eesh*, the Lord, or *Jiv*, the Soul: or we may say, that *Brimh* is Being in its state of simple essence; *Eesh* is Being exerting energy, and causing the phenomena of the material universe; *Kutasth* is Being existing in sensitive creatures in its pure simple state; and *Jiv* is Being in a sentient active state.

It is rare to find in Vedanta works any attempt to establish its doctrines by any process of reasoning. The authors announce the principles of their sect in a dogmatical authoritative style, as indubitable truths; or establish their assertions by the authority of the sacred text alone, and attribute disbelief to passion and ignorance. Sometimes, indeed, we do perceive an appearance of reasoning and argument, in support of the denial of a material world.

It will be perceived by those who investigate the Vedanta philosophy, that it does not correspond closely either with the Berkeleyan, or with any other system known in the western world. (See BERKELEY.) It does not teach that the Supreme Being is the soul of the universe, as was taught by Virgil (see MAYA); that animate beings are separate detached portions of his essence, or that the visible extended material frame of things is God; but it affirms that the world is one living, unextended, indivisible Being, who puts forth his energy, and excites in himself the phenomena of sensible things, as well as of sensation, passion, &c. In explaining this system, however, the writers frequently make use of such figures as may mislead one who reads only detached passages of Vedanta works, without examining closely the nature of their doctrines. Hence the Vedantas have been supposed to teach the doctrine of *emanations*; and it must be admitted that passages occur, even in the Vedas, apparently countenancing this supposition. (See MURTY.) In the fourth or Atharva Veda it is said, that "as the sparks proceed from fire, so various kinds of animate and inanimate beings proceed from the incorruptible Being." But the best commentators say, that these expressions do not mean that these are separate individual beings, but only whatever is beheld or perceived is the Divine Essence. The Vedanta opinions cannot be represented by any figure: they must be deduced from plain and simple declarations.

The Vedanta philosophy will be found to correspond with the Berkeleyan in this important particular: both deny a material world, referring sensible things to the energy of a living Being. But the analogy appears to extend no farther. In another important particular they are strongly opposed: in maintaining and denying the existence of separate beings, upon whom this energy operates, exciting in their minds the ideas of external things. See more on this subject under our articles *MYSTICAL Poetry*, and *SUFI*.

Having offered this sketch of the Vedanta theory, the practical maxims of this very extended sect will be easily understood. They teach that perfection consists in rest; that motion or action is the origin of the moral distinctions of good and evil, both of which must be renounced, as they involve and imply each other. To the attainment of this sublime state, it is required that the active faculties be annihilated, and the passions and affections subdued; that the individual be totally indifferent to external things, animate and inanimate, to parents, wives, children, relations, goods,

or to whatever causes pleasure, pain, &c. This furnishes a reason why, in some Vedanta works, language very disrespectful is held towards such relatives and friends; so different to the general rule and usage of the Hindoos. When by the practice of rigid austerity, retirement from the world, and contemplation, this quiescent state is attained, the soul perceives that it is Being, and that Being is all things; and thus the soul becomes the one Infinite Essence. Some branches of this rigid austerity and contemplation are called TAPAS and JAP. (See under those words for some account of these practices; and under SECTS of Hindoos, and YOGI, of those who practise them.) Action, say the Vedantis, or religious performances, do not conduct the soul to the state of the Eternal but to *Swergra* (which see), where it continues, until the holiness it hath accumulated be nearly expended by the enjoyment of happiness; when it returns to earth, and takes a body corresponding to its remnant of virtue. Agreeably to this notion, action is condemned, as it tends to retain the soul in the prison of passion and affection. Still, while a person continues to perform the common acts of life, it is incumbent on him to attend to religious duties and rites.

It has been found expedient farther to modify the doctrine, in such a manner as to reconcile it with the ordinary avocations of life, on which depend the existence of society. Accordingly it is held, that the renunciation of the world does not require that a person cease or depart from those avocations; but only that he preserve his mind in a state of perfect indifference and tranquillity. "If it be alleged that the Puranas declare, that Bharata and others did not perform the acts of life; we would ask," says the Panchdashī, "why do you not listen to the Vedas, which declare that wise men eat, act, and procreate?"

It will be necessary to keep in mind that the Vedanta is a philosophical, not a religious system; and that a profession of its tenets is compatible with all the religious sects who admit the authority of the Veda. This may be said likewise of the Sankya, Nyayai, and other philosophical systems. The religious distinctions of the Hindoos result from the peculiar or exclusive veneration paid to a particular deity; and the adoption, as a spiritual guide, of those books which celebrate that deity as the great Being. On this point the reader may consult our articles KRISHNA, SARASWATI, SECTS of Hindoos, SANKYA, SIVA, and others thence referred to, connected herewith.

VEDENSKAIA, in *Geography*, a town of Russia, in the government of Irkutsk, on the Irkut; 34 miles W. of Irkutsk.

VEDENSKOI, a town of Russia, in the government of Vologda, on the Uria; 66 miles E.S.E. of Vielsk.—Also, a town of Russia, in the government of Archangel, on the Voksha; 200 miles E.S.E. of Archangel. N. lat. $58^{\circ} 45'$. E. long. $46^{\circ} 44'$.—Also, a town of Russia, in the government of Tobolsk; 36 miles S.E. of Tomsk.

VEDETTE, in the *Military Art*, a sentinel on horseback, detached from the main body of the army, to discover and give notice of the enemy's designs.

VEDIANTII, according to the orthography of Pliny, written *Vesliantii* by Ptolemy, in *Ancient Geography*, the name of a people, whose capital was Cæmelion (Pliny), or Cemenelium (Ptolemy), situated in the province of the Maritime Alps, according to the Notitia of the provinces of Gaul.

VEDRA, a river of Britain, the mouth of which is placed by Ptolemy on the south-east side, bounded by the German ocean. Horsley differs in opinion concerning this river from Camden and Baxter: he supposes it to be the river Tyne, and they conjecture it to be the Were.

VEDRA, *Cape*, in *Geography*, a cape of Spain, on the coast of Galicia. N. lat. $42^{\circ} 19'$. W. long. $8^{\circ} 51'$.

VEDRO, or WEDDRA, in *Commerce*, a liquid measure in Russia. The cask, farokowoi, or pipe of wine, contains 40 vedros; the vedro, 8 osmuchki or kruschkas; and the kruschka, 11 tscharkays or cups. The vedro in Petersburg contains 621 French, or 752 English cubic inches; hence 1 vedro = $3\frac{1}{4}$ English wine gallons, and 3 kruschkas = 1 English ale gallon. Kelly's Un. Camb.

VEÈNE, in *Geography*. See VEHNE.

VEER, in *Sea Language*, is variously used. *Veering out the rope*, denotes the letting it go by hand, or letting it run out of itself: thus, they say, *Veer more cable*; that is, let more run out.

VEER is also used in reference to the wind: for when it changes often, and suddenly, they say, *the wind veers*.—Or, the wind is said to *veer and haul*, when it alters its direction, and becomes more or less *fair*: thus it is said, to *veer aft*, and to *haul forward*.

VEER and haul, *To*, is to pull a rope tight, by drawing it in and slackening it alternately, till the body to which it is applied requires an additional motion, like the increased vibration of a pendulum, so that the rope is frightened to a greater tension with more facility and dispatch. This method is particularly used in hauling the bow-lines. Falconer.

VEERAPATCH, in *Geography*, a town of Hindoostan; 18 miles W.N.W. of Dindigul.

VEERE, or VERE, or *Terwer*, a sea-port town of Zealand, situated on the northern coast of the isle of Walcheren, communicating with Middelburg by means of a canal. The name given it signifies, in the language of the country, "Passage," and was probably acquired by its being the place from whence they ordinarily pass over to North Beveland. Its ancient name was Kamp Vere. The place is regularly fortified towards the land with strong bastions, and a broad ditch; and towards the sea is a strong wall. The harbour is very good, but lies much exposed to inundations. The arsenal is one of the best in Zealand, and furnished with all manner of stores for a considerable fleet. This is the third walled town in the island of Walcheren, and has the sixth place in the assembly of the states of Zealand. It has three gates towards the land, and one towards the sea, where vessels come from Dort, Zirczee, and other places. The inhabitants are chiefly occupied in the herring-fishery, which is their harvest. There is little to be observed in the town but the stadthouse, began in 1704, and the great church the steeple of which is low and unfinished; 4 miles N. of Middelburg. N. lat. $51^{\circ} 37'$. E. long. $3^{\circ} 35'$.

VEERE Channel, a channel between the Dutch islands of Walcheren and Schouwen.

VEERING, in *Sea Language*, denotes the operation by which a ship, in changing her course from one board to the other, turns her stern to windward. Hence it is used in opposition to *tacking* (which see), wherein the head is turned to the wind, and the stern to leeward. A ship, having made the necessary dispositions to veer, bears away gradually before the wind, till it blows obliquely upon the opposite side, which was before to leeward; and as the stern necessarily yields to this impression of the wind, assisted by the force of the helm, and the action of the waves upon the same quarter, the side which was before to leeward soon becomes to windward. Since, by this movement, a ship loses ground considerably more than by tacking, it is rarely practised except in cases of necessity or delay; as, when the violence of the wind and sea renders tacking impracticable; or when her course is slackened to wait for a pilot, or some other ship in company, &c.

When it becomes necessary to veer the ship, the sails towards the stern are either furled or brailed up, and made to shiver in the wind; whilst those near the head are spread abroad, so as to collect the whole current of air which their surfaces can contain. Hence, while the whole force of the wind is exerted in the fore-part of the ship to turn her about, its effect is considerably diminished, or altogether destroyed, on the surfaces of the after-sails. The fore-part, accordingly, yields to the above impulse, and is put in motion; and this movement, conspiring with that of the wind, pushes the ship about as much as is necessary to produce the effect required. When she is turned so that the wind will act upon that quarter, which was formerly to leeward, her circular motion will be accelerated by extending some of the sails near the stern, as the mizen, and by placing those at the prow more obliquely, which will wheel the vessel round with her bow to the windward; in the same situation, with regard to the wind, as when close-hauled, or tacking. When the tempest is so violent as to prevent the use of sails, the effort of the wind operates almost equally on the opposite ends of the ship, so that the masts and yards situated at the head and stern counter-balance each other. The effect of the helm is also considerably diminished, because the head-way, which gives vigour to its operations, is at this time feeble and ineffectual. Hence it is necessary to destroy this equilibrium which subsists between the masts and yards afore and abaft, and to throw the balance forward, in order for veering. This is accordingly performed by bracing the foremoft yards across the direction of the wind, and arranging those on the main-mast and mizen-mast directly in the line of the wind. If this expedient proves unsuccessful, and it is absolutely necessary to veer, in order to save the ship from destruction, by oversetting or running ashore, the mizen-mast must be instantly cut away, and even the main-mast, if she yet remains incapable of answering the helm by bearing away before the wind. Falconer.

VEERING, in *Husbandry*, a term borrowed of the sailors, and used for the turning of two furrows toward each other, as they must do to begin a ridge; they therefore call the top of a ridge a *veering*; and they call the two furrows that are turned from each other at the bottom between two ridges, a *venting*, that is, an ending, because it makes an end of plowing ridges.

VEERSE, in *Geography*, a town of Germany, in the county of Verden; 10 miles E.N.E. of Rotenburg.

VEGA, **LOPEZ DE LA**, or **LOPE-FELIX DE VEGACARPIO**, in *Biography*, a celebrated and voluminous Spanish poet, was born of a noble family at Madrid, in the year 1562. Having been educated in the university of Alcalá, he occupied several honourable posts, and served on board the grand armada destined against England. After the death of his second wife, he took holy orders at Toledo, and obtained admission into the congregation of priests at Madrid; acting as president, and professing himself as one of the third order of Franciscans. By favour of pope Urban VIII. he was honoured with the insignia of the knights of Malta, and with the title of doctor of theology. He died in 1635, at the age of 73. He was eminently distinguished as a poet, and regarded as the father of the Spanish drama, excelling, as some have asserted, all poets, ancient and modern, in this kind of composition. His "Theatre" occupies twenty-five volumes, each of which contains twelve plays of various descriptions. One of his biographers says of him, that "the inundation of Vega's fancy seems to have been no more than a deluge of very ordinary matter, in which there is little to be praised but an easy eloquence of language, and a faculty of dramatising,

after a manner, stories of every kind. Three hundred pieces could not possibly have been composed otherwise. Nor was this the principal portion of his literary labour; for he has himself affirmed, that upon a calculation it would appear, that he wrote five leaves of MS. for every day of his life." The high degree of admiration he inspired in his own country appeared from the numerous eulogies of which he was the subject after his death. Moreri. Gen. Biog.

VEGA, in *Geography*, a town of Spain, near the N. coast of Asturias; 34 miles N.W. of Oviedo.

VEGA, **La**, a town of the island of Hispaniola; 24 miles S.E. of St. Jago de los Caballeros.—Also, a town of the island of Hispaniola; 62 miles N. of St. Domingo.—Also, a town of Spain, in the province of Leon; 40 miles W.N.W. of Astorga.—Also, a town of Spain, in the province of Leon; 18 miles N.N.E. of Leon.

VEGAMAN, a town of Spain, in the province of Leon; 24 miles N.N.E. of Leon.

VEGENOE, a small island in the North sea, near the coast of Norway. N. lat. 65° 45'.

VEGESELA, in *Ancient Geography*, a town of Africa, in Numidia, upon the route from Theveste to Sitifis, between Mascula and Timphadis, according to the Itinerary of Antonine.—Also, a town of Africa, in the Byfacene territory, on the route from Thenæ to Theveste, between Sufetula and Menegefes. Itin. Anton.

VEGETABLES, in *Agriculture and Gardening*, are all such plants as are found capable of affording useful products as food for man, and different sorts of live-stock. They are constituted and composed of soft and fleshy and solid parts, the latter of which are formed and arranged in such a manner as to afford proper firmness and support in their different growths; and from which proceed those which are often considered as, in some measure, distinct and different in their nature and uses, as the roots, the stems, the leaves, the flowers, the fruits, the seeds, and some others.

The first of these, which differ greatly in different sorts of vegetables, are the parts which connect them with the earth or soil, and the main source of their nourishment and support. They are, in all cases, more or less fibrous in some of their parts; and the more perfectly this takes place, the more capable they are of drawing nourishment from the ground on which they grow. It is, consequently, the fibrous radicles and the leaves that constitute the media through which the growth and increase of vegetables are effected. The fixing of these parts in the earth, too, by the ramifications which they send forth, prevents the vegetables from being overturned by winds and other causes. The form or shape and uses of these parts in different kinds of vegetables differ very materially, having in some cases a branching lateral growth, in others a knobby, and sometimes that which is directly downward, in some instances is fleshy and eatable, and in others woody or sticky, and of no value.

They are very similar in the nature of the different divisions of their parts to the stem or trunk and branches; and may, indeed, be said to be a sort of continuation of the former, terminating in minute ramifications and filaments, and not in leaves; as by burying the branches of certain trees, as the willow, in the earth or soil, as practised by Woodward, and since repeated by many others, and elevating the roots in the atmosphere, there is, as it were, an inversion of the functions of them, the roots producing and becoming buds and leaves, and the branches shooting out into radical fibres and tubes, and forming roots. See **ROOT**.

The second of these parts are those which stand next in importance in vegetables, when considered merely as such, and which include the branches as well as all the more solid parts of them, consisting principally of different coats, as bark, flesh or wood, according to the nature of the vegetable, and pith, or the middle part. These coats or coverings are differently formed, modified, and constituted, so as to be of different uses in their economy. The part, or layer, which is placed next to the wood, is composed, in vegetables of the tree kind, of a soft white substance, not easily discernible in some sorts of trees, but harder and more apparent in others. It is, as it were, an imperfect wood, or in the state between bark and wood. The wood is the compact, fibrous, hard part or substance which is disposed in the middle of trees, which in annual and biennial vegetables is called the flesh, as has been seen already. Between the above coat and the wood, a new ring of a softer nature is formed every year, which gradually loses its softness as the cold season advances, and which towards the middle of winter is converted into a solid ring of wood. These annual rings, which are visible in most trees when cut through transversely, serve as marks by which to determine their ages in some cases. They seem to decrease in breadth as the trees advance in age; and as they are found to be very unequal throughout in their dimensions, their breadth probably varies as the season may be favourable or otherwise. The wood, however, does not only differ from the coats or bark in the degree of hardness, but likewise in its structure, which is essentially different; and the seeming conversion of bark into wood, is imagined by some to be entirely a deception.

Thus, if the branch, stem, or the root of a tree be cut in a transverse manner, it usually displays three distinct bodies or parts: the bark, the wood, and the pith; each of which is again susceptible of a new division. The bark, where perfectly formed, has a thin covering, that may easily be separated; is in laminæ or scales, which, in old trees, are mostly in a loose and decaying state. It is not vascular, but merely defends the interior parts from injuries. It is supposed to be a part of little importance in forest-trees, and the larger shrubs, the bodies of which are firm and of strong texture; but in the reeds, the grasses, and the plants which have hollow stalks, it is of great use, is of very great strength, and appears constituted of a sort of glassy network, which is chiefly siliceous earth, as has been lately ascertained. This is the case in wheat, in the oat, and in different other plants; in some of which it exists in large quantities, and is general in this part of those of the hollow kind. It is serviceable as a support as well as protection from insects in such cases.

The most interior part of the bark is composed of layers, the numbers of which vary with the age of the tree; so that on cutting this part of a tree of several years standing, the productions of different periods may be distinctly seen, though the layer of every particular year can rarely be exactly defined or ascertained. The functions of the different parts of the bark are of great importance to vegetables.

In regard to the wood in trees, it is composed of an external or living part, called sap-wood, and of an internal or dead part, termed heart-wood; the former of which is white, and full of moisture, and in young trees and annual shoots reaches even to the pith. It is the great vascular system of the vegetable through which the sap-juice rises, the vessels in it extending from the leaves to the most minute filaments in the roots. Its structure has different important uses in producing new arrangements, and forming new wood.

In respect to the arrangement of the fibres of the wood, there are two distinct appearances in them: as the series of white shining laminæ, which shoot from the centre towards the circumference, and which constitute what is termed the *silver grain* of the wood; and the numerous series of concentric layers, which are commonly denominated the *spurious grain*, the number of which denotes the age of the tree, as already suggested. The former has many important functions, and is the most distinct in forest-trees; though annual shrubs have even a system of fibres similar to it. See **TIMBER, SAP, and ALBURNUM.**

The stem parts of some vegetables are quite hollow; partly, it is supposed, from such vegetables requiring a more than ordinary supply of air in their support, as they are generally those which are of a quick growth.

The pith is the soft, white, innermost substance of vegetables of the tree and other kinds, that is situated in the centres of the stems.

In the very infancy of the vegetable it occupies but a small space, but gradually dilates; and in shoots of the annual kind, and in young trees, offers a considerable diameter. Being acted on by the heart-wood, as pressed by the new layers of the sap-wood, in the more advanced age of the tree, it begins to diminish, and in very old forest-trees wholly disappears. As it has lately been wholly removed in different young trees, which continued to live and increase; it is evidently only an organ of secondary importance. In early shoots, in vigorous growth, it is filled with moisture, and is a reservoir of fluid nourishment, perhaps, at the time when it is most wanted. As the heart-wood forms, it is more and more separated from the living part, the sap-wood; its functions become extinct, it diminishes, dies, and ultimately disappears. See **STALK and TRUNK.**

The third, or the leaves, are parts which are essential to the existence of vegetables; as when, either of the plant or tree kind, wholly divested, or only stripped of a considerable part of them, they do not shoot in a vigorous manner. They are produced from the coats of the stalks or stems, and are of the soft fleshy thick kind, or the more thin, barked, or woody sort. They are capable of affording nourishment, and of being of use to vegetables, by the nutrient fluid matters which they hold in reserve in their soft substances, and by the dew, air, and moisture, which they take in and throw off.

In all cases the leaves are similar in their interior organization, and perform the same functions as the above parts, only their structure is finer and more minute. The sap-wood spreads and extends itself from the footstalks into the very extremities of the leaves; it preserves a vascular system, and its living powers; some parts of the former of which may be distinctly seen in the leaf. A material use of the leaves is, the exposure of the sap to the influence of the air, heat, and light: for which their surface is extensive, the tubes and cells very delicate, and their texture porous and transparent. In the leaves, much of the water of the sap is evaporated; it is combined with new principles, and fitted for its organizing functions, and probably passes, in its prepared state, from the extreme tubes of the sap-wood into the ramifications of the cortical tubes, and then descends through the bark. On the upper surface of leaves, which is exposed to the sun, the external covering is thick but transparent, and is said to be composed of matter possessed of little organization, which is either principally earthy, or consists of some substance of the homogeneous chemical kind. That in the grasses it is partly siliceous, in the laurel resinous, and in the thorn and maple principally constituted by a substance analogous to wax.

VEGETABLES.

By these arrangements, any evaporation, except from the appropriate tubes, is, it is thought, prevented. On the lower surface of them, the external coat is a thin transparent membrane full of cavities; and it is probably altogether by this surface, it is said, that moisture and the principles of the atmosphere necessary to vegetation are absorbed or taken up.

The leaves in the greater number of plants annually decay, and are reproduced; their decay takes place either at the close of the summer, as in very hot climates, when they are no longer supplied with sap, on account of the dryness of the soil, and the evaporating powers of heat; or in the autumn, as in the northern climates at the commencement of the frosts. In common cases, the leaves preserve their functions no longer than there is a circulation of fluids through them. The colour assumed in the decay of the leaf, seems, it is said, to depend upon the nature of the chemical change; and that as acids are generally developed, it is usually either reddish-brown or yellow; yet there are great varieties. Thus, in the oak it is a bright-brown; in the beech, orange; in the elm, yellow; in the vine, red; in the lycamore, dark-brown; in the cornel-tree, purple; and in the woodbine, blue. The cause of the preservation of the leaves of evergreens during the winter is not well known. It is found that the force of the sap is much less in vegetables of this sort, and there is probably a certain degree of circulation throughout the winter season; their juices are less watery than those of other plants, and probably less liable to be congealed by cold, and they are defended by stronger coatings from the action of the elements. The production of the other parts of the plant may be noticed to take place at the time the leaves are most vigorously performing their functions. If the leaves of a tree be stripped off from it in the spring, it uniformly dies; and when many of those of forest-trees are injured by blasts, the trees are said always to become stag-headed and unhealthy in their growth.

The leaves, it is said, are necessary for the existence of the individual tree; the flowers, noticed below, for the continuance of the species.

In the flowers there are several different organs or parts, the forms, vascular nature, texture, and organization of which serve different important uses and functions. That which contains the rudiments of the seed has it never formed as reproductive, without the aid of the influence of the pollen, or fecundating dust provided for the purpose. This mysterious impregnation is, of course, necessary to the continued succession of the different vegetable tribes.

It has been noticed, that all the parts of a vegetable seem to contribute to the formation of the flowers and fruits of plants; as, although the latter do not swell and ripen until after the former have fallen, their rudiments or first beginnings are in the flowers, of which they properly make a part. These last are consequently temporary parts of vegetables, allotted to the purposes of generation, terminating, as it were, the old vegetables, and beginning the new ones. Fruits consist of nearly the same parts as the stems of vegetables, as a sort of skin or fine coat, which is a production or continuation of that of the bark of an outer soft pulpy substance, and is the same as that continued from the bark, only that its vessels or cells are larger, and it is more succulent and juicy. There is commonly an inner pulp, which is next to the core; and the core itself is nothing more than a hard woody covering, that includes the seed. It is to be noticed, however, that the formation of the fruit is very various: in some cases, the seeds are dispersed through the pulpy substance; in some, instead of a core, a strong woody material is met with, inclosing the seed or kernel, which,

from its great hardness, is termed a stone; in some, there is a number of seeds; and in others, only a single seed, inclosed in a large mass of pulpy matter. See FRUIT.

The seeds are the deciduous parts of vegetables, each seed including the rudiment of a new plant, imbued with the vital principle, which it is capable of retaining for a vast length of time. A seed consists of different parts, as that which is necessary to the production of the new plant or vegetable within the seed, termed the corcule; which is divided and distinguished into the scaly ascending part, named the plumule, and the plain descending part, called the roset; with different others of less importance, some of which are perishable. It has been commonly supposed, and not without probability, that the perfect plant, or the organization necessary to it, exists in the seed, surrounded by a quantity of farinaceous matter, which serves to absorb moisture, and to furnish nourishment to the corcule, until its parts are sufficiently unfolded to draw support from the soil in which it is placed. This is finely illustrated in the dwarf kidney bean, which, when steeped some time in water, and it begins to swell, may be easily separated into its two lobes, between which is seen the nascent plant or vegetable. The stem, and its connection with the lobes, too, are clearly seen; and numberless vessels ramify through the lobes, which directly communicate with the embryo plant or vegetable. And on the external surface of the seed are absorbent vessels, that take up moisture, by which a sort of fermentation is produced, and a liquid material formed, elaborated and prepared by a particular process, which is proper for the nourishment and support of the plant or vegetable, in its first tender growth. In this early growth, the lobes of the seed, which are provided with a mealy material, are likewise found necessary. And the first leaves, or those which are called seminal, are thought to appear not less necessary than the lobes to the perfection of the plant or vegetable; as, if they happen to be broken off or destroyed, the plant or vegetable experiences a proportional loss of strength and vigour in its growth.

There is, therefore, to be distinguished in every seed an organ of nourishment, a nascent plant, and a nascent root. The first of these, in wheat and many grasses, is a single part; in other instances, it consists of more than two parts; but in the greater number, it is simply divided into two.

The seed, which is the last production of vigorous vegetation, is wonderfully diversified in form. That being of the highest importance to the resources of nature, it is defended above all other parts of the plant, it is said, by soft pulpy substances, in the esculent fruits; by thick membranes, in the leguminous vegetables; and by hard shells, or thick external coverings, in the palms and grasses. Though the matter of the seed, in its common state, may appear wholly inert and inactive; when acted upon by moisture, heat, and air, it soon distinctly develops itself, and becomes a complete plant in root and stem.

The above observations have been chiefly taken from the works of Hooper and Davy, to which the reader may be referred. See SEED.

As vegetables are supplied with proper vessels, those of the absorbent kind on the surfaces of them take up the nutritious fluid or material, and convey it to the different parts. The surface of a plant has two sets of absorbents, as already seen, which constitute the absorbent organ of vegetables; as the mouths of the vessels of the radicles of the roots, and those on the surfaces of the leaves. The root, as long as it remains soft and tender, imbibes and takes up the nutritious juices from the earth, by means of the absorbent mouths of its vessels; but as soon as it be-

VEGETABLES.

comes lignous, it emits radicles on every side, which continue the absorption, and convey the matters first to the root, and then to the whole plant or vegetable. Thus, if a plant or tree be transplanted, it succeeds with greater certainty, the more absorbent radicles are preserved with the root. The leaves absorb matters from the surrounding atmosphere, in the same manner as the radicles do from the earth, and convey them to the other parts of the plant or vegetable. It is supposed that, by means of the absorbents, water is distributed to every part of the plant or vegetable, and constitutes its principal aliment; as, deprived of this universal fluid, it droops and dies; but, by its influence, is not only nourished, and the vascular parts of the whole fabric dilated, but it contributes greatly to excite the languishing fibres, and in this way to increase the vital power of the vessels. By means of this system of vessels, too, the atmospherical air, which is essential to the growth of vegetables, is absorbed or taken up; as plants *in vacuo* cannot be evolved from the seed, nor can they afterwards vegetate. This is most probably the reason why seeds, buried very deep in the earth, do not vegetate, but die. See SAP and VEGETATION.

There are many matters or principles in different kinds

of vegetables, which render them particularly useful in the way of food, or beneficial in the products which they afford. The starchy and saccharine principles are particularly important, as possessing the qualities of fattening animals in a high degree. See STARCH, SACCHARINE Matter, and VEGETO-ANIMAL Matter.

The bitter principle prevails very extensively in vegetables, and the natural sort of it is of great importance and utility in the art of brewing, as checking fermentation, and preserving fermented liquors, &c. And there are many other principles in them, which contribute to different useful purposes in several ways. See OIL, VOLATILE Oil, WAX, &c.

The particular nature and properties of the several different principles or parts of vegetables may be seen explained in Davy's Elements of Agricultural Chemistry.

The quantities or proportions of nutritive or soluble matters, which are contained in different vegetables, or substances of that kind, are very different, as shewn in the table given below from the above work, which comprehends the quantities of this sort of matters which are afforded by a thousand parts of different vegetable substances, when submitted to experiment, green, and in their natural states.

TABLE.

Vegetables or Vegetable Substances.	Whole Quantity of nutritive or soluble Matter.	Mucilage or Starch.	Saccharine Matter or Sugar.	Gluten or Albumen.	Extract or Matter rendered insoluble during Evaporation
Middlesex wheat, average crop	955	765	0	190	0
Spring wheat	940	700	0	240	0
Mildewed wheat of 1806	220	178	0	32	0
Blighted wheat of 1804	650	520	0	130	0
Thick-skinned Sicilian wheat of 1810	955	725	0	230	0
Thin-skinned Sicilian wheat of 1810	961	722	0	239	0
Wheat from Poland	950	750	0	200	0
North American wheat	955	730	0	225	0
Norfolk barley	920	790	70	60	0
Oats from Scotland	743	641	15	87	0
Rye from Yorkshire	792	645	38	109	0
Common bean	570	426	0	103	41
Dry peas	574	501	22	35	16
Potatoes	260 to 200	200 to 155	20 to 15	40 to 30	0
Linfeed-cake	151	123	11	17	0
Red beet	148	14	121	14	0
White beet	136	13	119	4	0
Parsnip	99	9	90	0	0
Carrots	98	3	95	0	0
Common turnips	42	7	34	1	0
Swedish turnips	64	9	51	2	2
Cabbage	73	41	24	8	0
Broad and long-rooted clover	39	31.30	3.4	2.3	3.2
White clover	32	29	1	3	5
Sainfoin	39	28	2	3	6
Lucern	23	18	1	0	4
Meadow fox-tail grafs	33	24	3	0	6
Perennial rye-grafs	39	26	4	0	5
Fertile meadow-grafs	78	65	6	0	7
Rough meadow-grafs	39	29	5	0	6
Crested dog's-tail grafs	35	28	3	0	4
Spiked fescue grafs	19	15	2	0	2
Sweet-scented soft grafs	82	72	4	0	6
Sweet-scented vernal grafs	50	43	4	0	3
Fiorin	54	46	5	1	2
Fiorin cut in winter	76	64	8	1	3

VEGETABLES.

These substances comprise some of the most important articles of food in different intentions, and it is suggested as probable, that the excellence of them in this view will be found, in a great measure, to be in proportion to the quantities of this sort of matters they yield or afford; though they cannot be regarded as absolutely denoting their value in this way. Some of the matters have the characters of animal substances, as the albuminous and glutinous; sugar is more nourishing, and extractive matter less so, than any other principles composed of carbon, hydrogen, and oxygen. Certain combinations of these substances, too, may be more nutritive than others. It is stated likewise, on the authority of Sir Joseph Banks, that the miners in Derbyshire, during winter, prefer oat-cakes to wheat bread, as they find that this kind of nourishment enables them to support and keep up their strength, and perform their labour better at that season. But that in summer, they say that oat-cake heats them, and they then consume the finest wheat bread they can procure. It is supposed, that even the skin of the kernel of oats has probably a nourishing power, and is rendered partly soluble in the stomach with the starch and gluten. It is noticed, that in most countries of Europe, except Britain, and in Arabia, horses are fed with barley mixed with chopped straw; and that the straw in this state seems to act the same part as the husk of the oat. Hard thin-skinned wheats are preferred in some parts to those of the soft thick-skinned kinds, as containing a larger quantity of gluten and nutritive matter. See *WHEAT*.

In regard to vegetables of the grass kind, the only substances which have been detected in the soluble matters procured from them, are mucilage, sugar, bitter extract, a substance analogous to albumen, and different saline matters; with feeble indications of the tanning principle in some products from after-math crops. The albumen, sugar, and mucilage, probably, it is thought, when cattle feed on grass or hay, are, for the most part, retained in the body of the animal; and the bitter principle, extract, saline matter, and tannin, when any exists, are probably in common voided in the dung, with the woody fibre. From the great similarity of the extractive matter procured from the fresh dung of cows, to that existing in the soluble products from grasses, and some other facts of the same nature, it appears probable, it is said, that the bitter extract, though soluble in a large quantity of water, is very little nutritive; but probably serves the purpose of preventing, to a certain extent, the fermentation of the other vegetable matters, or in modifying or assisting the function of digestion, and may thus be of considerable use in forming a constituent part of the food of cattle. A small quantity of bitter extract and saline matter is probably all that is needed, and beyond this quantity, the soluble matters must be more nutritive in proportion as they contain more albumen, sugar, and mucilage, and less so in proportion as they contain other substances.

In comparing the composition of the soluble products afforded by different crops from the same grass, it was constantly found, that the largest quantity of truly nutritive matter, was in the crop cut when the seed was ripe, and least bitter extract and saline matter; most extract and saline matter in the autumnal crop; and most saccharine matter, in proportion to the other constituent parts, in the crop cut at the time of flowering. It is supposed that the greater proportion of leaves in the spring, and particularly in the late autumnal crop, accounts for the difference in quantity of extract; and the inferiority of the comparative quantity of sugar in the summer crop, probably depends upon the agency of light, which always tends in plants to convert saccharine matter into mucilage or starch.

No differences have been found in the nutritive produce of the crops of different grasses cut at the same season, which could render it possible to establish a scale of their nutritive powers, but probably the soluble matters of the after-math crop are always from one-sixth to one-third less nutritive than those from the flower or feed crop. In this crop, the extractive and saline matters are certainly usually in excess; but the after-math hay, mixed with summer hay, particularly that in which the fox-tail and soft grasses are abundant, would, it is thought, produce an excellent food or fodder.

In the clovers, the soluble matter from the Dutch clover is said to contain most mucilage, and most matter analogous to albumen: all the clovers contain more bitter extract and saline matter than the common proper grasses. When pure clover is to be mixed as fodder, it should, it is said, be with summer hay, rather than after-math hay.

Other observations on this interesting subject may be seen in the appendix to the above work.

In cultivation, much use and advantage may, in many cases, be derived from changing the natural habits of vegetables, by sowing the seeds of them or planting them at unusual seasons, by placing them in more dry and warm, or more cold and moist situations, and by altering the time of their flowering, or the length of their duration, by cutting parts of them, or in other ways; as by such means some of them, though annual in their nature, may be made to last and afford crops for two or for several years. Others may furnish two or three green crops the same season, and an early one in the succeeding; and so on in a variety of instances in the garden as well as in the field.

VEGETABLES, Injuries or Destruction of Parts of, the affections and mischiefs which are produced in them by different causes, as those of frost, lightning, insects, and some others. It is well known, that trees of the apple and some other kinds, in field fruit-grounds, orchards, and gardens, have their buds, blossoms, and other parts, often affected or destroyed by a sort of blight or canker induced by such causes; in consequence of which there are great failures in the crops of them. The mischievous effects of frost in this way may frequently be clearly traced, though they are seldom greatly injurious, when it is of the dry kind, unless it be very severe; but most certainly so, when it succeeds to large falls of rain. Sudden transitions from heat to cold are hurtful to vegetables: by warmth the vessels of them are expanded, and their juices flow freely: a sudden application of cold causes a sudden contraction of their parts, without a proportionate diminution of the fluids which they contain, which being thus unnaturally checked in their current, become stagnant and diseased. Rain is congenial to the growth of vegetables; and while Nature disposes them to open all their pores, by which its influence can be received, when overtaken by frost in such a situation, the consequence must be injurious or fatal. It has been said by a philosophical writer, in speaking of the action of cold or frost, that besides its opposition to the adequate fluidity of the vegetable juices, it must be unfriendly to the animation of the solids, causing either local canker, or death of the whole vegetable. That when the vegetable fluids are chilled, and converted into ice, their bulk is vastly enlarged, and this enlargement sometimes takes place with such extreme violence as to rend them in pieces. In this way, frost, it is thought, destroys those parts of vegetables which are most succulent, particularly in that form of it which is called hoar-frost, or rime, so common in the spring season. The moisture of fog too is said to be equally mischievous, as far as it extends. Thus, in a fruit district, in one night at this season, a most promising

8
ing

ing blossom has been cut off; the elm, oak, and ash, being injured at the same time: the line of devastation was precisely marked, proceeding in a horizontal manner through a certain vale tract, to the height of about thirty-five feet; the trees that grew on higher ground not being touched. The explanation of this circumstance seems, it is said, to be, that the fog, which rises more or less every evening, especially after a warm day, was, during the night, in this instance, suddenly succeeded by a smart frost, which seized the moistened parts to the point of elevation of the fog, and produced the mischief. Cold winds coming on after a day or two of sun-shine, may likewise prove destructive of the blossom in such cases of apple-trees in these fruit-grounds. On this account, in a northern exposure, the fruit is not unfrequently preserved, while in others it is destroyed; for the sun, not having much influenced the trees in this situation, they are left to the prevailing temperature of the season, and thus enabled to bear the cold north-easterly blasts of the night without being hurt.

Though the second of the above causes is much believed to be hurtful to the trees in fruit-grounds by those engaged in them, the opinion has been considered as unfounded by some. If, however, the partial manner in which some trees and hedges are affected be considered, it will be difficult, it is thought, to account for the effect in any other way. This cause, like that of frost, may affect vegetables by its expansive power, bursting their vessels as it passes through them. In some cases, a single limb of a tree, in one night, loses all its foliage, and ceases to vegetate: in others, one tree of many in a fruit-ground; or a row of trees in the same direction; and sometimes whole fruit-grounds are affected in the same manner, and are difficult of recovery. The mischief is mostly done in a night, and with great uncertainty, as neighbouring trees in the very same directions often escape.

In respect to the last of these causes, it has been observed, that frosty nights, with a north-east wind, in the spring, succeeding a warm day, are particularly injurious to the blossom of the apple; the warmth of the day hatches the ova or eggs of the insect which breeds in it, while the coldness of the night, by checking the progress of the sap, keeps the blossom in its half-expanded state, to form a nidus for them. The opinion of apple-growers, too, is in support of this in most districts and situations. But whether insects are caused in this way, or by the diseased state of the trees, the most promising mode of preventing the ravages and destruction which they commit on the leaves, buds, and blossoms of such trees, is that of smoking them well by means of some proper substance, to which a little sulphur has been added. In this way they may mostly be got the better of without much trouble.

The other causes of mischief have been noticed under their proper heads.

Many other sorts of vegetables of the tree and other kinds are likewise liable to be affected, injured, or destroyed in their parts by these causes, the prevention of which may be attempted by similar means. See *Diseases of Plants* in Smith's Introduction to Botany.

VEGETABLE Acid. See ACID, and VINEGAR.

VEGETABLE Ashes, in *Agriculture*, the substances of this sort which are produced from vegetables of different kinds by incineration. They differ much in their nature and quantities as afforded by different vegetables. In general, those of the herb sort furnish four or five times, and those of the shrub kind two or three times as much ashes as those of trees. The leaves in common produce more than the branches, and the branches more than the trunks. Those

burnt in a green state afford more ashes than such as are consumed in a dry condition. The quantities of ashes that are afforded by some common vegetables are, in 10,000 parts of the thistle, 53 of ashes; in the same number of fern, 62; in that of the sow-thistle, 196; in wormwood, 730; in vetches, 275; in beans, 200; and in fumitory, 790: while in the same number of parts of the poplar-tree, 7 of ashes are only afforded; in the beech, 12; in the oak, 15; in the elm, 39; and in the vine, 55. Such vegetable ashes as contain alkalies, are capable of being applied to land with advantage in some cases. The oxyds of metals are sometimes found in the ashes of vegetables, but only in very minute quantities. In cases where the vegetable ashes are of a reddish-brown appearance, they are mostly impregnated with the oxyds of iron; but where they have a black or purple cast, with that of the oxyd of manganese; and where these different colours are blended, they contain both such substances of the oxyd kind.

The different saline compounds contained in vegetables, or afforded by the incineration of them, are extremely various, and have been considered under their several proper heads. See *SULPHATE of Potassa*, &c. *PHOSPHATE of Lime*, &c.

The quantities of soluble saline matters, metallic oxyds, and other substances which are afforded by the ashes of different vegetables, may be seen in a table inserted in the "Elements of Agricultural Chemistry."

These points may serve to direct and assist the farmer in the preparation and application of vegetable ashes in the most economical and beneficial manner, where they can be had recourse to with propriety as a dressing on land or over crops of some kinds. See *ASHES and WOOD-Ashes*.

VEGETABLE Earth, or Mould, that sort of fine reduced earthy material, which is formed and produced by the destruction and decay of different vegetable productions and matters, either upon the surface, or in the more interior parts of the land. The term is, however, more generally applied to the peculiar earthy substance, or body, which constitutes the superficial layer of fine black or dark coloured mould, in which plants, for the most part, strike or take root, and grow in every sort of ground or soil, and which varies very greatly in different situations and circumstances, in consequence of the variations that happen in respect to its depth, and the progress it has made towards the state of perfect decomposition and destruction, as well as from the nature of the vegetable substances and matters of which it is constituted and composed. It has been suggested too, as acquiring some diversity or difference of quality on account of its being more intimately or more loosely mixed and incorporated with the other bodies and materials that are found to constitute land: and, likewise, that the earthy matter which is formed from the destruction of some particular sorts of vegetable materials, may be better suited for the purposes of vegetation than that which proceeds from others. It is an earthy material, which, besides being produced both by the dissolution and reduction of vegetable matters, as above, may probably be partly too acquired from the air, water, and light; by the process of vegetation, and partly from the properties of the lands in or on which it exists. In some cases it is of very considerable depth, while in others it forms merely a thin superficial coat or covering of the land; and there are still other cases, in which it is scarcely visible, or met with at all.

It may be noticed, that vegetables, in consequence of their having in their composition a large proportion of mucilaginous matter in a state of mixture with their other materials or substances, especially in some sorts, are in some degree

VEGETABLES.

gree capable of being dissolved in water, though the external coats or coverings of living plants, principally on account of the resinous material that enters into their composition, are preserved from its action and effects. It is plain, that in consequence of the first of these circumstances, and that of earthy matters being contained in them, which had been taken up in the state of solution or diffusion with their fresh fluids or juices while growing, that considerable quantities of vegetable earth or mould must be continually formed and deposited on lands by the natural dissolution and decay of such bodies. But its formation and provision are much more abundantly effected by means of the putrefaction and destruction of such vegetable productions as are cut down, or otherwise destroyed, on the surface of the land, and the laying of different kinds of manures and compost materials upon it. In cases where these have been in great abundance for a long time, there is mostly, it is said, a deep rich surface bed of this earth or mould; but that where few vegetable products, and those of the less luxuriant kind, have been left to undergo the above processes, or little assistance given by means of manures, the crust of surface earth or mould is commonly very thin and poor. In all cases, it is evident that the dissolution and decay of vegetable materials must be greatly promoted and expedited by a proper degree of moisture, and suitable state of heat; the atmosphere being at the same time in a proper condition for the purpose. The close and stagnated state of different sorts of luxuriant tall growing crops of the grass, herb, plant, or other kinds, have likewise much effect in the forming and elaborating of this mouldy material, by the decaying foliage thereby promoted, falling down and being so much deposited on the land.

All these materials, during the state of decay, undergo different changes in their constituent principles or parts; the water which they contain being decomposed, pure air or oxygen is absorbed, heat disengaged, and new compositions of the aerial and saline kinds formed; by which means a number of matters are prepared and fitted for the use and support of vegetable life, which could not have been supplied in any other way, as well as rendered much more extensively applicable in this intention than they could otherwise possibly have been.

It is advised, that in order to promote the formation and production of vegetable earth or mould, recourse should be had not only to such substances as accelerate the putrefactive process, but also to such as have a tendency to increase the solubility of the vegetable earth or mould of the land itself: and that the first of these purposes may be promoted and attained by the application of such substances and materials as have been found useful in changing vegetable matters into the state of mudilage, such as the carbonate of lime, or effete lime, marle, chalk, and calcareous matters in general, and likewise some earthy saline substances, as the refuse of salt manufactories, and others of that kind. That the latter of such intentions is to be attempted by the use of different substances and matters that are of an alkaline nature; such as the ashes produced by the burning of various green vegetable materials, the urine of animals, the liquor of dung-hills and pits, night-soil, and many other such animalized matters and substances. There are many other ways, too, in which vegetable earth or mould may be made and rendered more abundant in land; such as the frequent growth of those kinds of crops that cover the ground in a close full manner, so as to produce a confined state of the air, as already suggested; the consuming upon, or turning down into the ground, full, rich, and succulent green crops, by which much vegetable matter is brought into a state of decay; and

by the causing of the destruction and evacuation of insects of various sorts, which are predominant in land, by the use and application of such substances and matters as have the power of effecting these different purposes and intentions.

It must be noticed, however, that it has been remarked by the writer of the work on the "Connection of Agriculture with Chemistry," that too large a proportion of vegetable matter in land, particularly where it is exposed to be much acted upon by the oxygen principle of the atmosphere, is liable to render the ground too loose and open in its nature for the growth of most sorts of crops of the grain kind; winter corns being, especially from the sudden alternations of frost and thaw, frequently thrown out of such lands, and almost wholly destroyed. In cases of this nature, great advantage may, it is said, be derived from the use of different matters of the saline kind, and lime in its saturated state, as by such means the vegetable parts of the land will be brought to their most proper and productive state, in so far as the growth of crops is concerned.

It has been conceived too by the same writer, that the absorption of the oxygen principle from the surrounding atmosphere, or what is termed the process of oxygenation, is the principal cause of the retention of vegetable matter on the surface of the earth, in deep peaty lands as well as others, but especially in such as have been long in a state of tillage, or under the plough. This process having the power, it is supposed, of rendering the vegetable matter less destructible, scarcely any of it being carried away in a state of dissolution by rains, or water in other ways, an accumulation takes place, which, under other circumstances, could not have happened. The indestructible state of vegetable matters under these circumstances, and their constant accretion, may, it is thought, be referred to the insoluble compounds produced by the action of pure air on such inflammable substances. The insolubility, to a certain degree, of this system adopted by nature, is undoubtedly, it is supposed, to be preferred to one more completely soluble; for it is evident, it is said, that if putrefaction or oxygenation had possessed the power of rendering all the vegetable matter, by a speedy process, soluble in water, two pernicious consequences must have followed: the rains would have washed down such extracts, and soluble matters, as fast as formed, into the rivers and springs, contaminating the waters, and rendering them unfit for the existence of fishes, or for the use of terrestrial animals. The sea in process of time would thereby receive all the vegetable and animal produce of the dry land, and the earth would ultimately become barren, consisting alone of the simple earths, without any admixture of vegetable matter; consequently there could be no accumulation of this substance on the surface, as is the case to an immense degree at present. As such, there cannot, it is conceived, be a doubt, but that the present incomplete process of putrefaction, oxygenation, or solution of organic bodies, has been established by the great Creator of all things for wise and benevolent purposes; especially when it shall be understood, that the apparent imperfections of this, to a certain degree, insoluble system, are, as they respect agriculture and vegetation, to be remedied, when necessary, by the ingenuity and industry of man. It is consequently supposed that the vegetable matters which exist in lands, from their admitting different degrees of this process, and, of course, becoming more or less insoluble, have different powers in forwarding the growth and support of plants. Where the exposure to these causes has been long, they are generally more insoluble in their nature than where the contrary has been the case. See OXYGENATION.

Upon the whole, vegetable earth or mould should be accumulated

mulated in grafs lands as much as poffible ; but where grain-crops are to be raifed, a proper mixture of other earths is neceffary, to give them ftability, and prevent their being thrown out of the ground.

VEGETABLE Fly, in *Natural Hiftory*, an infect found in the ifland of Dominica, and (excepting that it has no wings) re-fembling the drone in fize and colour. In the month of May this infect buries itfelf in the earth, and begins to vegetate. By the latter end of July the tree is arrived at its full growth, and refembles a coral branch ; being about three inches high, and bearing feveral little pods, which dropping off become worms, and afterwards flies, like the Englifh caterpillar. Dr. Hill, in his account of this production, to whole examination it was fubmitted, obferves, that the *cicada* is common in Martinique, and in its nymphs ftate, in which the old authors called it *tettigometra* ; it buries itfelf under dead leaves to wait its change ; but when the feafon is unfavourable, many perifh : and that the feeds of the *clavaria fobolifera*, which is a fungus producing foboles or shoots from its fides, and growing in putrid animal bodies, find a proper bed on this dead infect, and grow. This, he fays, is the fact ; though the untaught inhabitants fuppofe a fly to vegetate, although there exifts a Spanifh drawing of the plant's growing into a trifoliate tree ; and it has been figured with the creature flying with this tree upon its back. Phil. Tranf. vol. liii. p. 270, &c.

VEGETABLE Oil. See OIL.

VEGETATION, in *Vegetable Phyfiology*. See GERMINATION, CIRCULATION of Sap, SPIRAL Veffels, LEAF, &c.

VEGETATION, as it relates to *Agriculture and Gardening*, is of confiderable importance, by explaining the nature and means by which plants and crops receive nourifhment and fupport, and are the beft promoted in their different growths. In refpect to grain, feeds, and fets, it feems evident, from the experimental enquiries of Mr. Gough and others, that during the act or procefs of their germination or infant vegetation, they draw the oxygene principle from the furrrounding atmo-fphere, part of which is retained, and the remainder thrown off, charged with a portion of carbon ; and that, in this procefs or operation, the fubftances of the feed-lobes, or other parts that anfwer the fame purpofe, of courfe undergo a confiderable change, an additional proportion of the fame principle entering into their compofition, while a portion of their carbon is difipated and deftroyed : that by this alteration in the proportion of their conftituent principles and parts, the faccharine fermentation is induced to take place, and fugar is formed, as demonftrated in the operation of malting grain : and that the fugar and carbonic acid, from their being more foluble in water than in the oxyd of farinaceous matter, eafily combine with the moifture in the capillary veffels of the feed or other fubftances, and find a ready paffage to the germ ; the vegetative principle being thus brought into action by a ftimulus fited to the particular nature of it : and that by the decomposition of the feed-lobes, or other parts, a nutritious fluid being thus formed and diftributed through the infant plant, its organs are excited to exert their peculiar fpecific actions in decomposing the nourifhment conveyed to them, and in forming new oxyds from the elementary principles of it, in order to the increafe and evolution of the veffels and fibres.

As it is in this manner that the firft ftage of germination or vegetation is fuppofed to commence, it would appear that in fuch feeds and fets, in order to their undergoing thefe different changes the moft readily, and in the moft perfect manner, on which, probably, healthy growth may materially depend, they fhould not only be properly deposite

in the earth or foil, but, in the cafe of grain and feeds, be fo well ripened and filled with farinaceous or mealy matter, and poffefs fuch a degree of moifture, as may difpofe them to undergo fuch changes in a fuitably fpeedy manner ; while, at the fame time, a due fupply of proper nutritious matter is afforded for the perfect germination and early growth of the infant vegetables or plants. They fhould not confequently be put fo deep in the ground as to be too much excluded from the action of the air, or be fown or fet when in too dry a condition from the ftate of the feafon or other caufes, but be constantly fuffered to have as much of the agency and influence of fuch forwarding powers as may be neceffary for the perfect vegetation and growth of the plants or crops.

Others conclude on the grounds, and for the reafons that are ftated below, that two of the airs of which the atmo-fphere is compounded, are abfolutely neceffary to the nourifhment and proper growth of vegetables ; thofe of vital air or oxygen, and mephitic air or azote. It is found from different trials, that plants placed in vital or oxygene air grow larger, become more powerful, and are greener than thofe put in that of the atmofpheric kind. That if the feeds of the kidney-bean and the pea be put into earth of the filiceous kind, and be fprinkled with water mixed with a fmall portion of the oxygenated muriatic acid, in which oxygen the moft abounds and the moft loofely adheres, they germinate much fooner than if fprinkled with pure water : but that if feeds be immerfed in diluted muriatic acid, they become black and rugous, and never germinate. That in no kind of air deprived of oxygen do plants vegetate ; for if they be placed in azotic or mephitic air, in carbonic or fixed air, they become flaccid and drooping, it is faid, by the heat of the fun, and gradually die away. And that in nitrous air, plants become inactive in a few hours. It would appear from this, it is thought, that the portion of vital or oxygene air imparts a natural ftimulus, which is highly neceffary to excite the fibres and fustain the living power and ftrength of the veffels of plants ; and that, laftly, this air, with the peculiar acidifiable bafes, generates the various acids which are found in plants or vegetables.

As the gluten of the fibres of vegetables confifts of carbon, chemically combined with azote, it follows, it is fuppofed, that the azotic air is abforbed or taken up by the plants ; and that it is by this means that vegetables increafe fo rapidly in rich foils, cemeteries, and other places where animal and vegetable matters putrefy and decay in large quantities in or on the ground.

Carbonic air too difolved in water is abfolutely neceffary to the vegetation of plants in order to provide their carbonic principle, which is a conftituent part of the fibres, oil, mucilage, and other vegetable principles.

It is fuggelted, that plants appear to derive their caloric or matter of heat from the furrrounding atmofpheric air. Hence it is that the fhades of trees are fo cool ; and that nothing is more healthy for almoft all plants in their vegetation and growth, than mild tepid fhowers, by which they obtain water together with this principle. That, laftly, feeds do not vegetate in the cold, and many plants die in it. Heat too is evidently of much benefit in vegetation, as giving the natural colour to the foliage, flowers, and fruits of plants, caufing or promoting the flow and circulation of the fap-juice, increafing the faccharine matter, and promoting the flavour of moft forts of fruit.

Light too contributes to the life and healthy growth of plants ; for thofe which vegetate in atmofpheric air deprived of its light, as in the night and dark places, become pale and weak ; but in the day-time, ftrong and coloured.

VEGETATION.

The rays of light, likewise, appear to contribute to stimulate plants, with the various gases or vapours they absorb and take up from the air.

Pure air has also been found by many to be essential to the production of perfect feeds, pulse, grain, and fruit, and that by its action upon or being taken up by the soil, it has very powerful and beneficial effects in promoting vegetation and the perfect growth of plants and crops.

Thus water, air, and these other matters, appear to have a very great share in the vegetation and nourishment of vegetables, but especially the two former. The first has been considered as indispensably necessary to the process, and as supplying the principal materials of vegetable juices. It is unquestionably the chief medium through which the various nutritious matter derived from the soil, is conveyed to the plants which grow upon it. But it has been supposed more favourable to the vegetation and growth of grass plants or crops than those of the grain kind; as crops of grasses may be continually produced by watering, while with those of grain it has been found to be wholly impossible. It is found, however, that soft water, such as that of rivers, rain, or which has been exposed to the action of the sun for some time, is more favourable to vegetation, than such as is hard, as that of springs, or which is impregnated with metallic substances and other such matters. The author of *Phytologia* considers the first three things necessary to the infant vegetation and growth of plants to be heat, water, and air, as furnishing the general cause of fluidity, the menstruum in which nutriment is conveyed, and the principle of excitability so perpetually necessary to all organic life.

However, besides these different matters, other agents are necessary, after the plants have been formed and evolved, to the perfect vegetation and growth of the crops, as those of earth or other such matters, which are not only useful and essential for the purpose of holding and supporting the plants in a steady and erect manner, but also for containing and conveying, at least, some portion of the food on which they live, as derived from the atmosphere or other sources, and for the regular ramification and extension of their fibrous roots, in order that it may be more certainly provided and supplied. They are beneficial too in receiving, retaining, and distributing moisture to them, as well as in receiving, reflecting, and dispersing the heat of the sun, dews, and exhalations of different kinds, by which their growth and perfection are greatly promoted. For though some plants of the aquatic kind grow in water, most of them have their roots in earth. Even marine plants, although they grow upon bare rocks or stones, are well known to be fixed to them, and that they derive their food from the seawater in or near which they exist. It has been contended by some, that plants are actually nourished by earth alone, but numerous experiments shew the opinion to be erroneous, and that it is perhaps only the medium of their existence. It is well ascertained that they are capable of acquiring a great accession of weight, without almost any loss of weight of the earth in which they have been planted.

The aid and assistance of dead organized materials are, likewise, requisite in the process of vegetation and the growth of crops, as it would seem to be a part of the beautiful and orderly arrangement of Nature, that nothing should have life in vain, and that the destruction of one plant or animal should furnish food for others: consequently, that however useful air, water, light, heat, and earth may be to the growth of plants and crops, it is, if not certain, at least questionable, it is thought, whether they could ever come to perfection without the help of matter that had been for-

merly in an organized state. The richest soils, it is well known, are full of dead animal and vegetable matter, and there is no soil that will not produce plants or crops if a sufficient quantity of dead animal or vegetable substance be added to it. Under this denomination are comprehended all those manures which are found so useful in cultivation, more especially those to which some authors give the name of *muclaginous*, *enriching*, or *nutritious*. These substances and materials are greatly beneficial, by correcting the tenacity of stiff soils or lands, and the over-porosity of light ones, by producing a fermentation in them, and by affording nutritive matter to the roots of vegetables, as well as by retaining moisture in dry and expelling it in wet lands. Saline substances have been supposed too of much importance in vegetation by some, but they do not appear essential to the growth of any sort of plants except the marine; and there are many productive soils in which little or no saline matter can be discovered. Such matters may, however, be of use to vegetation, though not essential to it. That of common salt may operate upon plants as it does upon the human body, by assisting to digest the food, without furnishing nutriment itself. It is of use, mixed with dung, as an assistant to putrefaction, and it may act in the same way in promoting vegetation. It is serviceable too by attracting moisture, destroying vermin in the soil, and decaying and reducing the roots of any plants it may first meet with, thus furnishing nourishment to the succeeding ones.

It is found likewise, that the culture of the earth is essentially necessary for the vegetation and growth of plants and crops to perfection, the health and vigour of both the roots and branches being thereby greatly increased. By dividing and reducing the particles of soils, the roots of the plants and crops put into them can more easily and readily penetrate and spread out in them, as well as suck in more expeditiously the nourishment which they contain. By proper and effectual culture too, such weeds or useless plants as are apt to rise, are extirpated and destroyed, whilst stirring the earth admits air and moisture more fully to the soils, and to those plants and crops the feeds or sets of which have been sown or put in them. It is evident likewise, that young trees thrive and succeed much better, if the soils in which they are planted have been previously ploughed in so deep a manner, as readily to admit their roots and suckers. Even after they are planted, it is supposed to be of great service to have potatoes and other such roots cultivated among the young trees in the plantations with a view to kill weeds, and loosen the soil for the free admission of air and water. And the practice seems to be generally well received, and to have much effect in promoting vegetation in most sorts of vegetable.

The management of the farmer and gardener should, of course, aid and assist these views and intentions in every way as much as possible, in raising and producing plants and crops of different kinds; as by the suitable cultivation of the ground, the proper application of manure or other substances of that sort to it, the preservation of the moisture of it by different modes of cropping, and by every other practicable method in their power; as by such means the perfect vegetation and growth of them may be the best promoted and assisted. See *FALLOWING Land*, *PULVERIZATION*, *SEED*, &c.

It may be observed, that the substances or matters in land which have hitherto been found injurious to vegetation, are chiefly those of the metallic, sulphureous, aluminous, and astringent kinds. It has been noticed, that where mines of iron, lead, or copper, are near the surface, no plants will grow to perfection, as is well ascertained to be the case in different

different mining districts. Schistus too, in which there is generally a great deal of iron and alum, is found so unfavourable to vegetation, that any considerable quantity of it would destroy the fertility of the richest sorts of land. The noxious, corroding, and weakening effects of such substances on the tender roots of vegetables being such in some cases as to cause their decay, dissolution, and destruction. Frequent stirring, or the exposure of new surfaces of land to the action of the air, and the use of lime, chalk, or other dissolving matters, will, it is supposed, correct the injurious qualities of this substance, and promote the vegetation and growth of plants and crops in such states of land. The astringent principle or acidity in peat is often so great and so noxious to vegetation, that until any quality of that nature which may exist be subdued, though that sort of land be a perfect mass of vegetable matter, nothing but heath and other such miserable plants are capable of growing in it. Vegetation is consequently in such cases only to be assisted by breaking the parts of the land well down, and the application of earthy and other matters to it, so as to wholly destroy its astringent property, and in fact change its nature. See SOIL.

It may be noticed too, that the vegetation or growth of plants and crops is frequently much injured and impeded by the various sorts of vermin with which the earth as well as the air abounds. Those which inhabit the earth, it has been supposed, may be destroyed and got quit of by the use of saline matters, lime, and other different substances, operations, and arts, as are seen under their several proper heads. See GRUB, MOLE, SLUG, WORM, VERMIN, &c. also TURNIP.

But in regard to the myriads of those of the insect kind with which the air abounds, it is more difficult and uncertain to propose or point out any remedy or means of prevention that may be effectual. It is not ascertained that the smell of any plant, in its natural growing state, is destructive of insects; but there are several plants which are, when dried and reduced to powder, or when burnt near to certain insects, destructive of them, as those of tobacco, hemlock, henbane, rue, wormwood, and others. Sometimes, however, vermin of this sort are occasioned by the weakness and unhealthy growth of the plants, and the poverty of the soil of the land where they grow; the best remedies in such cases are, of course, those of more perfect tillage and cultivation, so as to render them strong and healthy in their vegetation.

VEGETATION, Artificial. Many of the processes and operations in chemistry afford productions, whether of salts or metals, or of whatever other substances, which very much resemble plants of one kind or other, whence they have been called *metallic* vegetation. But though many have been hence induced to believe, that these productions were formed in the manner of vegetables, there is not the least ground for such an opinion from reason or experiment.

M. Homberg, who has treated very accurately of the several kinds of these chemical vegetations, divides them into three different classes.

Those of the first class are such as consist of a pure massy metal, without the mixture of any foreign matter whatever. Those of the second class are composed of a dissolved metal, which, though it has concreted afterwards, yet retains a part of the menstruum in it; and the third class contains those which have no metal in them, but are merely composed of salts, oils, or earths, or of combinations of these.

All the productions of the first kind are made without the admixture of any liquor, and are merely owing to the

force of fire. These are of a firm and solid texture, and may be taken out of the vessels in which they were made, without danger of breaking them. On the other hand, the vegetations of the second kind are all formed in a fluid, and are all so brittle, that they are not to be touched without breaking. Of the third kind, some are formed, or will subsist at least, in the dry air; others are very tender, and are formed only in fluids, the very stirring about of which destroys them. See ARBOR.

VEGETATION of Salts, a name given by M. Petit of the Academy of Paris, to the concretions which salts form, after solution in water, when set in the air to evaporate.

These concretions always appear round the surface of the liquor, affixed to the sides of the vessel, or arising above its top, and are very different in the different salts, and in most of them very beautiful.

One of the most ready and most beautiful of all the saline vegetations, is that formed by a solution of the salts in the caput mortuum of aquafortis with common water. If a pint of water be put to half a pound of this caput mortuum, and the whole boiled together, that the salts may be dissolved, and the liquor afterwards filtrated, and exposed in an earthen vessel, there will be formed, in about eight and forty hours, vegetations wholly like those from the mixture of spirit of nitre and oil of tar, except that those from the caput mortuum are more ramified and more beautiful. When the solution is exposed in a glass vessel, they form themselves on the surface into very beautiful figures of trees, shrubs, and bushes; and this not only on the surface, but on both the inside and outside of the glass. These can be compared to no known concretion, except to the vegetations of iron, described by M. Lemery; they differ indeed in nothing from these, but that the vegetations of the metal are of a brownish colour, whereas those of the salt are white.

This impregnation succeeds best in dry weather, for in a moist season the vegetations form themselves more slowly, and are much less beautiful. Glass vessels are also essential to the vegetations being formed in their greatest beauty; they are never nearly so beautiful in earthen ones; and even in the former, the vegetations succeed much better in some sort of glass than in others. The caput mortuum of aquafortis also is very different, from the different distillations; and all of it does not succeed alike in this vegetation of the salt. That which looks lightest, and of the reddest colour, seems the best for this purpose. An impregnation of this caput mortuum in red-wine produces no vegetations, but only forms a crust with small eminences on the sides of the vessel; and saltpetre, dissolved in the impregnation of this caput mortuum in water, produces a much more beautiful vegetation than that of saltpetre alone; but at the same time much less beautiful than that of the impregnation alone. Salt-water, dissolved in the same impregnation, sometimes will produce beautiful vegetations, but sometimes only a rough crust. Common rough saltpetre forms no vegetations, but only crusts over the vessel; as is the case with the solutions of many of the metals in different acid menstrua. And the same is the case in regard to many salts from which it might be natural to expect concretions of this kind. *Memoirs Acad. Par. 1722.*

VEGETIUS, FLAVIUS RENATUS, in *Biography*, lived in the reign of the emperor Valentinian, to whom he dedicated his treatise "De Re Militari." Although he was probably a military man, his Latin style was pure, considering the age in which he lived. The best editions of his work are the Variorum, Leyd. 1644, and Vesal. 1670. Turpin's Commentary was printed in French, Paris 1783, in 2 vols. 4to.

A work on the veterinary art, by a writer of the same name, is printed with the "Scriptores Rei Rusticæ." Moreri. Gen. Biog.

VEGETO-ANIMAL MATTER, in *Agriculture*, a term formerly applied to one of the principal constituent parts of the farina, meal, or flour of some vegetable seeds. It is found in the greatest proportion in grain, especially that of the wheat kind, existing in a state of mechanical union or mixture with mucilage or starch. On cautiously washing wheaten flour in the form of paste, in a kneading manner, under a small stream of water, until the whole of the starchy matter be removed, this substance or material is found in an elastic, ductile, tenacious state, but incapable of being dissolved in it. It has none or scarcely any taste, readily draws out and contracts, and is of a whitish-grey colour. When fully drawn out, it extends to the length of about twenty times its diameter before it breaks, and appears as if composed of fibres placed beside each other, according to the direction in which it has been drawn. If the force ceases, it recovers its original form by its elasticity; when dry, it is semi-transparent, and somewhat resembles glue in its colour and appearance. If it be drawn out thin when first obtained, it may be dried by exposure to the air, and in that state has a polished surface, somewhat resembling that of animal membranes. If it be exposed to warmth and moisture while wet, it putrefies like an animal substance; it crackles, swells, and burns, exactly in the manner of a feather or piece of horn. By distillation it affords, like animal substances, alkaline water, concrete volatile alkali, and an empyreumatic oil. Its coal is very difficultly incinerated, and does not afford fixed alkali. From these facts, it is said to be obvious, that it is a substance totally different from all the others known to exist in vegetables, except albumen, which has lately been discovered in some of them, and in many of its characters resembles the fibrous part of the blood. It does not appear to exist in any considerable quantity in other farinaceous substances, such as rye, barley, buck-wheat, rice, and others of the same kind. M. Berthollet, however, thinks that it contains phosphoric salt like animal matters, and that this is the reason of the difficulty with which it is incinerated; and the younger Rouille found a glutinous substance in the fecula of plants analogous to that of wheat. It is now commonly called gluten, and said to become of a brown colour by exposure to the air, to be very slightly soluble in water, and to differ from albumen in being infinitely less soluble in that fluid. When burnt, it affords similar products to that substance, and probably differs very little from it in composition. It is found in a great number of plants. Proust is said to have discovered it in acorns, chestnuts, horse-chestnuts, apples, quinces, barley, rye, peas, and beans; and likewise in the leaves of rue, cabbages, cresses, hemlock, borage, saffron, in the berries of the elder, and in the grape. It appears, it is said, to be one of the most nutritive of the vegetable substances; and that wheat seems to owe its superiority to other grain, from the circumstance of its containing it in larger quantities.

In the work on the "Connection of Agriculture with Chemistry," it is said that different kinds of grain contain mucilage or starch, and this substance in different proportions, and that the same sort of grain contains them in different quantities, according to the climate, season, and soil. But that good wheat generally contains two-fifths of animalized matter, and three-fifths of starch. And that good and well-raised bread depends on flour containing a due admixture of these two substances. Hence, it is thought, by mixing the flour of different sorts of wheat, better bread

may at times be produced than from one sort only. Extensive benefits, too, may arise to the processes of brewing, distilling, and making of vinegar, by a mixture of the different sorts of grain; and to that of distilling, a further advantage would be derived by a mixture of different roots with the grain, such as potatoes, parsnips, carrots, and many others, if prepared in a proper manner.

VEGETO-MINERAL WATER of Goulard, in *Medicine*. See *Water of LEAD*.

VEGGIANI, in *Geography*, a town of the island of Corfica; 12 miles W. of Bonifacio.

VEGI, or **UGI**, the names given by the Arabian physicians to the acorus. These writers seem not to have been acquainted with the plant itself in its growing state, but only to have known that part of it which was used in medicine in their time; but the Greeks described the plant in some sort.

VEGIA, in *Geography*, a town of Africa; 45 miles W. of Tunis.

VEGIANO, a town of Naples, in Basilicata; 12 miles S. of Potenza.

VEGIO, **MAFFEO**, in *Biography*, was born at Lodi in 1406, and studied at Milan and Pavia, manifesting in the former place an attachment to poetry, and in the latter directing his attention to civil jurisprudence. He obtained some honorary and lucrative appointments under the popes Martin V., Eugenius IV. and Nicholas V. Highly respected and esteemed for his genius and learning, as well as for the sanctity of his life, he died in 1458. As a Latin poet, he composed with facility, but without being distinguished for elegance or purity. He began, in his early age, with profane poetry, composing, among other works, an additional book to Virgil's *Æneid*; but after he entered into the priesthood, he confined himself to sacred subjects. The best of his works in this class, highly commended by Dupin, was his treatise "De Educatione Liberorum et eorum claris moribus." His prose style is accounted elegant and polished for his time. Moreri. Gen. Biog.

VEGLENSKOI, in *Geography*, a town of Russia, in the province of Ustiug, on the Vim; 72 miles N.N.E. of Yarensk.

VEGLIA, an island in the gulf of Venice, near the coast of Dalmatia, about 30 miles in length, from 6 to 14 broad, and 90 in circumference, anciently called *Curiæa* and *Fulfinio*. In the decline of the Greek empire, it obtained the name of *Becla*, of which the present is a corruption. It is situated in the innermost part of the gulf of Quarnera, and separated from the continent by a small canal only. There are many harbours, but unfit for the reception of large vessels, on account of the storms by which they are agitated. Its soil is mountainous and rocky, towards the north sterile, but very fertile to the south, and the vallies are extremely fruitful. The greater part is covered with woods, which occasion a considerable trade in fire-wood. Agriculture is not so much attended to here as the culture of the vine, which produces excellent wine. The culture of silk is insignificant: the breeding of horses is more important. The breeding of sheep and goats is likewise considerable. The quarries produce a red spotted marble, not unlike that of Verona, which is much known by the name of *Mandolato of Venice*. This isle is inhabited by 17,000 souls. N. lat. 45° 16'. E. long. 14° 42'.

VEGLIA, a sea-port town, situated on the S.W. coast of the island so called, surrounded with walls and defended by a castle, in which the governor resides. It is the see of a bishop, suffragan of Zara, and contains about 3600 inhabitants. N. lat. 45° 11'. E. long. 14° 38'.—Also, a town of Naples, in the province of Otranto; 15 miles S. of Brindisi.

VEGLIANA, a town of France, in the department of the Po, near the Little Doria, where the French obtained a victory over the Piedmontese and Spaniards, in the year 1630; 11 miles N. of Turin.

VEGLIONELLA, a town of Naples, in Basilicata; 20 miles S.S.W. of Turfi.

VEGRE, a river of France, which runs into the Eure, near Yvry.

VEHAILEK, a town of Arabia, in the province of Nedsjed; 70 miles S.W. of Jamama.

VEHICLE, VEHICULUM, in its literal sense, signifies somewhat that carries, or bears a thing along. See CARRIAGE, WAGGON, WHEEL, &c.

Thus, in *Anatomy*, the serum is said to be the vehicle that conveys the globules of the blood.

In *Pharmacy*, any liquid serving to dilute another with, or to administer it in, more agreeable to a patient, is called a vehicle.

In *Painting*, vehicles denote certain fluids, which are added to colours, in order to give them an unctuous consistence while used, that they may be laid on and spread properly, adhere to the grounds on which they are laid, acquire a proper degree of tenacity when dry, and defend them from being injured by accidents. The principal vehicles hitherto used are oils, water, spirit of wine, and turpentine. But as water and spirit of wine want the unctuous consistence necessary for spreading the colours, and dry away totally without leaving any glutinous substance to bind and fix such of the pigments as are of an earthy or incohering texture; gums, size, sugar, and other such viscid substances have been superadded to supply their defects, and render them of a due consistence and body.

VEHNE, or VEENE, in *Geography*, a river which rises in the bishopric of Munster, and joins the Solte, near Stickhausen.

VEIA. See VEGLIA.

VEICAMA, a town of Spain, in the province of Guipuscoa; 12 miles from Tolosa.

VEIENTANA GEMMA, in *Natural History*, the name of a gem described by Pliny, and said to be found in Italy; he says it was black, but surrounded with a circle of white: it was probably a stone of the camea kind.

VEJER, in *Geography*, a town of Spain, in the province of Seville, near the Straits of Gibraltar; 9 miles S. of Medina Sidonia.

VEII, in *Ancient Geography*, a town of Italy, in Etruria, S. of the Falerii, but nearer the Tiber and Rome. This was a very ancient town, and very considerable on account of the wealth and the valour of its inhabitants. Its original name was Veja, which was also, among the Osci, the name of one of those carriages in which they resided before they had houses. Its vicinity to Rome was one principal cause of its misfortunes; for the jealousy and envy of that city were excited by its opulence and prosperity. From the time of Romulus, the inhabitants of these rival towns contended. At length Veii was taken by Camillus, after a siege of ten years, in the year of Rome 356 or 357. The booty was very considerable; and part of it was lodged in the temple of the Pythian Apollo. It is a sufficient evidence of the eligible situation of Veii, that after the capture of Rome by the Gauls, it was a subject of deliberation whether this town should not be made the capital of the republic.

VEIL, VELUM, a piece of stuff, serving to hide or prevent the sight of any thing.

In this sense, we read of a large veil, or curtain, in the temple of Jerusalem, miraculously rent at the passion of our

Saviour. In the Roman churches, in time of Lent, they have veils, or curtains, over the altar, crucifix, images of the faints, &c.

VEIL is also used for a large piece of crape, worn on the head by nuns, as the badge of their profession. Whence, to *take the veil*, signifies to commence religious.

The novices wear white veils; and those who have made the vows, black ones.

The prelate before whom the vows are made, blesses the veil, and gives it to the religious.

VEIL, in *Botany*, see CALYPTRA. These terms are now exclusively appropriated to the membranous covering of the germen in MUSCI and HEPATICÆ, through the summit of which impregnation takes place, and which therefore must be considered as a peculiar organ, partly perhaps, but not exactly, analogous to a corolla. It is elevated with the ripening capsule in *Musci*, but splits irregularly, to let the fruit pass, in *Hepaticæ*. The reader is requested to correct two important errors of the press in the 8th column of the article MUSCI: line 18th, for *sinks*, read *spring*; line 60th, for *sexual*, read *asexual*.

VEIL, CHARLES MARIE DE, in *Biography*, the son of a Jew at Metz, and a profelyte to the Roman Catholic religion by Bossuet, became a monk of the Augustine order, and entered among the canons-regular of St. Genevieve. Pursuing his theological studies at Angers, he took the degree of doctor in theology, and taught in the public schools. In 1679 he visited England, and abjuring Popery, conformed to the English church. He had previously distinguished himself by his scriptural researches, and published Latin commentaries on the gospels of St. Matthew and St. Mark, on Joel, and the Canticles. During his stay in England he addressed a letter to Mr. Boyle, the design of which was to prove, against Father Simon, that the Scripture is the only rule of faith. In London he reprinted his commentary on the Canticles, giving a literal explanation of that book; and he also published commentaries on the twelve minor prophets, and on the Acts of the Apostles. At this time he styled himself a presbyter of the English church, but in consequence of marrying the daughter of a Baptist, he became connected with persons of that persuasion, and preached among them in the year 1685. His death is supposed to have happened about the close of the century.

The brother of the preceding, LOUIS DE COMPEIGNE DE VEIL, was also a converted Jew, and distinguished for his knowledge of Hebrew literature. He was interpreter of Oriental languages to the king of France, when he accompanied his brother to England, and joined in communion with the English church. The principal works he published were "The Jewish Catechism of Abraham Jagel;" a Latin translation, with notes, of "Maimonides de Sacrificiis," and also of Abarbanel's "Exordium in Leviticum." Moreri. Gen. Biog.

VEILLANE, in *Geography*. See VEGLIANA.

VEILLY, or VESLEY, a town of France, in the department of the Aisne, on the Aisne; 9 miles E. of Soissons.

VEIN, in *Anatomy*, the name of those vessels which convey back to the heart the blood carried out from it by the arteries. All the details relating to the structure of these tubes, to their arrangement in the body, and to their office in the circulating system, are considered in the articles HEART and CIRCULATION.

The veins are naturally arranged in three divisions; viz. 1st, the general venous system, commencing from the capillaries all over the body, and pouring the black blood into the heart by three large trunks: 2dly, the pulmonary veins, which

VEIN.

which are concerned only in the minor circulation: and 3dly, the system of the vena portarum, in which the blood that has circulated through the organs of digestion is conveyed to the liver, and distributed through the substance of that organ. The umbilical venous system of the fœtus, with its ramifications in the placenta, its trunk in the umbilical chord, and its subsequent course and distribution in the liver, is not included under either of these divisions. It belongs to the fetal state of existence, and is described under EMBRYO.

On the subject of the pulmonary veins, we have nothing to add here to what is stated in the articles LUNG, CIRCULATION, and HEART: the vena portarum is described under LIVER; and the peculiarities of arrangement, belonging to the veins of any organs, are noticed in the account of those organs: so that the present article will include simply a description of the situation and course of the veins of the general system. These we shall trace, according to the course of the blood in them, from the branches to the trunks; as, on the same principle, the arteries have been traced from the trunks to the branches.

The veins of the general system may be arranged in three divisions, according to the great trunks which terminate in the right auricle; viz. the cardiac veins, those belonging to the superior, and those to the inferior vena cava.

I. The *veins of the heart* do not all end in one trunk: besides one large vein, there are some smaller. The great coronary vein of the heart (*grande veine cardiaque postérieure*) runs in the groove between the left auricle and ventricle; and opens on the left of, and below the fossa ovalis and valvula Eustachii, in the right auricle. A middle coronary vein runs on the inferior flat surface of the heart, between the two ventricles, to open by a common orifice with the former, or close to it. At this opening into the auricle, a valve is placed, differing considerably in size and appearance; sometimes semilunar and broad, covering the whole aperture, at other times smaller and hardly distinguishable; sometimes perforated or reticulated. See HEART.

Some smaller veins open by one or more trunks in the anterior part of the right auricle. See the plates of Senac, sur la Structure du Cœur, &c. on these veins.

II. The *superior vena cava* receives the veins of the head, neck, thorax, and upper extremities.

The superficial veins of the head and face end for the most part in two trunks, an anterior and a posterior.

The anterior facial vein (frontal or angular) commences on the forehead, runs along the inner angle of the eye, and then pursues its course obliquely along the face from the corner of the eye to the basis of the jawbone, which it passes at the same point with the external maxillary artery. It joins, behind the angle of the jaw, the trunk of the posterior vein. This anterior facial vein, which is a large and very constant trunk, receives a vast number of venous ramifications from all parts of the forehead and face, which are covered by one universal venous net-work or plexus. (See two excellent plates by Walter, *Observat. Anat.* 1775.) The following are enumerated as the vessels which open into it: 1, *venæ frontales*; 2, *v. supra orbitalis*; 3, 4, *v. dorsalis nasi*, superior and inferior; 5, *palpebralis inferior interna*; 6, 7, *alaris nasi*, superior and inferior; 8, *palpebralis inferior externa*; 9, 10, *labiales superiores*; 11, 12, two from the zygomatici and levator labii superioris; 13, *ramus profundus venæ facialis internæ*, formed by the junction of, a. *vena ophthalmica facialis*, which, communicating by its opposite end with the cavernous sinus, receives branches from some parts in the orbit; b. *nasalis posterior interna*; c. *alveolaris superior*; d. veins of the buccinator, &c.;

14, *labialis media*; 15, 16, *vena labii inferioris*, superior and inferior; 17, 18, *buccalis*, superior and inferior; 19, 20, two, three, or four *venæ massetericæ*; 21, *submentalis*; 22, *glandulosa*.

The posterior facial vein is much larger than the anterior; it arises on the side of the head by branches accompanying the ramifications of the temporal artery, descends in front of the ear, through the parotid gland, behind the angle of the jaw, and unites with the former. It receives several deep temporal veins; the maxillaris inferior; several pterygoid veins: these join its deep-seated trunk. The superficial trunk is joined by three superficial temporal branches; articularis anterior and posterior; auriculares anteriores and profunda; transversalis faciei; auricularis posterior; several parotid veins.

The common trunk, formed by the union of the anterior and posterior facial veins, behind the angle of the jaw, terminates in the internal jugular near the point, at which the common carotid divides into the external and internal branches. It also anastomoses with the external jugular: this trunk receives the superior thyroid vein.

Veins of the Brain.—They possess no valves: their coats are much thinner than those of other veins; their capacity very much exceeds that of the arteries. Their greatest and most distinguishing peculiarity consists in the circumstance, that they do not accompany the arteries, either in their great or smaller branches. Their trunks are collected in the pia mater, and run either in the interval of the convolutions, or over the convexities of the latter. They pour their blood into receptacles formed in the dura mater, and called sinuses; and in this respect again they differ from all other veins. The sinuses are composed, externally, of the dura mater, which holds the place of the external coat of other veins; internally, of a smooth thin membrane, corresponding to the internal membrane of the veins, and continuous with it. The cerebral veins open in large numbers into these sinuses, of various sizes, from that of a crow's-quill to a writing quill; and they enter, for the most part, very obliquely, and with an obliquity contrary to the direction of the blood in the sinus.

These receptacles, being formed in the dura mater, which is attached to the bone, are fixed in their situations. They are generally of a triangular figure: the interior is lined by a smooth membrane, but, in many instances, it presents small transverse fibrous bridges going from side to side. They receive not only all the cerebral veins, but also those of the dura mater and the ophthalmic.

There are four large sinuses, of which the others appear to be subordinate dependencies; they are the superior longitudinal, the two lateral, and the fourth sinus.

The superior longitudinal sinus (*falciformis superior*) begins near the crista galli, where it is small; it runs from before backwards to the internal occipital tuberosity, along the middle line of the cranium, occupying the superior or convex edge of the falx, and increasing to the size of the little finger. A vertical section of it, from side to side, is exactly triangular; the base of the triangle being upwards, and corresponding to the excavation in the bone, the sides of the triangle being lateral, or turned towards the hemispheres, inclined towards each other, and united below so as to form the apex, which is downwards. Several fibrous bridges cross its cavity, which contains a greater or smaller number of the granular bodies called *glandulæ Pacchioni*. Numerous small veins enter the sinus from the cranium, and others from the dura mater; through the parietal foramina it receives veins from the integuments: blood may be expressed from these, when they have been lacerated by detaching

taching the skull-cap. But the principal veins it receives come from the superior or convex surface of the hemispheres. These are spread irregularly over the convexities, advance from the sides towards the middle, uniting into larger and larger trunks, and open in considerable numbers on each side of the sinus: they receive the veins from the opposed flat surfaces of the hemispheres. The anterior branches are the smallest; the middle and posterior much larger. They are directed at their termination obliquely from behind forwards, and sometimes pass for half an inch, in the substance of the coats, before they open.

The two lateral sinuses, right and left (*sinus transversii*), are produced by the division of the superior longitudinal at the internal occipital protuberance. They are usually of equal size, but sometimes differ in this respect, the right being often larger. They proceed along the internal transverse ridge of the occiput, at the posterior attachment of the tentorium, as far as the commencement of the petrous portion of the temporal bone, when they descend along the internal surface of the mastoid portion of that bone to the foramen lacerum in basi cranii, through which they quit the skull, taking the name of the internal jugular veins. These sinuses are as large as the termination of the superior longitudinal; and are generally uniform on the internal surface. The cavity is triangular, where it occupies the posterior attachment of the tentorium: the base of the triangle being turned backwards, and corresponding to the skull, and the two sides being inclined towards each other, and joining at an acute angle in the tentorium. Where it lies in the mastoid portion, it consists of a layer of membrane lining the bony channel, and another passing directly over it.

The lateral sinus receives veins from the back of the cerebrum and cerebellum, and some meningeal veins; large branches from the integuments of the skull through the mastoid foramina, and from the muscles of the neck through the posterior condyloid holes; veins from the cavity of the tympanum, according to Soemmerring; the superior and inferior petrous sinuses; and the occipital sinuses.

At the under or concave edge of the falx, there is found the inferior longitudinal sinus (*falciformis inferior*). This is very small, just admitting a probe, and it opens behind into the following: it may rather be regarded as a vein than a sinus.

The fourth sinus (*perpendicularis*, *torcular Herophili*, *sinus droit*) is placed at the junction of the falx and tentorium, has a triangular figure, the basis being formed by the tentorium, and the sides by two oblique layers of the falx, and exhibits internally several prominent fibrous fasciculi. In size it is about equal to a goose-quill. It receives in front the small vein called the inferior longitudinal sinus, and a large vein, called *vena magna Galeni*, which brings back the blood from the choroid plexuses and interior of the ventricles: it also receives, at its under surface, the superior veins of the cerebellum. It opens behind into the bifurcation of the superior longitudinal sinus; sometimes having a double termination.

The superior petrous sinus runs along the sharp ridge of the petrous portion, at the attachment of the tentorium, and opens into the lateral, just where that begins to descend from the tentorium. Besides some small meningeal veins, it has some from the anterior lobe of the cerebrum, and from the cerebellum.

The inferior petrous sinus is larger than the preceding, and runs in the junction of the basilar process of the occipital bone and the petrous portion of the temporal. Its anterior end joins the cavernous sinus, while the posterior opens into the lateral sinus, just before it enters the foramen

lacerum. The right and left are united by one or more transverse communications on the basilar process. This transverse communication unites the two inferior petrous sinuses just where they communicate with the cavernous: it is placed at the anterior end of the basilar process, is broad, and is described by Bichat to contain the same kind of cellular substance as the cavernous sinus.

The cavernous is the most complicated in its structure, and altogether the most remarkable of the cerebral sinuses. It occupies the side of the sphenoid bone, reaching behind to the fissure which separates the end of the petrous portion from the sphenoid, and in front to the foramen lacerum: above, to the summits of the clinoid processes, and below, to the openings through which the nerves of the fifth pair pass. The dura mater, in this situation, is divided into two layers, one of which adheres to the bone, as in other situations, and forms the internal side of the sinus; the other, which is much thicker, forms its external side, and is part of the internal surface of the cranial cavity. In this latter layer the nerves of the third, fourth, and fifth pairs are placed, contained in sheaths of the membrane. The interval of the two layers is occupied by a soft kind of filamentous cellular substance, through which the nerve of the sixth pair and the internal carotid artery pass. The ophthalmic vein, returning the blood from the orbit, opens into this sinus, which receives also meningeal veins, and communicates with the veins on the side of the basis cranii. It opens behind into the inferior petrous sinus. The right and left cavernous sinuses are said to communicate sometimes with each other under the pituitary gland.

The circular sinus is a small one occupying the superior aperture of the sella Turcica, and describing a circular course round the edge of the pituitary gland. It communicates on each side with the cavernous; and it receives veins from the dura mater and the pituitary gland. The anterior or posterior semicircle, or even the whole sinus, is sometimes wanting.

Occipital Sinuses.—These are very small; they begin at the sides of the foramen magnum, run backwards and upwards, and open into the lateral sinuses close to their origin. Anterior occipital sinuses are described, communicating with the inferior petrosal and the cavernous, and opening into the lateral near its exit from the head: they are not constant.

For representations of the veins and sinuses of the brain, see Haller, *Icon. Anat. fascic. 1*; Vicq d'Azyr, *Traité d'Anat. et Physiol. avec des pl. color. pl. 33. 35. 36.* Santorini, *Tab. Posthum. 3.*

The meningeal veins, or veins of the dura mater, receiving innumerable ramifications from the substance of the cranium, form trunks, which accompany the arteries, and often on each side, being lodged with them in bony channels of the skull: these veins open into the sinuses, particularly towards the basis of the skull, and they are said to communicate with the pterygoid veins.

Veins of the Eye.—(See Walter, *Epistola Anatomica de Venis Oculi.*)—The *vena ophthalmica cerebialis* begins about the internal canthus, communicating with the *ophthalmica facialis*, goes outwards and downwards behind the globe, and ends in the cavernous sinus. The following veins enter it; *viz.* *vena nasalis*, *ethmoidalis anterior*, *infraorbitalis*, *ciliaris interna*, *ciliaris superior*, *lacrymalis*, *ciliaris posterior*, *ciliares longæ*, *ethmoidea posterior*, *centralis retinae*. The arrangement and distribution of these vessels in the eye are described under *EYE*.

There are free communications between the external and internal veins of the head, in various situations, which have been already noticed; *viz.* at the parietal, the mastoid, and the

VEIN.

the posterior condyloid foramina. The veins of the orbit also constitute a communication between these two sets of veins, as they are connected on one side with the facial vessels, and on the other with the cavernous sinus.

It appears from the preceding description, that all the sinuses end, either mediately or immediately, in the right and left lateral, and consequently that all the blood conveyed to the brain is returned by these vessels. Having passed the foramen lacerum, the tube is called the internal jugular vein; it swells out into a dilatation received into the fossa jugularis of the temporal bone, descends perpendicularly along the neck, in company with, and on the outside of the internal carotid first, and afterwards of the common carotid artery, and of the par vagum, with which parts it is enclosed in a common cellular sheath. Just behind the anterior extremity of the first rib it ends, by joining at a right angle the subclavian vein. The internal jugular is a very large vein; when distended in the living subject, or by injection after death, it is nearly as large as the thumb. It receives the following veins; *viz.* the pharyngeal, the lingual, the common trunk formed by the union of the anterior and posterior facial, the superior and middle thyroid.

The external or superficial jugular vein is formed by two or three principal trunks, and by smaller branches, which form a kind of venous plexus on the side of the neck, covered by the skin and by the latissimus colli. These trunks are the occipitalis superficialis, which commences, in company with the occipital artery, from the integuments of the back of the head, and receives branches from the muscles of the neck; transversa colli, which accompanies the artery of the same name: deep-seated veins of the cervical muscles; subcutaneous veins towards the front of the neck; and smaller twigs from the sterno-mastoideus and lymphatic glands. The trunk terminates at the angle of union of the internal jugular and subclavian, or in the subclavian itself.

For the veins of the neck, see Walter's plates in the *Observat. Anat.* already quoted.

Veins of the Upper Extremities.—The arteries are every where accompanied by corresponding veins, which lie close to them, and are generally double, one on each side. These it is not necessary to describe. In addition to these, which may be called the deep-seated, there is a cutaneous set of veins in the fingers, fore-arm, and arm, forming large trunks placed merely under the skin, not accompanied by any arteries. Both the deep-seated and cutaneous veins end in a single large trunk, the axillary, which accompanies the artery of the same name.

The superficial veins of the fore-arm lie between the skin and the fascia, and form a venous net-work, composed of larger and smaller branches, over the whole limb. There is great variety in the size and arrangement of the trunks, which, however, are regular and constant in the arm. The digital veins run into trunks at the backs of the fingers, completely covering them after successful injection; they form a plexus (*dorsalis manus*) on the back of the hand, from which a large trunk (*cubitalis interna*, or *ulnaris superficialis*) or two, with smaller ramifications, run in the course of the ulna to the elbow. It passes over the tendon of the biceps, and assumes the name of basilic vein; ascends along the arm, on the inner edge of that muscle, in company with the brachial vessels, and enters the axilla, where it ends in the axillary vein.

A large vein on the back of the hand, arising from the little finger, was called by the ancients *salvatella*.

A venous plexus arises from the thumb, of which the largest branch is sometimes called *cephalica pollicis*: this

plexus, containing one or two larger trunks, (*radialis externa*, or *cephalica minor*,) is continued along the radial side of the fore-arm to the bend of the elbow, where it divides into two branches; the largest, under the name of median vein, passes obliquely in front of the joint to join the basilic vein; the other is called the cephalic, (*cephalica major*,) ascends on the outer edge of the biceps, runs in the cellular interval between the pectoralis major and deltoid to the edge of the clavicle, then dips under the bone, and ends in the axillary vein.

There is considerable variety in the median vein, which is sometimes merely an oblique communication between the basilic and cephalic: in other instances, a large branch comes from the middle of the fore-arm, (*mediana communis*,) and divides at the elbow into two trunks, which separate like the branches of the letter V, and join, one the basilic, and one the cephalic. These branches are then called *vena mediana basilica*, and *mediana cephalica*. There is always a large communication at the elbow, between this median vein and the radial and ulnar veins.

The axillary trunk, in which all the veins of the upper extremity end, is placed in front of its corresponding artery, on the side and anterior part of the chest; passes in front of the anterior scalenus muscle, then taking the name of subclavian, and ends at the sternal extremity of the first rib, by joining the internal jugular at a right angle. In this angle the thoracic duct ends behind, on the left side; and the minor trunk in front, on the right side.

For representations of the veins of the upper extremity, see Camper, *Demonstrationes Anatomico-Pathologicae*, lib. i. *Klint de Nervis Brachii*.

The axillary trunk receives the superior and inferior thoracic veins, the external and internal scapular, the *dorsalis thoracica*, the vertebral, and the superior intercostal vein.

The trunk of the latter accompanies its corresponding artery in the transverse processes of the cervical vertebræ, commencing about the foramen magnum, and receiving numerous branches, of which the most remarkable are from a large plexus of veins lying close on the vertebræ before and behind, and connected with the transversa colli, the occipital, and the internal jugular veins, from the sinuses of the medulla spinalis in the neck, (*circuli venosi cervicales medullæ spinalis*), and communicating with the cerebral veins, at the foramen magnum. The vertebral and superior intercostal veins end in that part of the trunk called subclavian.

The right superior intercostal is sometimes deficient; that is, the veins of the two or three superior intercostal intervals, instead of uniting into a separate trunk, join the *vena azygos*. The left is always a considerable vein, formed by the veins belonging to the five or six superior intervals, which join into a trunk ascending on the left side of the vertebral column, receiving the left bronchial vein, and some other small branches.

The subclavian vein, having received the internal jugular, descends on the right side almost perpendicularly, and on the right of the *arteria innominata*, receives the internal mammary vein, and very soon receives the left subclavian at a right angle. It now takes the name of superior or descending *vena cava*, continues its course in the same direction, receives the *vena azygos* from behind, and after a farther perpendicular descent of about an inch, having penetrated the pericardium, terminates in the right auricle.

The left subclavian vein crosses the chest, immediately behind the upper edge of the first bone of the sternum, and in front of the trachea and primary branches of the

aortic arch, proceeding transversely from left to right, and joining the right subclavian above the pericardium, as already described. It receives in this course the left internal mammary, the mediastinal, thymic, superior pericardiac, and inferior thyroid veins.

The internal mammary vein accompanies the artery. The thymic veins are connected with the mediastinal, pericardiac, &c. They end either in the subclavian, internal mammary, bronchial, superior intercostal, or thyroid.

The superior and posterior pericardiac veins generally end in the subclavian; but they may terminate in the bronchial or internal mammary. The vein accompanying the left phrenic nerve ends in the bronchial; on the right side, in the internal mammary.

The vena azygos returns the blood from the parietes of the chest, except in so far as the superior intercostal veins are concerned, which, as we have already described, join the subclavian. This vein connects the superior and inferior veins of the body: for its inferior ramifications anastomose with the lumbar or other abdominal veins. Hence, where the inferior cava has been obstructed, the blood has found its way through the vena azygos into the superior.

The minute origins of the vena azygos on the right side of the body are connected with the vena cava, the lumbar, or the renal veins. The trunk, at this part small, enters the chest, either with the aorta, or through an interval in the right crus of the diaphragm. It ascends on the right side of the vertebral column, in front of the right intercostal arteries, covered by the pleura, with the trunk of the aorta on its left, and the thoracic duct in the cellular substance between it and that artery, receiving the intercostal veins, and increasing in size. About the third dorsal vertebra it quits the spine, passing forwards over the right bronchus and pulmonary artery, receiving the right bronchial and some œsophageal veins, and of a considerable size, and opens into the back of the superior vena cava.

The intercostal veins, which it receives in its course, accompany the arteries of the same name, and return the blood from the intercostal muscles, and those of the back, from the medulla spinalis, from the vertebræ, pleura, integuments, &c.

About the seventh or eighth rib, the vena azygos receives a large branch from the left side, called hemi-azyga. This begins by roots, which communicate with the abdominal veins, from a trunk entering the chest through the diaphragm, ascending on the left side of the chest, receiving four, five, or more left inferior intercostal veins, and then crossing to the right side, to join the trunk. Sometimes the hemi-azyga joins the common trunk by two or three branches; sometimes it is not formed, and the left intercostals proceed straight to the right side. See Wrisberg, *Observat. Anat. de Vena azyga duplici, aliisque hujus venæ varietatibus*. Goetting. 1778.

III. *The inferior Vena Cava*.—The veins of the lower extremities, of the pelvis, and the abdomen, terminate in this trunk.

The veins of the lower, like those of the upper extremity, consist of a deep-seated set accompanying the arteries, and therefore not requiring a separate description; and a superficial order, covered only by the skin, and intervening between it and the fascia. The femoral vein is the common channel for the blood of both these systems of veins.

The superficial veins of the leg compose two principal trunks, called saphenæ: there is indeed, as in the upper limb, a plexus covering nearly the whole of the foot and leg, of which the different branches every where communicate.

The saphena externa or minor arises from the venous

plexus of the sole and back of the foot towards the outer edge; it runs below and behind the outer ankle, then rises over the calf, and having frequently communicated with the deep-seated veins, terminates in the trunk of the popliteal.

The saphena externa or major is made up by the veins coming from the backs of the toes, and from the inner side of the sole, which form a considerable trunk, ascending in front of the internal malleolus, on the inside of the leg, knee, and thigh, communicating frequently with the deep-seated veins, and ending in the trunk of the femoral, about an inch below the crural arch. Just before its termination, it receives some veins from the external organs of generation (*puvicæ externæ*); and a considerable trunk, which descends from the integuments of the abdomen.

The femoral vein passes under the crural arch, on the outside of the corresponding artery, and continues in company with the artery, under the name of the external iliac, along the side of the psoas magnus, until it meets with and joins the internal iliac or hypogastric vein from the pelvis, at the sacro-iliac symphysis, or the point where the common iliac artery bifurcates into its external and internal branches. Immediately above the crural arch, the external iliac receives the epigastric and circumflex iliac veins.

The internal iliac or hypogastric vein is made up by the union of venous trunks, corresponding to the various arteries which are given off from the internal iliac artery. These veins accompany their respective arteries; but they are remarkable for forming thick and intricate plexuses, which surround the prostate, vesiculæ seminales, neck, and fundus of the bladder, urethra and vagina, and rectum.

A large vein runs along the back of the penis, in its middle, between the two arteriæ dorsales, and returns the blood from the glans, corpus spongiosum, bulb, and corpora cavernosa. It passes under the arch of the pubes, and divides into a right and left branch, which run into the plexus about the prostate and vesiculæ feminales.

The superficial veins of the penis and scrotum find their way under the arch of the pubes, communicating with the internal pudic vessels, and end in the plexuses about the neck of the bladder.

They are united on the outside with branches of the spermatic vein, and of the femoral. The prostate and vesiculæ seminales, the lateral and inferior parts of the bladder, are covered by numerous ramifications of a dense plexus, from which the trunks of the vesical veins convey the blood to the hypogastric.

The veins in the labia are numerous, and communicate frequently: these and the veins of the clitoris pass under the arch of the pubes; the front of the vagina and urethra are covered by a thick plexus, which is the common termination of the external and internal pudic vessels. These plexuses envelope the sides of the vagina, the anterior, lateral, and inferior parts of the bladder, and end in the vesical veins.

The external hemorrhoidal veins end in the pudendal; the middle occupying a space of three or four inches, and united with the plexuses already mentioned, join the hypogastric. These latter then are interposed between the internal hemorrhoidal, which joins the vena portarum, and the external, from which the hemorrhoidal flux proceeds.

Large veins proceed from the vagina and uterus to the internal iliac: there are also the lateral sacral veins, corresponding in number to the sacral foramina, out of which they proceed, and united with the middle sacral vein. The other vessels contributing to the hypogastric vein are, the obturatrix, ischiatic, pudenda communis, glutea, ileo lumbaris.

The primary or common iliacs, formed by the junction,

VEIN.

at nearly right angles, of the externa and internal, are very considerable venous trunks, differing slightly on the right and left sides of the body. The right is much the shortest, and proceeds obliquely behind, and rather above its corresponding artery. The left, placed behind and below the left common iliac artery, proceeds obliquely upwards and towards the right, across the front and upper part of the sacrum; then goes between the fifth lumbar vertebra and the right common iliac artery, to join its corresponding vein, at an acute but open angle, on the right side of the vertebral column, at the interval between the fourth and fifth lumbar vertebrae; forming by this union the great trunk of the inferior or ascending vena cava.

One or two lumbar veins sometimes join the common iliac. The sacra media, a small vein, terminates, either at the angle of union, or in the left common iliac.

The inferior vena cava lies at its origin, close to the aorta, on its right, and on the right side of the vertebral column: it ascends in the same relative position, first connected to the spine, then to the right crus of the diaphragm, but more and more distant from the aorta, as it rises higher in the body. It leaves the vertebral column towards the upper part of the abdomen, and enters a deep fissure in the posterior or thick edge of the liver, which covers two-thirds, and sometimes the whole vein. From the loins upwards the size of the trunk is considerably increased: it will easily admit a large thumb. Quitting the liver, it penetrates the tendon of the diaphragm (see DIAPHRAGM), and immediately opens into the right auricle of the heart. (See HEART.) In its passage it receives the following veins.

1. The sacra media has been already mentioned.
2. The lumbar veins correspond to the arteries of the same name, and return the blood from the parts supplied by those vessels. They form about four trunks on each side, which end in the lateral and posterior part of the inferior cava.
3. The spermatic veins. They come from the testicles in the male subject, from the uterus and ovaria in the female; receive various branches from the ureter (uretericæ), fat of the kidney (adiposæ), &c. and communicate with veins in the mesentery and mesocolon; form first a considerable plexus, with several trunks communicating together, and afterwards a single vein, which ends in the front of the vena cava on the right side, and in the renal vein on the left.
4. Renal or emulgent veins. Of these large trunks, the right is much shorter than the left, on account of the relative position of the vena cava and the kidneys. The latter crosses the vertebral column in front of the aorta. There are rarely more than one on each side.
5. Capsular veins. These often end in the renal, particularly on the left side, otherwise they terminate in the cava.
6. Hepatic veins. They are numerous, and of different sizes. Usually there are from three to five large ones, and several smaller. They return the blood of the vena portarum and that of the hepatic artery.

7. Inferior diaphragmatic veins; accompanying the arteries, and ending either in the cava, or in an hepatic vein. Soemmerring states that some diaphragmatic veins join the vena portarum.

Besides the works to which we have referred in the course of this article, for plates illustrating particular veins, we may refer in general to the Fasciculi of Haller, to the plates of the veins in Loder's collection, and to Mayer's Anatomische Beschreibung der Blutgefäße des menschlichen Körpers; mit kupfern, 1788, 8vo. See also Walter Angiologisches Handbuch, 1779. Soemmerring, De Corporis Humani Fabrica, t. 5. Bichat's Anatomie Descriptive, t. 4.

VEINS, Diseases of the. Veins (says Mr. Hodgson) are liable to all those morbid changes which are common to soft parts in general; but the membranous lining of these vessels is peculiarly susceptible of inflammation. When a vein is wounded, the inflammation, which is the effect of the injury, sometimes extends along the lining of the vessel into the principal venous trunks, and, in some instances, even to the membrane which lines the cavities of the heart. This inflammation sometimes produces an effusion of coagulating lymph, by which the opposite sides of the vein are united so as to obliterate the tube. In this manner, a great extent of the vessel is occasionally converted into a solid cord. In some instances, the secretion of pus into the cavity of the vessel is the consequence of inflammation of the membranous lining of veins: under these circumstances, the matter is either mixed with the circulating blood, or the inflammation, having produced adhesion of the sides of the vessel at certain intervals, boundaries are formed to the collections of pus, which in this manner form a chain of abscesses in the course of the vessel.

When the inflammation of veins is not very extensive, its symptoms are the same as those of local inflammation in general; but when the inflammation extends into the principal venous trunks, and pus is secreted into the vessel, it is accompanied with a high degree of constitutional irritation, and with symptoms which bear a striking resemblance to those of typhus fever. See Hodgson's Treatise on the Diseases of Arteries and Veins, p. 511, 512.

In the first volume of the Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge, Mr. Hunter has published an extremely interesting paper on the subject of inflammation of veins, and he has particularly adverted to that common case, an inflamed arm after bleeding. By some, he observes, this complaint has been imputed to the wounding of a tendon; by some, to the injury of a nerve; and by others it has been ascribed to a bad constitution.

Mr. Hunter expresses his doubts of the accuracy of these opinions, and he remarks, that the manner in which these fore arms come on, plainly proves that they arise from the wound not healing by the first intention; for, in most cases, the external wound first festers or inflames, and then suppurates or ulcerates, the cavity of the vein becoming subsequently impervious. In some instances, this suppuration is only superficial, the vein and parts below having united. In other examples, the skin appears to be united, but not close to the vein, so that a small abscess forms between the vessel and the integuments. This bursts and discharges a thin watery fluid, and no further mischief happens. When, however, this imperfection of union is continued on to the cavity of the vein, this vessel inflames both upwards and downwards, frequently to a considerable extent, and the surrounding parts join in the inflammation.

We find, says Mr. Hunter, all these variations in different cases. Sometimes the disease goes no further than an inflammation near the orifice of the vein, and the case often ends in resolution. At other times, the inflammation is carried further, but suppuration is prevented by the adhesive inflammation taking place in the affected portion of the vein, and, in such cases, the veins may be plainly felt, like hard cords, after the surrounding tumefaction has subsided. But this salutary effect is not always produced, and suppuration in the vein is the consequence, but often in so limited a degree, that only a small abscess forms in the cavity of the vein, near the puncture. The confinement of the matter in this part of the vein, arises from adhesions in the vessel, a little above and below the orifice. But, in many cases, adhesions

adhesions do not occur, and then the inflammation and suppuration are not confined to the vicinity of the wound. On the contrary, an abscess is frequently produced, occupying a considerable length of the vein in both directions; and, says Mr. Hunter, we often have more than one abscess; nay, sometimes there is a series of them, generally in the direction towards the heart; but not always in this course; for, occasionally, these abscesses are observed between the orifice in the vein and the extreme part of the limb.

In consequence of a wound in the foot, Mr. Hunter saw the vena saphena inflamed all up the leg and thigh, nearly as high as the groin; and he was obliged to open a chain of abscesses, which reached nearly the whole course of the vessel.

In cases in which the inflammation had been violent, and in which the opportunity of examination was afforded, Mr. Hunter found the inflammation at some distance from this violence in the adhesive state; in some places, the sides of the vein were adhering; and, in others, the inner surface of the veins was covered with coagulable lymph. When different abscesses had formed, he always found, that the spaces of the vein between them had united by the adhesive inflammation, and it is this union which circumscribes such abscesses.

In examining the arm of a man who died at St. George's hospital, Mr. Hunter found the veins, both above and below the orifice, united in many places by the adhesive inflammation. He also found in many parts of the veins the commencement of suppuration, without ulceration having actually begun; while, in several other places, ulceration had occurred, and destroyed the surface of the vessel next the skin, a circumscribed abscess being produced. The vein near the axilla was in a state of suppuration, and as no adhesions were formed beyond the part affected, Mr. Hunter conceived that the matter had passed freely into the circulation, and most probably been the occasion of the man's decease.

When larger abscesses had come on than those arising from the ulceration of the wound of the lancet, Mr. Hunter always found that the vein was afterwards obliterated, having united and healed up as any other cavity does, so that the patient could never be bled in the same vein again.

Inflammation of a vein is a common effect after bleeding horses, which is to be ascribed to the careless and rough manner of closing the puncture with a pin. Mr. Hunter has seen the jugular veins of horses inflamed through their whole course, the swelling extending to all the side of the head, and the inflammation reaching even to the chest. In these cases there is always an abscess formed at the wound, and often several along the vein, as in the human subject; and whenever the complaint is carried as far as this stage, the vein is rendered for ever afterwards impervious. Many horses die of this disease; but what is the particular circumstance which occasions their death, Mr. Hunter was not able to determine. It may (says he) either be that the inflammation extends itself to the heart, or that the matter secreted from the inside of the vein passes along that tube in considerable quantity to the heart, and mixes with the blood.

Although the operation of venesection, which is the most frequent cause of this complaint, is to appearance trifling, yet, as it is often of very serious consequence, both to the life of the patient and the character of the surgeon, the operator should use the utmost care to prevent an evil of such magnitude. He should be particularly attentive to the mode of closing the wound and binding up the arm. This is to be done by bringing the two sides of the wound together,

in order that they may unite by the first intention. To accomplish this, let the surgeon, with the thumb of that hand which holds the arm, push the skin towards the orifice, while he draws it on the other side to the same point with the compress, which is then to be immediately applied. The compress should be broad, so as to keep the skin better together; and thick, in order that the compression may be more certain. Mr. Hunter preferred a compress of linen, or lint, to sticking-plaster. He very properly thought, that the blood which dried over the orifice was a more natural and effectual bond of union than any other application. This conclusion, he observes, is drawn from practice; and he had seen more fore arms, in consequence of bleeding, where the puncture had been dressed with plasters, than under other circumstances.

When inflammation takes place beyond the orifice, the surgeon should endeavour to promote adhesion of the inflamed sides of the vessel by means of compression. If it be suspected that suppuration has happened, the pressure should be applied just above the suppuration, with a view of producing an obliteration of the vessel in that situation. (See *Trans. of a Society for the Improvement of Med. and Chir. Knowledge*, vol. i. p. 18, &c.) As Mr. Hodgson observes, the treatment of the inflammation, when only the punctured vein is affected, should be the same as that of local inflammation in general; namely, the application of leeches, the use of evaporating washes, purgatives, and low diet. Although the constitutional irritation, which takes place in extensive inflammation of veins, is attended with more debility than usually accompanies acute inflammation, yet the case can hardly be relieved without recourse to copious bleedings, and the usual antiphlogistic remedies.

For additional information on the foregoing subject, we refer to Mr. Hodgson's excellent Treatise on the Diseases of Arteries and Veins, a publication which reflects the highest credit on its intelligent author. Some other affections of the veins are noticed in distinct articles of this Cyclopædia. See CIRSOCELE, HEMORRHOIDS, VARICOCELE, VARICOSE Veins, VARIX, &c.

VEINS, *Method of opening*, for the purpose of taking away blood. See BLEEDING.

VEIN, in *Botany and Vegetable Physiology*, *vena*, is a term used for all those assemblages of tubes, through which the sap of a plant is transmitted along the leaves, and by some of which also the secreted fluids must be returned into the bark and wood, for the increase of both. Hence Hedwig, for the sake of precision, has invented the term *ductorum fasciculus*, a cluster of ducts, for the ribs of the foliage in Mosses; but we see no improvement in this phraseology. The larger, primary, or more direct, assemblages of vessels have obtained the name of ribs, *costæ*, or nerves, *nervi*; but the limits between these and veins are not always very certain. Large transverse veins, as well as the great longitudinal ones, are often called ribs or nerves, especially if they send off finer and more complex ramifications, interbranching with each other like net-work, to which the name of veins is evidently more suitable. We could wish to apply the term *costa* to the great central rib, and *nervi* to the lateral ones, whether longitudinal or transverse, but this has not been adopted with any regularity. See COSTA and LEAF.

Veins are also found copiously in the *petals* of flowers, and are exactly analogous to the veins, ribs, or nerves of leaves, except being generally more pellucid and homogeneous. When the petals undergo any changes of colour, in their progressive stages of growth, the veins partake remarkably of such changes, and mostly in the first instance. Ribs, rather

VEIN.

rather than veins, are most apparent in the *calyx* of many plants.

VEINS, *Metallic* and *Mineral*, in *Geology*, are fissures intersecting rocks or strata, filled more or less completely with mineral or metallic matter, different from the substance of the rock. When veins are seen on the surface intersecting or traversing a mountain, they have been supposed to resemble the veins of animals; but the resemblance is only superficial, for veins are not tubular, except in a few instances; but their thickness is small, compared with their length and depth.

Metallic veins are the principal repositories of most of the metals, except iron and manganese, which occur more frequently and abundantly in beds than in veins. The thickness of metallic veins varies from a few inches to several feet or yards: the same vein varies also in thickness in different parts of its course, sometimes contracting to a narrow string of ore, and then expanding again to the width of several yards. The depth to which they descend is unknown, for we believe no instance has occurred of a considerable vein being worked out in depth, though it may sink too deep to render the operation of the miner profitable; or it may branch off in a number of strings, which are too much intermixed with the rock to be worked to advantage. In cases where the metallic ores have disappeared at considerable depths, the veins are still continued, though they are filled exclusively with the mineral matter or vein-stone which accompanied the ore in the upper part of the rock. Some veins appear to grow wider, and others to contract as they descend. The direction of veins downwards inclines more or less from the perpendicular; but they sometimes run for a certain distance parallel with the dip of the beds or strata in a mountain, and then strike down through the lower beds.

The length of metallic veins has rarely, if ever, been accurately determined; they have frequently been traced several miles, but their further progress has been concealed by the intervention of valleys, rivers, or accumulations of sand and alluvial deposits. Some of the metallic veins in South America have been traced to the distance of eighty miles. Large veins generally take a nearly direct line through a country, except where they are turned aside by cross veins, or what are called in Cornwall *cross courses*: it is also remarkable, that the metalliferous veins in England generally run nearly east and west, and the cross courses north and south. To what cause this is owing we are perfectly ignorant. Large metalliferous veins frequently send off smaller veins, or strings of ore, from their sides, which penetrate the rock to a considerable distance on each side of the large vein. Veins are seldom entirely filled with ore, but sometimes it extends in a compact mass from one side to the other. More frequently, the ore is intermixed with mineral matter called vein-stone, *matrix* or *gangue*: this, according to the rock which it intersects, will be either calcareous spar, fluor spar, barytes or quartz. The vein-stone and the ore are frequently arranged over each other, lining the sides of the vein with alternate layers of metallic and mineral matter, and filling up the whole vein. In the mines of Cornwall, the ores of copper and tin commonly occur in detached masses, which are called *bunches* of ore; and the other parts of the vein, being unproductive, are called *deads*.

The vein is generally separated from the rock which it intersects by a thin layer of mineral matter distinct from the vein, and from the rock itself, and also by a thin lining of clay. Sometimes there are large cavities in veins called *druses*, which are generally lined with crystals. In other instances the vein divides, inclosing a piece of rock, which is called the *rider*; but it is observed, that the inclosed mass,

or rider, differs in its quality from that of the rock through which the vein passes.

The superficial part of a vein generally contains the ore in a decomposing state; and it frequently happens that the ores in the upper and lower part of the vein are different: thus in Cornwall, blende, or the sulphuret of zinc, often occupies the uppermost part of the vein, to which succeeds tin-stone, and at a greater depth, copper pyrites. See ZINC, TIN-STONE, and COPPER.

When Mr. Pryce wrote his "*Mineralogia Cornubiensis*," the mines of Cornwall had not been worked to a great depth, for he says the richest state of a mine for copper was from eighty to one hundred yards deep, and for tin, from forty to one hundred and twenty yards. This account by no means corresponds with the present state of the Cornish mines. The Dolcooth copper-mine, near Redruth, is worked to the depth of four hundred and fifty-six yards, and is very productive at that depth.

Veins generally decline from the perpendicular, and descend into the earth obliquely. The sides, or, as they are called, the walls or cheeks of the vein, are differently denominated, the upper side being called the *hanging-side*, the *up-cheek*, or *hanger*; and the under side, the *hanging-side*, the *down-cheek*, or the *ledger*. The veins we have been describing are called *rake* veins in some parts of England, and in Cornwall, they are denominated *lodes*; which see. These metalliferous veins have commonly the same direction, or nearly so, in the same district, and the veins which cross them are generally unproductive, or contain metallic ores of a different kind. They are called *cross courses*, or north and south veins.

Metalliferous rake-veins intersect most of the mountains called primary, such as granite, gneiss, and mica-slate. (See GRANITE, &c.) But they are more abundant in slate-rocks than in rocks of granite or porphyry. (See GRANITE, SLATE, and PORPHYRY.) They also intersect the rocks of transition and mountain lime-stone, which rest upon slate, or alternate with it; but they rarely rise into the secondary strata which contains coal. This fact seems to prove that veins were formed prior to the deposition of the upper secondary strata. When a metallic vein in its descent passes through different kinds of rock, it is frequently observed that the products of the vein vary in each bed; and when it passes through regularly stratified beds of the same rock, there are particular strata in which the veins are always found most productive, and these in the north of England are called *bearing measures*. If the nature of the rock seems to have produced a change in the quality of the ore, it is no less remarkable that the rock itself is also frequently changed or decomposed in the immediate vicinity of a vein. This change is more apparent in some rocks than in others, particularly in granite, sienite, gneiss, mica-slate, argillaceous schistus or slate, and porphyry. In such instances, according to Werner, it is only one of the component parts of the rock that is decomposed, either the felspar, the hornblende, or the mica, but never the quartz. This change sometimes extends to a considerable distance on each side of the vein, even to a fathom or more; it extends farther in some places than in others, and is most general in those parts where the vein contains sulphur. Sometimes this change in the rock may be perceived so far, that it serves as a guide to the miner; and in following a sterile vein, when he comes to a place where the rock is decomposed, he concludes that the metallic ore will soon be found. In Cornwall, the felspar is frequently changed in the vicinity of a vein, and tin-stone is sometimes disseminated through the rock to some distance on each side of it.

The cross courses or veins which intersect the metalliferous veins, frequently occasion a considerable derangement in the position of metalliferous veins, and, what is still more remarkable, occasion a change in the quantity or quality of their contents. When a vein is cut through by another, either in its line of bearing along a country, or crosses it by declining in a different direction, the vein which is cut through is supposed to be of more ancient formation than the vein which crosses and cuts through it; but it may be doubted, from various circumstances, whether many of these veins were not formed at the same time with the rock itself, or were fissures passing through the rock in different directions, into which the various metallic substances were secreted, during its consolidation. To form a more distinct idea of the structure of a vein and its intersection by cross courses, we refer to *Plate IV. Geology. Fig. 4.* *a a* represent a rake-vein descending obliquely; *b b*, the rock; *c, c*, the walls or cheeks of the vein; *d*, an interposing piece of rock, called the rider; *e, e, e*, the division of the vein into numerous small veins or strings of ore. If the space at *d*, which is supposed to be filled with rock, were empty, or filled with water, it would constitute what is called a druse; and it is in these cavities or druses that all the most beautiful and regular crystallizations of the mine occur. *Fig. 5.* represents the section of a rock containing a metallic vein cut through, and displaced by cross courses or veins of another metal; *a a a* is a vein which appears to have been once continuous, and contains tin; *b, b, b*, represent different veins of copper, which cut through the former, and have upheaved the lower part, and brought them nearer the surface. In *Plate II. Geology, fig. 10.* represents the ground plan or horizontal section of a plot of ground traversed by a vein and a cross course; *E. W.* represent the east and west sides of the ground. It is in this direction the vein *a a* passes, but it is cut through by the cross vein *b b*, which has carried the western side of the vein and the ground along with it considerably to the north of its original position. Such a fracture and removal of the vein can only be conceived to have taken place by a lateral or horizontal motion of a portion of the ground. Such a motion has been frequently observed during violent earthquakes. For though the ground is heaved upwards, the greater resistance which certain parts offer to this motion must occasion a lateral pressure on other parts of the earth's surface, and to such a pressure we must also refer the remarkable contortions of the coal strata near Valenciennes. See *Plate II. fig. 9.*

Metallic veins frequently occasion a displacement of the strata when they pass through regularly stratified rocks; and it is observed, that when this displacement is considerable, so as to bring a bed of lime-stone on the same level with a bed of sand-stone or shale, the vein is never so productive as when the opposite sides or walls of the vein are in the same kind of rock. See *Plate II. Geology, fig. 8.* where the different strata *a, b, c, d, e, f, g*, represent different strata on each side of a vein or fault. If *d, d*, are supposed to represent parts of a bed of lime-stone broken by the vein, and *g g* a bed of sand-stone below the lime-stone, but brought on the same level with it by the upheaving of the strata,—in that part of the vein where the lime-stone, *d*, and the sand-stone, *g*, form the walls opposite to each other, the vein will be unproductive, though in other parts of the district, when the vein passes through the same bed of lime-stone, on each side of it, at the same level, it will be remarkably productive. These facts may be commonly observed in the mining districts of the western parts of Northumberland and Durham, where the strata consist of different beds of mountain lime-stone,

sand-stone, and shale. See STRATA, under which article the succession of the different beds is enumerated.

As cross veins generally displace and injure the quality of veins, on the contrary, when east and west veins in a district meet, by a slight variation in their direction or dip, the part where they join is frequently very rich in ore; and where a number of metallic veins cross each other at the same place, they frequently produce a large irregular conical mass of ore of vast extent, from which the different veins diverge, like radii from a common centre. The main shaft of such a vein, which Mr. Williams, in his Mineral Kingdom, calls an *accumulated vein*, "resembles," he says, "the inside of a glass-house; and the vast capacity of this vein is frequently filled with a rich body of metallic ore, often imbedded in soft mineral soils; but the veins and branches which join and diverge resemble rake-veins, or perpendicular mineral fissures. When the ore is worked out of an accumulated vein, it exhibits a frightful gulf, sometimes fifty or sixty feet wide below, and is often worked down to a great depth from the surface." A number of these accumulated veins have been worked at Pike-Law, in the county of Durham. Cross courses sometimes contain ore to a small distance from their junction with metallic veins, and in other situations they become so rich as to be worked with advantage. The Botallack mine, on the sea-coast near St. Just, in Cornwall, offers a striking illustration of this, though we believe its structure has not been generally known or understood. The vein which is worked is a north and south vein, varying in width from nine to twelve feet, and extending under the sea. The vein-stone is quartz, with a small quantity of fluor spar. It is found to contain ore of copper and tin only in those parts where the east and west veins enter it, and for thirty or forty fathoms on each side of the junction. This mine produces the richest ore of copper in Cornwall, the grey sulphuret yielding twenty *per cent.* of this metal. It is deserving notice, that the metalliferous veins which enter this lode on the east side and render it productive, have never been found on the west side, so that they appear to terminate in it. The rock near the great north and south vein is a soft killas or slate, but beyond this it is a very indurated flinty slate. This vein may properly be considered as a cross course, rendered rich in ore in various parts by a number of small veins which fall into it, like brooks into a large river where they are lost. The situation of this mine is truly remarkable, at the foot of a precipitous cliff that overhangs the Atlantic ocean. If ever a spot seemed to bid defiance to the efforts of the miner, it was this. At the very commencement of his labours, he was required to lower an immense steam-engine down a precipice of more than two hundred feet, with a view of extending his operations under the bed of the sea, where the workings are at present continued for seventy fathoms in length and sixty-five fathoms in depth. In these caverns of darkness, many human beings for a small pittance, and that even of an uncertain amount, are constantly digging for ore, regardless of the horrors which surround them, and of the roar of the Atlantic ocean, whose boisterous waves are incessantly rolling over their heads. In some places the sea actually penetrates through; and it is worthy of observation, that the water is deprived of a great portion of its salts; but whether this arises from filtration, or whether some portion of the fresh water from the land percolated through subterranean fissures in the rocks, we could not ascertain when we visited this singular mine. If the filtration be more abundant after heavy rains, it would prove the intermixture of rain-water. The thin cross courses filled with clay called *flucan*, heave the east and west veins, and also hold up the water. The vein which is rich

VEIN.

in ore on one side of the flucan, will be poor on the other side. This fact, which we believe has not been sufficiently noticed, is well deserving attention, and would indicate that the presence of water affected the contents of veins.

Some veins contain little diversity in the nature of their contents, being filled principally with one kind of ore or vein-stone. Other veins contain a great variety of minerals, without any apparent regularity of arrangement: there are also numerous veins which have a regular structure, the different minerals being arranged in parallel layers, coating each other: the same succession of different minerals occur on each side and meet in the middle, filling up the vein, or sometimes leaving an empty space between. Thus calcareous spar, fluor spar, barytic spar, lead-ore, blende, and grey copper-ore, form different layers over each other in the same succession on each side of the vein. In the Botallack mine, before described, copper-ore is frequently found lining each side of the vein, and this is covered by tin; but in other parts of the mine the tin covers the walls, and is succeeded by copper.

Irregular Veins.—Besides rake-veins, which may be considered as regular, there are other veins which present a great variety of structure, and are called *bellies*, *pipes*, &c. according to their form. If a rake-vein be regarded as a tubular mass of mineral matter intersecting mountains; if this vein become irregular, and have its sides closed, or, as the miners call, *twitched in*, it forms what they denominate a pipe-vein, or mass of ore and vein-stone sometimes of a tubular shape, descending to a considerable distance like a pipe. In other instances, the sides are closed in both above and below, as well as on the sides, inclosing what the miners call a *belly*, or mass of ore of considerable magnitude. Sometimes a small rib of ore is continued through that part of the rock where the sides of the vein are twitched in, until the vein expands again and produces another mass of ore. In some instances there is no ore between, a rib of vein-stone or rider of clay being carried through the narrow part or *twitch* of the vein, but many of these twitches contain neither ore, clay, nor rider. In such cases, it becomes exceedingly difficult to follow the vein through the rock, to where it opens out again.

The veins in general do not close suddenly, but the sides gradually approach each other, and the ore terminates in the form of a wedge at the *twitch*.

These contractions or twitches are of various lengths, and no miner can tell, when the vein is so squeezed in, how many fathoms he must pass through before it opens again, unless the same twitch has before been cut through above or below the part where he is working. The intervening space between two masses of ore is called a *bar*, and sometimes extends ten, twenty, or even a hundred fathoms or more; and when it is cut through, the ore makes its appearance, and begins gradually to widen and form another mass or belly. When one of these bellies of ore proves pure and solid, it generally happens that all the contiguous bellies prove so in the same vein. According to Mr. Forster, instances have been known of eight hundred *bings* of ore being raised by six miners from one of these bellies in the space of nine weeks.

When the matrix in these large bellies of ore is soft, the ore is generally found in a globular form, more or less irregularly imbedded in the soft materials, and these globular masses of ore are of various dimensions. It is no uncommon thing to find the soft openings in this kind of vein swell to an enormous width, so as to make it difficult to find the real sides of the vein. Working these veins is the most difficult part of mining, as there is no proceeding a foot

without advancing timbers as far as they go, in the form of a passage in a house, composed of two side-posts, a lintel and a sole. The miners stand within this square frame, where they work and erect more timber as they proceed. It frequently happens that the ore is so plentiful and rich in this kind of metallic repository, as abundantly to compensate for all the labour and expence.

Flat Veins and Beds.—When a vein runs parallel with the strata, it is called a flat vein. If the strata are soft, and the metallic matter is widely distributed, such veins do not differ from beds, being regular beds or strata impregnated with metallic matter. When flat veins run between hard strata, they are also liable to contractions, or *twitches*, and again expand, forming *pipes* or tubular masses of ore, which extend in an inclined position, having the same dip as the strata. Flat veins may be distinguished from beds by this character; proper flat veins appear to be openings between the strata which have been filled with metallic matter from a rake-vein, or are at least connected with it, as they seldom are productive of ore, except in the vicinity of the vein; whereas beds are regular strata, having the same elevations and depressions as the other strata in a mountain, but containing metallic matter more or less abundantly scattered through them. Iron ores and ores of manganese frequently occur in beds, forming regular parts or layers of the mountain. Other metallic ores, which occur less frequently and abundantly in beds, are, we believe, for the most part veins which have taken the course of the softer beds and distributed their contents through them. It is well known, that when a vein descends through strata of different kinds of rock, it grows wider in the soft strata, and contracts in the harder beds of rock.

The metalliferous beds in Cumberland appear, in many instances, to be soft beds, rendered productive of ore by a number of small veins running through them. There are few metallic beds in England, except in that county. Manganese occurs in beds in red sand-stone in the vicinity of Exeter, but the metallic matter decreases as the beds dip from the surface. Metallic beds, in primary countries, occur most frequently among the schistose mountains, composed of gneiss, mica-slate, and slate. (See Rock.) It is observed, that the ores and minerals which occur in beds are seldom crystallized, as these beds contain few druses or cavities to admit the formation of crystals. The minerals in beds are accompanied with garnet, actinolite, and hornblende, which never occur in rake-veins. See GARNET, &c.

Stock-work.—When a rock is crossed and penetrated by a great number of small veins in every direction, the whole mass is worked as an ore, and is called by the Germans a *stock-work*, or *werke*, the rock being afterwards separated from the ore by pounding and washing, in the same manner as the vein-stone is cleared from the ore in other mines. When the ore is diffused in particles through the rock, such rocks are also worked for the ore when it exists in sufficient quantity. In some instances, masses of ore of great magnitude are found imbedded in rocks, without any apparent connection with veins, which masses must have been formed at the same time with the rock itself.

Rocks and strata are sometimes penetrated by metallic salts or oxyds, diffused through the mass in the same manner as we frequently observe strata of sand-stone abounding with the red oxyd of iron. Where the metals are valuable, such impregnated rocks or strata are sometimes worked as ores. At Alderley Edge, a hill near Macclesfield, in Cheshire, the sand-stone, which is in some parts a kind of breccia, is impregnated with the black oxyd of cobalt, with the carbonate and oxyd of copper, and with particles of sulphuret
and

and carbonate of lead, and has formerly been worked for the lead and copper, and more recently for the cobalt. Mr. Williams, in his "Natural History of the Mineral Kingdom," describes a singular stratum of stone near Loffmouth, in the shire of Moray, of about eight feet thick, which is composed of several species of hard and fine stones of various beautiful colours. "This stratum is a kind of pudding-stone, in the composition of which there is blended about an eighth part of good blue lead-ore or galena.

"This curious bed of stone is nearly horizontal, but dips away with an easy slope towards the north of the Moray Frith. The lead is found in larger and smaller grains and flowers, blended through the whole body and composition of the stone, in the same manner as the small masses of agates and coloured crystals, and other species of stone, are found blended through the whole body of the stratum."

Where metallic ore is thus intermixed with fragments of rock forming a conglomerate or breccia, it may probably be referred to the same kind of metallic repository as stream-works, (see *STREAM-Works*,) in which particles and masses of ore are intermixed with loose pebbles and sand, forming beds at the bottom of valleys, or on the sea-shore, the metallic matter, as well as the pebbles, being derived from the disintegration of rocks containing metallic veins; but in the instance cited by Mr. Williams, the parts have become united, forming a solid stratum.

The manner in which metallic veins were filled with ore has greatly divided the opinions of geologists. George Agricola, a Saxon, who died in 1555, appears to have been the first writer who had any distinct knowledge of the structure of metallic veins, which he published in a work entitled "De Rê Metallica," and another work entitled "Bermanus." His theory of veins is in some respects similar to that of Werner, which has lately excited much attention. According to Agricola, the rents or fissures which are filled with metallic matter were partly formed at the same time with the rocks themselves, and partly afterwards, by the waters penetrating the softer parts; so that where there has been a larger quantity of water, or where the substance of the rock has been much softened, there the largest fissures occur. With respect to the earths and stones found in veins, he conceives the former to have been detached from the rocks and carried into the veins by water; the latter he considers as arising from the earthy matter, hardened partly by change of temperature and partly by a lapidific juice. Minerals and metals he regards as being deposited from a solution in water, containing the earthy parts intimately mixed and combined with it in certain proportions. The solution of these mineral substances he conceives to have been greatly promoted by heat, on the abstraction of which they assumed their present solid form; the precious metals being the result of a more pure and perfect solution.

Becher, in his "Physica-Subterranea," published in 1669, ascribes the formation of metals and minerals to certain subterranean vapours which arise from the bowels of the earth, and penetrating the substance of veins, produce a peculiar change in the earthy or stony matter they meet with. He regards the earth as a hollow body, filled with clay, water, sulphureous and bituminous substances, from which arise certain exhalations that form the metals. The celebrated German physician Stahl, considers veins, as well as the substances they contain, to have been formed at the same time with the earth itself, and of course as being contemporaneous with the rocks they intersect; but he is disposed to attribute some effect to the action of air and other causes.

Henkel, in his "Pyritologia," has given an ingenious theory of the formation of metallic veins, which has been adopted,

with certain modifications, by some later geologists: he attributes the formation of ores to a peculiar exhalation produced and engendered by fermentation, supposed by him to take place in the interior of rocks. The basis of each ore and mineral he supposes to exist in the substance of the rock, and by a peculiar process of nature it is matured and converted into the metal. He does not venture to ascertain the nature of these bases, but in one passage he treats of subtle earths, in another of mercurial, arsenical, and sulphureous parts. These three last he probably considered as constituent parts, and the metals as compounds. Air, water, and fire, are substances, according to this mineralogist, of which Nature avails herself in the formation of metals. He also supposes certain kinds of earths and stones to exist, which serve as the matrix for others, and which are indispensably necessary in the formation of minerals.

Zimmerman, the pupil of Henkel, is the first mineralogist who considers veins to have been formed by a transformation of the substance of the rock. Minerals, he says, are undoubtedly formed in the rock; but daily experience shews that the rock is not of itself capable of forming a metal, for were the mineralizing principle capable of converting it into a metal, we should find whole mountains which had undergone this change. But this change is only met with in certain directions, where the part of a rock, being thus transformed, constitutes veins. These veins, when they have not suffered an entire change, or when they do not contain perfect metals, are still of a different nature from the rest of the rock. An attentive examination will shew that they are of a decomposed and friable nature, appearing to have a tendency to return to this natural earthy state, from which we may conclude that these veins were originally the same as the rock, but that their texture had been altered and decomposed by some particular saline substance, which penetrated the rents and fissures, and had rendered them fit to be transformed into minerals.

Before noticing the theory of Von Opperl, which has since been adopted by Werner, we shall state the opinions of those geologists who, with Henkel and Zimmerman, suppose that veins have been filled by local causes which may still continue to operate; whereas Von Opperl and Werner conceive that they were formed by a general cause, the operation of which ceased before the present state of the globe. Lehman, in his treatise on the matrices of metals, published in 1753, says, "the veins which we find in mines appear to be only the branches and shoots of an immense trunk, which is placed at a prodigious depth in the bowels of the earth, but in consequence of its great depth we have not been able to reach the trunk. The large veins are its principal branches, and the inferior ones the twigs. What I have said," he adds, "will not appear incredible, when we consider that the bowels of the earth are, according to every observation, the workhouse where Nature carries on the manufacture of the metals; that, from the beginning of the world, she has been working at, and elaborating their primitive particles; that these particles issue forth, in the form of vapours and exhalations, to the surface of the globe through rents, in the same manner as the sap rises and circulates through vegetables by means of the vessels and fibres of which they are composed."

The latter part of the theory of Lehman, which supposes that changes are now taking place in the interior of the globe, by which metallic ores are still forming, has been supported by many geologists, who have had opportunities of extensive observation. Mr. Von Trebra, sub-director of mines in Saxony, in his work entitled "Observations on the Interior of Mountains," advances a theory nearly similar to that of Zimmerman, and agreeing in part with Lehman.

From the third letter of that work we make the following extract.

“ In explaining the phenomena which are observable in the interior of mountains (it must however be remembered, that I do not include such as are evidently of volcanic origin), I do not avail myself of those great causes which, by their magnitude, the suddenness of their action, and by their effects, produce sudden changes which take place under our eyes, such as subterranean fires, earthquakes, and the like. I refer these phenomena to natural causes, which, though less evident and slower in their operation, are no less certain of producing a radical transformation. Of this kind are putrefaction and fermentation. It is of little consequence by what name we distinguish this peculiar action exerted by Nature in the mineral kingdom; it consists in an intestine motion in the central parts of the globe, and appears to be produced by water combined with heat in different degrees of intensity. I observe such changes still going on, and can conceive them to continue so long as the same series of operations exist in nature. I am persuaded that there is constantly going on in our mountains a variety of transformations, compositions and decompositions, which not only take place at present, but will continue to the end of time.

“ Fermentation, if I may be allowed to call by that name this quality which acts by insensible degrees, produces the most perfect transformations in the bowels of the earth; fermentation I say may, according to my theory, alter the entire mass of a mountain; it may convert granite into gneiss, as this last only differs from the former in its structure, which is slaty or schistose; gneiss indeed has no other distinctive character than its structure, namely, the regularity and parallelism of its beds, and in some places a decomposed felspar approaching to clay. This fermentation may also convert greywacke into an argillaceous schist, which last may again by induration become jasper, when this process is either diminished or stopped. By it, also, quartz may be converted into clay, calcareous substances into quartz, and the whole mass of a mountain into inflammable or saline matter, or even into ores, metals, or semimetals. To it I ascribe the power of producing, preserving, and continuing to form the different beds and mineral repositories, which are found both in primitive and Sætz mountains: finally, the effects which the waters produce in filtering from above to below, and which in their passage through the different rocks may undergo some peculiar modification, appear to me the principal cause why this fermentation may act with more force in one part of the same mountain than in another.”

Patrin, a celebrated French mineralogist, considers the changes taking place in the mineral kingdom, as effected by a process somewhat similar to secretion in the animal and vegetable kingdoms, and ascribes a kind of mineral life to the earth itself, differing perhaps as much from vegetable life as the latter differs from that of animals. According to this theory, each kind of mineral substance is capable of converting masses of mineral matter into its own peculiar nature, as animals convert their aliment into flesh and blood. Whatever may be thought of this theory, we believe that those who are most practically conversant with the various phenomena and transmutations that occur in mines, will readily admit that many changes are taking place, which cannot be explained on any known chemical or mechanical principles, and which bear a strong resemblance in their effects to the process of secretion. Nor can it, even in the present state of chemical science, appear improbable that the different earths and metals may be converted into each other by natural processes. The different beds of rock intersected by metallic veins, are themselves metallic substances combined with oxygen; or, in

other words, all the rocks and strata which form the earthy parts of the globe, consist of oxygen combined with metallic bases; and as these metallic bases may perhaps be compounded of the same elementary parts united in different proportions, the transmutation of one earth or metal into another, may be effected by a simple change in the arrangement of the elementary molecules.

The theory of veins proposed by Von Oppel, and in part supported and extended by Werner, supposes veins to have been fissures originally formed by the desiccation of mountains, and the shrinking in of the mass. These fissures, being open at the top, were afterwards filled with their contents by metallic solutions poured in from above. Mountains, according to Werner, have been formed by a successive accumulation of different beds and layers, placed or heaped over one another. “ The substance of these beds was at first wet, and possessed little solidity; so that when the accumulation of matter had attained a certain height, the mass of the mountain yielded to its weight, and must consequently have sunk and cracked. As the waters which assisted in supporting the mass began to retire, and lower their former level, these masses then lost their support, and yielded to the action of their weight, opening, and falling to the side where the least resistance was opposed. The shrinking of the mass of a mountain produced by desiccation, and still more the fractures by earthquakes, and other similar causes, may also have contributed to the formation of fissures.

“ The same precipitation, which in the humid way formed the strata and beds of rock, furnished and produced the *substance of veins*. This took place when the solution, from which the precipitation was formed, covered the existing rents, which were as yet wholly or partially empty, and open in the upper part. Veins, whether considered as rents, or as the substance constituting the vein, have been produced at very different times; and the antiquity or relative age of each can be easily determined.”

Such, in Werner's own words, are the great outlines of his theory, a theory which we conceive to be decidedly opposed by all the most striking appearances existing in the mineral kingdom, and equally opposed to the simplest known and acknowledged laws of nature. If metallic veins were once open fissures, filled by precipitations from a solution that covered the whole globe, with the highest mountains in which metallic veins are found; it is obvious that these metallic precipitations would be most considerable in the lower parts of the surface, in valleys and plains, where the fluid must have been much deeper than on the summits and sides of mountains. We ought, therefore, to find thick beds of metallic matter covering and incrusting the low and level parts of the globe; but nothing is more rare than to find beds of metallic matter in low plains. Where beds of metallic matter exist, it is always in comparatively high countries, abounding in veins; and it is much more probable that the beds and veins were formed by local causes, and not from a solvent covering the whole globe. The metallic parts of this metalliferous ocean must have possessed the greatest specific gravity, and instead of floating on the top of the fluid, to be deposited in the fissures of lofty mountains, it would have descended by the laws of gravity, forming crusts of different degrees of thickness from the bottom to the top, increasing downward. The reverse of this is the fact. It is principally in alpine districts, and at enormous heights, that metallic matter is accumulated in the greatest abundance. It is in the heights of the Cordilleras of Peru that the productive mines of Potosi are situated: it is in the same chain of mountains, more

than 14,000 feet above the level of the sea, that the prodigious mass of mercurial ores is found at Guanaca Velica, where, in the space of two centuries, more than 15,000 quintals of this metal have been procured.

But the facts most opposed to the theory of Werner are those which we have stated, namely, that when a metallic vein passes through different strata, the mineral substances it contains generally vary in each stratum, either in kind or quality. Sometimes an entire change takes place, as from tin to copper or lead; in other instances, the vein will contain the same kind of ore in the different strata, but it will be invariably richer or poorer in some of the strata than in others, and there will be certain strata in which scarcely any ore occurs. Very frequently where the same kind of metallic matter is contained in the vein, it will be mineralized or combined with different substances, as the vein passes through different beds: thus we find a metallic sulphuret more prevalent in one part, and a metallic salt or oxyd in another part of the vein.

In Derbyshire, where the veins of lead pass through different beds of mountain lime-stone, which alternates with beds of basaltic amygdaloid, provincially called toad-stone, it is found that the vein scarcely ever contains lead as it passes through the toad-stone, where it is always much narrower, and in some places appears to be entirely cut off by it; but on sinking into the under beds of lime-stone, the vein is found again, and is as productive as in the upper beds. Where the vein can be traced through the toad-stone, it contains calcareous spar, and sometimes a few particles of lead-ore. If veins had been filled from above by metallic solutions, it is impossible to conceive that the nature of the rock could change the quality of the ore; much less could the ore disappear in one stratum, and appear again in a stratum below it. Professor Jameson, in a paper published in the Memoirs of the Wernerian Society, has attempted to explain the difficulty presented by the interruption of the veins in Derbyshire, on the supposition that the different beds of lime-stone and toad-stone, together with the metallic veins, were contemporaneous, and that the toad-stone cut through the veins at the period of their formation. On this hypothesis, Mr. Bakewell, in his Introduction to Geology, remarks: "The existence of different organic remains in the upper and lower beds of the mountain lime-stone in Derbyshire, precludes the possibility of these beds having been all formed at the same time. The zoophytes in the lower beds of rock could not be living and co-existent with the shell-fish in the upper, nor with the vegetables, the remains of which are occasionally found in the sand-stone that covers the whole, and into which the veins sometimes shoot. Cuvier has well observed, that the existence of different organic remains in the upper and lower strata offers inconceivable proofs that they were formed in succession over each other." In point of fact also, the veins are not always cut off by the toad-stone; but they are never productive of ore, where they pass through it, except in very small particles.

These facts are not less opposed to the igneous theory of metallic veins than to that of Werner. If metallic veins had been filled with their contents by the operation of subterranean fire, which cracked the surface, and injected the metallic matter in a state of fusion, it is impossible to conceive that the nature of the rock, through which the veins pass, could have produced any material change in the quality of the ore. Metallic ores may, in some instances, have been formed slowly by exhalations from subterranean fires; as specular iron-ore, and even gold, has been found in the craters of volcanoes; and the phenomena, presented by the

lava which destroyed Torre del Grecco in 1794, indicate the manner in which such ores are formed. The lava had buried entire houses for more than twelve months, at the latter end of which time it had considerably cooled; and when the houses were opened, pieces of iron were found converted into a state of black, red, and magnetic oxyds, having the hollow parts and interstices filled with a brownish-red transparent oxyd of iron, and with specular iron-ore. In the articles made of iron, which had undergone this change, the external form was scarcely altered, which evinces that the crystals had been produced by sublimation. Copper articles were changed into crystallized red oxyd of copper, and red oxyd with green and blue carbonate. From the absence of metallic sulphurets, it is inferred that the lava contained little, if any, sulphur. These changes shew that metallic matter may be sublimed and converted into the state of ore by subterranean heat, at a much lower degree of temperature than has been supposed.

There is a circumstance on which those who contend for the aqueous formation of metallic veins have laid much stress. In some instances, rounded pieces of stone, apparently resembling water-worn pebbles, have been found in mines at a considerable depth; but as many veins contain hollow spaces, through which water is continually running, the formation of pebbles might admit of a satisfactory explanation, without supposing that these pebbles had fallen in from above. The pebbles which we have seen of this kind, from the mines in Cornwall, are all of a chlorite schistus, and the form oblate, presenting the appearance which may frequently be observed in rocks of the same kind. It is in all probability an original formation, and not a breccia from pre-existing rocks.

There is another circumstance which appears to have escaped the attention of geologists. The water in the mines of Cornwall, particularly in the vicinity of copper veins, has a temperature considerably above that of the natural temperature of the earth: it is said to be at 70° Fahrenheit; and the working miners, from its sensible warmth, can predict with certainty the vicinity of a copper vein. The increase of temperature, if any, in the vicinity of tin veins is less sensible.

From hence, as well as from various appearances in mines, we are led to infer that there are certain chemical changes now going on in the interior of the earth; and it is from a more enlarged acquaintance with these phenomena, that we can alone expect to obtain a satisfactory theory of the formation of metallic veins.

The following is a summary account of the rocks and situations in which metallic ores are generally found.

Platina, and the recently discovered metals, palladium, rhodium, osmium, and iridium, have not been hitherto found in veins, but in the sands of rivers. The four latter metals are found as alloys in the grains of platina. See PLATINA, PALLADIUM, &c.

Gold and silver are found in veins, and disseminated in primary and transition rocks, in porphyry, sienite, and the lower sand-stone. Gold has been occasionally discovered in coal, and is very abundantly disseminated in the sands of some rivers. See GOLD and SILVER.

Mercury is found in slate, in lime-stone, and in secondary strata. See MERCURY.

Copper occurs in veins and beds in primary and transition rocks, in porphyry and sienite, and occasionally in sand-stone. Masses of native copper, of large size, are found on the surface of the ground, in the interior of North America. See COPPER.

Lead and zinc occur in veins, and disseminated in primary and

VEIN.

and transition rocks, except trap and serpentine, in the lower secondary strata, and in porphyry and sienite. See LEAD and ZINC.

Antimony occurs in veins in primary and transition mountains, except trap and serpentine.

Bismuth, cobalt, and nickel, occur in primary and transition mountains, except lime-stone, trap, and serpentine. Cobalt and nickel also occur in transition mountains, and in sand-stone. See BISMUTH, &c.

Arsenic occurs in veins, either as a sulphuret or mineralizer of other metals, in primary and transition mountains, and in porphyry. See ARSENIC.

Tellurium occurs in veins in porphyry, combined with gold. See TELLURIUM *Mines*.

Manganese occurs in beds and veins in primary and transition mountains, and in beds, and disseminated in red sand-stone. See MANGANESE.

Molybdena, tungsten, and titanium, occur in granite, gneiss, mica-slate, and argillaceous schistus. These metals, with chromium and cerium, are very rare, and can only be reduced to the metallic state with great difficulty. See MOLYBDENA, &c.

Mineral veins differ from metallic veins, being destitute of ores, and filled with the same substances which compose entire rocks, or with earthy minerals.

Quartz veins (see QUARTZ) resemble in their structure and position many metallic veins; and it not unfrequently happens that a vein, which contains metallic ore in one part, intermixed with quartz and other vein-stones, will, in another part, be entirely filled with quartz. Quartz veins intersect almost all primary and transition rocks, but are particularly abundant in rocks of argillaceous schistus and greywacke. (See ROCK.) The quartz in veins is most frequently white, and nearly opaque; and being much harder than the rocks which it intersects, it remains on the summits of mountains, after the surface of the rock is decomposed, until it is carried down by diluvial currents into the beds of rivers, where it becomes rounded by attrition, and is transported to distant districts. Most of the white quartz pebbles in England have probably been formed from the quartz veins of decomposed rocks, as no quartz of a similar kind exists as a rock in any part of England or Wales; but the same mineral abounds in veins.

Granite, argillaceous schist or slate, porphyry, greenstone, pitch-stone, basalt, and various other rocks, frequently form veins in mountains of the same kind with themselves, or in different rocks. Where a vein of one kind of rock intersects a rock of a similar kind, the substance of the vein generally differs from that of the rock in texture, colour, and other characters. The granite in veins, which passes through granitic rocks, will generally be coarser or finer grained than the rock which it passes through, and have the constituent parts differently mixed. The followers of Werner assert, that veins which contain rock substances have been filled from above by matter poured into the fissures, and that the granite in veins is of a secondary formation. They further maintain, that the lower rocks, which they consider as the older, never rise into the upper rocks in the form of veins. In opposition to this opinion, it has been discovered that veins of granite, in Cornwall, may be distinctly seen rising into the schist or killas which covers the granite rocks in many parts of that county, particularly at St. Michael's mount, east of Penzance, and at Mousehole, two miles west of that town. Where the junction of the granite and schist is exposed by the action of the sea, veins of the former rock may be traced, at low water, running in a zigzag form for many yards into schist, gradually

growing narrower, and terminating in small branches and strings. One circumstance we observed in these granite veins at Mousehole, which may deserve notice: the same vein which penetrated the schist, when it entered the granite, was different in texture from the granite rock, though it had the same constituent parts; it might be distinctly traced for a considerable distance into the granite. The granite also, in the vicinity of the schist, was smaller grained than the general body of the rock; and the schist, where in junction with the granite rock or granite veins, was changed to a kind of very fine-grained gneiss. These facts seem to indicate that both the granite and the schist, to a considerable distance from their junction, had been in a softened state at the same time, and that their consolidation was contemporaneous. Similar appearances, with an intermixture of veins of schist in granite, are presented at Glentilt, and other parts of Scotland. Veins of granite, porphyry, or schist, never penetrate the upper secondary strata; but veins of basalt and trap (see TRAP) have been found in every kind of rock, even penetrating chalk. These veins are sometimes of vast extent and width, and frequently occasion great dislocations and derangements in the stratified rocks, particularly in the coal strata, where they have been most observed; hence they are called faults. (See FAULT and STRATA.) The dislocation of the strata by a vein of this kind is represented in *Plate II. Geology, fig. 8*, where the different strata, *c, d, e, f, g*, on the left-hand side, are separated from the corresponding strata on the right, and considerably elevated.

As the veins of trap or basalt are nearly vertical, and often several yards in width, and the substance with which they are filled being frequently harder than the strata which they intersect, these veins remain when the surface is decomposed to a considerable depth, rising like a wall or fence, which, in the language of North Britain, is synonymous with *dyke*; hence such veins have been called *dykes*, or *whin-dykes*, the term whin-stone being used to denote basaltic rocks. (See WHIN-STONE.) Basaltic veins, or whin-dykes, vary in width from a few inches to several yards, and are sometimes more than one hundred yards wide. They often extend many miles in length; in other instances they terminate at shorter distances, forming irregular wedge-shaped masses. When basaltic dykes are of considerable width, the basalt is intersected by fissures; and sometimes the central parts and sometimes the sides are harder or softer than the other; and in some parts the basalt graduates into a dark ferruginous clay. Masses of basalt from the dyke are frequently found wedged in between the strata, extending to some distance; and where basaltic dykes intersect coal strata, the coal in the immediate vicinity of the dyke has frequently the appearance of being charred. At Corkfield-fell, in the county of Durham, the coal strata are cut through by a basaltic vein or whin-dyke, which is about seventeen yards wide. Where it comes in contact with the coal, the latter substance, for several feet, is converted into a pulverulent state, like foot. At a greater distance from the basalt, the coal is reduced to a coke or cinder, which burns without smoke, and with a clear durable heat. At the distance of fifty feet from the basalt, the coal is found in the state of common mineral coal. The roof over the coal is lined with bright crystals of sulphur, probably sublimed by heat from the pyrites common to coal. In these appearances we recognize every circumstance which might be expected from the agency of heat, but which would be extremely difficult to reconcile with the aqueous formation of basalt. We have seen similar appearances near basaltic dykes in Northumberland. The vein, or dyke, of basalt

at Cockfield-fell, is part of the longest dyke which has been traced in England, or perhaps in any other country. According to the description of it in Mr. Bakewell's Introduction to Geology, "it extends from the western side of Durham in an eastward direction, to Bewick in Yorkshire, crossing the river Tees at this place, and proceeding in the same direction through the Cleveland hills, in the East Riding of Yorkshire, to the sea-coast between Scarborough and Whitby. It rises to the surface, and is quarried, in many parts of its course, for stone to repair the roads. It crosses the turnpike near the seven mile-stone from Whitby to Pukering, where there is a quarry sunk in it. The vein, or dyke, is here about ten yards wide; the stone is a dark greyish-brown basalt, and is the principal material for mending the roads in the district called Cleveland. The extent of this dyke has been traced in a direct line about seventy miles. In its course it intersects the metalliferous lime-stone of Durham, the coal district, and the aluminous schistus. The circumstances attending this and other extensive dykes, which have not hitherto been regarded by geologists, completely invalidate," says Mr. Bakewell, "the theory, that these dykes were originally open fissures, formed by the drying or shrinking in of the rocks. As the different rock formations through which it passes contain different organic remains, they must have been formed in succession at different periods, and the metalliferous lime, with the lower strata, must have been consolidated long before the upper strata were deposited; and the causes which might dispose the upper strata to shrink and open, cannot be supposed to act on the lower rocks. It is also remarkable, that the width of this vein is more than twenty yards in the lower rocks on the west; but in the upper rocks it is not more than ten yards. The dyke must have been filled with its contents at the time of its formation, otherwise it would contain fragments of the rocks which it intersects. As it passes through the limestone, it has rendered it more crystalline in its vicinity, and the effects in charring the coal, before described, point to subterranean fire as the original cause of its formation, and as the source whence the basalt that fills it was supplied. The close resemblance between the basalt and compact lava, add probability to the opinion that this great dyke was originally formed by an expansive force operating from below, which opened a chasm in the surface of the earth, and ejected the contents in a state of fusion. A volcanic dyke was formed on the western side of Vesuvius, June 12, 1794, two thousand three hundred and seventy-five feet in length, and two hundred and thirty-seven feet in breadth, through which lava rose to the surface. This lava, when cooled, formed a wall of stone intersecting the former beds of lava, and constituting a real dyke. The stone has a dark-grey colour, and is in some parts so compact as to resemble horn-stone." See VOLCANO.

The effects of basaltic veins on the contiguous parts of the strata of sand-stone which they intersect, are no less remarkable. In some instances, the sand-stone appears very considerably indurated, and converted into a substance resembling horn-stone.

It is observed by Mr. Allan, Transactions of the Royal Society of Edinburgh, vol. vii. that the sand-stone which is thus indurated, contains calcareous earth, which appears to have promoted its semi-vitrification; but where the sand-stone remains unchanged in the vicinity of a dyke, the calcareous earth is wanting. Sir G. Mackenzie observed basaltic dykes in Iceland, the walls or sides of which were lined with a glassy substance resembling obsidian. These effects offer further illustration of the igneous origin of

basaltic veins. A very interesting account of the effect produced by basaltic veins on the different beds of rock at the Giants' Causeway, and on other parts of the same range on the north coast of Antrim, is given in the third volume of the Transactions of the Geological Society.

Various beds of columnar basalt, argillaceous lime-stone, and chalk, are intersected by perpendicular dykes or veins of basalt. The chalk in the vicinity often undergoes a remarkable change, extending eight or ten feet from the wall on each side, and thence gradually decreases. The part nearest the basalt is converted into a dark-brown crystalline lime-stone, like coarse-grained primitive lime-stone. The next strata is that of finer-grained primitive lime-stone, or faccharine lime-stone; then fine-grained arenaceous lime-stone. A compact variety, having a porcelain aspect, and a blueish-grey colour, next succeeds; this, towards the outer edge, becomes gradually white, and insensibly graduates into unaltered chalk. The flints in the altered chalk assume a greyish-yellow colour. The altered chalk is highly phosphorescent when subjected to heat. In other parts of the range, the argillaceous beds of lias appear converted into horn-stone by contact with the basalt, and contain in that state the imbedded fossils peculiar to the lias stratum. (See STRATA.) The basalt in some of the veins is columnar; but the columns lie horizontally. It has been conjectured, with some probability, that this has been caused by its passing from a state of igneous fluidity, and the refrigeration commencing from the sides. From the same cause, in the beds of columnar basalt in that range, (see GIANTS' Causeway,) the columns are perpendicular, the cooling commencing from the top and the bottom of each bed. The marine organic remains in the strata over the basalt, prove that the whole were formed under the sea. In some instances, basaltic veins appear to have been opened, and the intervening space filled with debris from the upper strata; and there are basaltic dykes in Northumberland, in which the basalt being divided into irregular masses, the interstices are filled with iron-clay, and contain impressions of ferns, like those in the coal strata which these dykes or veins intersect. On the whole, no country in the world which has yet been examined presents so many interesting appearances of basaltic veins as the northern parts of Great Britain and Ireland, nor are they any where exposed to the eye of the observer with so much distinctness as on many parts of the sea-coast, where the ocean has bared the surface, and exposed the most magnificent and instructive sections of entire mountains, penetrated by these veins to the height of many hundred feet. The veins may often be seen extending from the mountains into the sea, rising up like enormous walls, which serve as monuments of the ravages of the ocean upon the coast. The great hardness of the substance which fills the veins has prevented their destruction by the waves that have broken down and removed the mountain masses in which these veins were once imbedded.

Messrs. Lewis and Clarke, the American travellers, describe extensive walls of dark columnar stone ranging through the interior of North America: these walls were undoubtedly dykes or veins of columnar basalt, remaining where the surface of the ground had been washed away. There are also instances where the substance of basaltic veins has been softer than the surrounding rock, and is washed out wherever the rock is exposed, forming deep fissures, with perpendicular walls of rocks on each side. Such appearances are not uncommon on the sea-coast in various parts of Scotland. For an account of basaltic rocks, see TRAP.

VEIN is also applied to the streaks, or waves, of divers colours appearing on several sorts of woods, stones, &c.

as if they were really painted; and which the painters frequently imitate in painting waincots, &c.

Marble is generally full of such veins.

Lapis lazuli has veins like gold. Ovid, speaking of the metamorphosis of men into stones, says—"Quæ modo vena fuit, sub eodem nomine manfit."

Veins, in stones, are often a defect, proceeding usually from an inequality in their consistence, as to hard and soft: which makes the stone crack, and shiver in those parts.

VEJOURS, or VIEWERS, *Vifores*, in *Law*, are persons sent, by the court, to take a view of any place in question, for the better decision of the right.

It is also used for those sent to view such as esjoin themselves *de malo lecti*, whether, in truth, they be such as that they cannot appear, or whether they counterfeit.

VEIRAS, in *Geography*, a town of Portugal, in Alentejo; 15 miles N.N.E. of Estremos.

VEIRY, a town of France, in the department of the lake of Lemán: 9 miles E. of Seiffel.

VEISENBERG, a town of Russia, in the government of Revel, on the coast of the gulf of Finland; 56 miles E. of Revel. N. lat. 59° 22'. E. long. 26° 14'.

VEISENSHTEIN, a town of Russia, in the government of Revel; 32 miles S.E. of Revel.

VEIT, *St.*, a town of Germany, in the circle of Bavaria, and archbishopric of Salzburg, near the Salza; 28 miles S. of Salzburg.—Also, a sea-port town of Istria, called also *Fiume*, situated near the gulf of Venice, on a narrow plain, which yields good grapes, figs, and other fruits. The harbour is formed by the Fiumara. For the convenience of exportation and importation, the emperor Charles VI. caused an highway to be made from this place to Carlstadt, in Croatia. A sugar-house has also been founded here. *St. Veit* is exempt from taxes and contributions; 3 miles S.E. of Trieste. N. lat. 45° 46'. E. long. 14° 42'.—Also, a town of Germany, sometimes called *St. Weit*, in the duchy of Stiria; 3 miles S.E. of Pettau.—Also, a town of Germany, in the duchy of Carinthia, situated on the river Glan; 8 miles N. of Clagenfurt.—Also, a town of Germany, in the archduchy of Austria; 5 miles W. of Vienna.—Also, a town of Germany, in the archduchy of Austria; 11 miles W.S.W. of Freustadt.

VEITA, a small island in the Mediterranean, near the east coast of Tunis. N. lat. 35° 1'. E. long. 11° 12'.

VEITH, *St.* See *St. Veith*.

VEITSBERG, a town of Saxony, in the circle of Neustadt; 3 miles N.E. of Weyda.

VEITSHOCHHEIM, a town of the duchy of Wurzburg, on the Mayne; 20 miles S.W. of Schweinfurt.

VEL, in *Ancient Geography*, a town in the interior of Africa, and one of those which were subjugated by Cornelius Balbus. Pliny.

VELA, in *Geography*, a rocky shoal in the Spanish Main. N. lat. 15° 16'. W. long. 75°.

VELA, *Cape de la*, a cape on the N. coast of South America. N. lat. 11° 50'. W. long. 71° 46'.

VELABORI, in *Ancient Geography*, a people who inhabited the territory on the western coast of Hibernia, S. of the Gangani. Ptolemy.

VELACH, in *Geography*, a town of the duchy of Carinthia, at the union of the Campach and Moll; 11 miles N.N.W. of Saxenburg.

VELAGA, in *Botany*, *Gærtn. v. 1. 245. t. 133*, a name of Adanson's, adopted by Gærtner, and belonging to the genus now called *PTEROSPERMUM*; see that article, under which it should be cited as a synonym.

VELAINE, in *Geography*, a town of France, in the department of the Meurte; 6 miles E.N.E. of Nancy.

VELAM, a town of Hindoostan, in the country of the Nays; 34 miles E. of Calicut.

VELAMEN, is used, by some *Surgeons*, for the bag, skin, or bladder, of an imposthume, or swelling.

VELAMENTUM BOMBYCINUM, a name which some anatomists give to the velvet membrane, or inner skin of the intestines.

VELANGOODY, in *Geography*, a town of Hindoostan, in Marawar; 7 miles W. of Truman.

VELANI, in *Botany* and the *Arts*, sometimes called *Valonia*, a name given by the modern Greeks to the acorns of a species of oak, (see *QUERCUS Ægilops*, and *QUERCUS Infectoria*.) denominated the "Velanida." The tree grows on the western coast of Natolia, in the islands of the Archipelago, in those of Corfu and Cephalonia, and throughout all Greece. For an account of the galls of this oak, we refer to the article *GALLS*. The Orientals take care to gather the galls at the precise time which experience has proved to be most favourable, or in which the excrescence has acquired its full size and weight. For this purpose, they visit the hills and mountains that are covered with oaks. The first galls that are picked up are laid apart; these are known in the East under the name of "Yerli," and distinguished in trade by the terms of "black galls" and "green galls." Those which have escaped the first searches, and which are gathered a little later, called "white galls," are of a very inferior quality. The galls of the environs of Mosul and Tocat, and in general those which come from the eastern part of Turkey, are less esteemed than those of the environs of Aleppo, Smyrna, Magnesia, Karahissar, Diarbekir, and the whole interior of Natolia. The former are sold at Smyrna and at Aleppo two or three piasres less *per* quintal than the others. The inhabitants neglect to gather the acorns, which serve as food for the wild boars and goats; the latter contribute very much to render the oak small and stunted, by devouring, with its fruit, a part of its foliage and young boughs.

The diplopepis which produces these galls has a body of a fawn-colour, with the antennæ dark, and the upper part of the abdomen of a shining brown. It is sometimes found, under its latter form, in the inside of the galls which are not yet pierced. On the same oak are found other galls in great numbers, which the inhabitants neglect to gather, because they are not fit for dyeing.

The velani, or valonia, is gathered in the autumn, and dried under sheds, which protect it from rain, and is in a proper state for shipping about the beginning of March: that which is gathered on the mountains is preferred to that of the valleys. There is also a difference with respect to its age or size; the small and young is taken from the trees before it has attained its full growth, and is reckoned better than the large, or that which remains till it is full grown. Those of the best quality are usually sent to England, and the inferior to Ancona and Trieste. This gall is used for dyeing and tanning, and in Turkey a considerable quantity is consumed for the latter purpose.

The quantity shipped annually from the different Turkish ports may be calculated at from 4000 to 5000 tons. It is sent to several places in Europe; particularly London, Liverpool, Leghorn, Trieste, Ancona, and Genoa. The nut, or kernel, of the valonia is not reckoned of any value, and is sometimes picked out to save freight and charges. The loss in weight thus occasioned, together with garbling, (that is, freeing it from dirt, stones, &c.) is from 10 to 25 *per cent.*, according to the quality of the article, and the expence

expenſe is from 30s. to 40s. *per* ton. The cup which contains the nut or kernel conſtitutes the value of the valonia. It has been uſed in this country many years by the dyers, and has lately been introduced into the tanneries as a ſubſtitute for oak-bark, and the quantity uſed in this way has been very conſiderable. The quantity imported into London and Liverpool for the years 1811, 1812, 1813, amounted to above 1200 tons *per annum* on an average. This was at a time when oak-bark was ſcarce and dear; but when the price of bark is low, the conſumption of velani is leſs extenſive; for the leather manufactured with oak-bark is preferred to that prepared with velani, chiefly on account of its colour, as the quality of the leather is reckoned to be equal, if not ſuperior, to that which is tanned with bark. We may here obſerve, that the great diſtance from which valonia, or velani, is brought, and the heavy duty it pays, compared with oak-bark, diſcourage its uſe; but if the duty ſhould be taken off, it is probable that the conſumption would be greatly increaſed.

VELANIDA, in *Botany*. See QUERCUS, n. 68.

VELARIUS, in *Antiquity*, an officer in the court of the Roman emperors, being a kind of uſher, whoſe poſt was behind the curtain, *vela*, in the prince's apartment; as that of the chancellors, *cancelli*, was at the entry of the baluſtrade, and that of the *oſtarii* at the door.

The velarii had a ſuperior, of the ſame denomination, who commanded them; as we find in two inſcriptions, quoted by Salmalius in his notes on Vopiuſcus, and by a third in Gruter.

VELASCO, DON ANTONIO PALOMINO, in *Biography*, was a Spaniſh painter and hiſtorian of the artiſts of his country. He was a native of Valencia, where he flouriſhed about 1700. He was painter to Philip V., and painted many pictures for the churches and convents of Valencia, Salamanca, and Grenada, but is much better known to us as an author. He publiſhed an elaborate treatiſe on the art of painting, in two folio volumes, in which he notices 250 painters and ſculptors who had flouriſhed in Spain previous to the concluſion of the reign of Philip IV. Of this work, there was an abridgment publiſhed in London in 1742, entitled "Las Vidas de los Pintores y Statuarios eminentes Eſpanoles," of which there is an Engliſh tranſlation.

VELASCO, in *Geography*, a town of North America, in the province of Mexico.

VELASQUEZ DE SILVA, DON DIEGO, in *Biography*, the moſt diſtinguiſhed painter of the Spaniſh ſchool, was born at Seville in 1594. His parentage was noble, being of a family originally of Portugal, which had eſtabliſhed itſelf in Andaluſia. Though confined in fortune, they gave him a liberal education, and, as he had evinced much inclination for drawing, placed him with Franeſco de Herrera, the elder; but he afterwards became the diſciple of F. Pacheco, an artiſt of very conſiderable ability, and a ſcholar, then reſiding at Seville. With him Velasquez ſtudied attentively, and his talents diſplayed themſelves in a variety of imitations of natural objects, particularly of peaſantry in their peculiar habits and occupations. Of theſe we have now a ſpecimen in England, which had at all times been eſteemed as a maſter exhibition of his early acquirements, and celebrated under the appellation of the "Water Carrier." It was ſtationed in the new palace at Madrid, but was removed from thence by Joſeph Bonaparte, and was found, with a great number of other pictures, in the imperial carriage taken at the battle of Vittoria. It is now in the poſſeſſion of the duke of Wellington, among the numerous other trophies of that great man's fame. Still, however, it is conſidered by his grace as the property of the Spaniſh crown. Velasquez continued attached to this particular application of

his art, conſcious of his ſuperiority, and declining to extend his views to a more elevated claſs of ſubjects, till at length the ſight of ſome pictures by Guido and Caravaggio, which Pacheco had received from Italy, excited his emulation, and he then turned his thoughts to hiſtory and portraiture. After he had been five years with Pacheco, that maſter beſtowed upon him the hand of his daughter in marriage, and he continued ſtill to praſtiſe his art under the guidance of that able inſtructor. In 1622, Velasquez left Seville, to viſit the metropolis of Spain and the Eſcurial, and there his talents recommended him to the notice of the count De Olivarez, the favourite miniſter of Philip IV., who patronized and befriended him; taking him into his own palace to dwell. Soon after he introduced him to the king, who immediately ordered him to paint his portrait. From the completion of this picture, which was upon a grand ſcale in armour, and on horſeback, the reputation of Velasquez was eſtabliſhed above all his contemporaries, and his patron was ordered to inform him, that from that time the royal perſon would be intruſted to no other painter but himſelf. He received the royal permiſſion to make a public exhibition of it, when it was loudly applauded by all about the court, and held up to public eſtimation by laudatory verſes in its honour from the poets.

After this ſucceſsful commencement of his public career, he was employed to paint the portraits of the infants Don Carlos and Don Fernando; and that of the miniſter, his patron, mounted, like his royal maſter, on a noble Andaluſian charger, richly caparifoned. He now, therefore, began to enjoy the bleſſings of fortune, as well as thoſe of fame. He was appointed principal painter to the king, with a liberal ſalary, beſides receiving munificent remuneration for his pictures, and being buſily occupied in portraits.

He now alſo, in emulation of other Spaniſh painters, determined to undertake a work upon a more extended ſcale than he had before done, and took for his ſubject the expulſion of the Moors from Spain by Philip III. But, if we may judge by the deſcription given of the picture, it does not appear to have poſſeſſed much intereſting matter of a high hiſtoric quality; however, he gained great reputation from the ſkill with which he executed it. The compoſition repreſented the king armed, and in the act of commanding a party of ſoldiers, who are eſcorting a group of Moors of different ſexes and ages to the ſea-ſhore for embarkation. On the other ſide is perſonified the kingdom of Spain, as a maſtetic matron, with a ſtately edifice. This picture, as appears by an inſcription upon it, was painted in 1627, and it was no ſooner completed than he again experienced the munificence of his ſovereign, who made him one of his chamberlains, and allowed him an additional ſtipend.

It was at this time that Rubens viſited Madrid. He formed an intimacy with Velasquez, and firſt inſpired him with a deſire to viſit Italy; and he obtained from his royal patron every advantageous means of going there, with recommending letters to render his residence in Rome and Venice as uſeful and agreeable to him as poſſible.

He embarked at Barcelona in 1629, and firſt landed at Venice, where he was received and entertained by the Spaniſh ambaffador. In this delightful birth-place of colouring, the works of its great maſter Titian, in the palace of St. Marc, excited his warmeſt admiration, and he made ſeveral copies of them: and no one ever more thoroughly imbibed the principles upon which they are conſtructed. But perhaps it is of Tintoretto that Velasquez is more the imitator, than of Titian. His freedom of pencil appears to have been more congenial with the taſte of the Spaniard, than the ſober and more correſt hand of the former. After remaining at Ve-

nice a few months, he went to Rome, where he was most graciously received by the cardinal Barberini, nephew to Urban VIII., who procured for him apartments in the Vatican, and access at all times to the works of Raffaele and M. Angelo. During his residence at Rome, he painted his celebrated history of Joseph's coat brought to Jacob; and also another very able work, of Apollo informing Vulcan of the infidelity of Venus; in which he had an opportunity of displaying his power of handling, and his admirable skill in colouring. Vulcan is at his forge, the light and shadow proceeding from which are most skilfully conducted: the strong and muscular forms of the Cyclops gracefully contrasted with the pure form of the Apollo; and the whole composition arranged with infinite judgment. Both these pictures were sent to Spain, and honoured by having distinguished places assigned to them in the palace of the king.

On his return home he went to Naples, and there painted the portrait of Donna Maria of Austria, queen of Ferdinand III. After about the lapse of a year and a half, he arrived at Madrid, and found his favour with his royal master undiminished. He was again lodged in the royal palace, and the king kept a key of his painting room, that he might have free access to him without ceremony; and this he frequently indulged himself with, as his great predecessor, Charles V., had done with Titian. And so strong were the resemblances in his pictures, that it is said the king, going into his room one day, expressed some surprize, that a nobleman, to whom he had given a commission which required his absence from Madrid, had not departed, imagining that he saw him in the room, when it was in reality only his portrait.

In 1638, Velasquez painted his most celebrated picture of our Saviour on the Cross, for the convent of St. Placido, at Madrid; and about the same time, that of the general Pescara receiving the keys of a Flemish citadel from the governor of the place. The management of all the different characters, the officers, &c. and the effect of the fortification, &c. of the town and landscape in the back-ground, is altogether eulogized by Mengs as the chief-d'œuvre of Velasquez.

Though his patron d'Olivarez fell into disgrace in 1643, yet Velasquez maintained his interest at the court; and in 1648, was commissioned by the king on a particular embassy to pope Innocent X., and at the same time was empowered to purchase for his majesty the finest works of art, both of sculpture and painting, which he could procure in Italy. On this occasion he embarked at Malaga, and having landed at Genoa, passed through Milan and Padua to Venice, where he was well pleased to renew acquaintance with the great masters of art, whom he had before beheld with so much admiration. He afterwards visited Bologna; and on his arrival at Rome, was received with great favour and distinction by the pope; and in the unengaged moments of his more serious business, he painted a very fine portrait of his holiness, of which there is a capital exemplar at Luton, the seat of the marquis of Bute, which has every character of originality. For this painting, the pope gave him a gold medal and chain; and the academicians of St. Luke elected him of their body.

After a lapse of nearly three years, Velasquez took his departure from Genoa, in a vessel freighted with a magnificent collection of pictures, statues, busts, &c. which he had collected, and on his arrival was most graciously received by the king, and honoured with further marks of his royal favour and bounty; among which the order of Santiago was not the least, as being confined to persons of the highest rank, or the most eminent abilities. He thus lived,

in honour and riches, till 1660, when the ruthless hand of death put an end to his labours and enjoyments. He was buried with great funeral pomp in the church of San Juan.

VELATODURUM, or **VELATUDURUM**, in *Ancient Geography*, a place on the route from Befançon to Epamandodurum or Mandura.

VELAUNI, a people of the Maritime Alps near the sea, E. of the Nerufii.

VELAUR, in *Geography*, a river of Hindooftan, which rises near Attore, in the Mysore country, and runs into the bay of Bengal, near Portonovo.

VELAY, before the revolution, a country of France, in Languedoc, situated to the W. of the Vivarais, and the E. of Auvergne. It is mountainous, but fertile: Le Puyen Velay was the capital. It now constitutes the department of the Upper Loire.

VELAZGHERD, a town of Persia, in the province of Kerman; 54 miles N.E. of Gomron. N. lat. 28° 10'. E. long. 56° 34'.

VELBERG, a town of Germany, in the territory of the imperial town of Hall; 7 miles E. of Hall.

VELBERT, a town of the duchy of Berg; 5 miles N.N.E. of Medman.

VELBURG, a town of Bavaria, in the principality of Neuburg; 12 miles N. of Dietfurt. N. lat. 49° 10'. E. long. 11° 28'.

VELCERA, in *Ancient Geography*, a town on the coast of Illyria, between the mouth of the river Cœneus and the town of Senia. Ptolemy.

VELDEN, in *Geography*, a town of Bavaria; 6 miles S.S.W. of Landshut.—Also, a town of Germany, in the territory of Nuremberg, on the Pregnitz; 21 miles N.E. of Nuremberg. N. lat. 49° 37'. E. long. 11° 31'.

VELDÉNTZ, a town of France, in the department of the Sarre, formerly capital of a county, in the circle of the Upper Rhine, united with the palatinate; the environs are celebrated for an excellent Moselle wine; 17 miles E.N.E. of Treves. N. lat. 49° 55'. E. long. 6° 58'.

VELEGIA, in *Ancient Geography*, a town of Africa, in Libya Interior, situated on the banks of the river Niger, N. of it. Ptolemy.

VELEIA, a town of Hispania Citerior.—Also, a town of Italy, S. of Placentia, in Gallia Cispadana: now in ruins.

VELEN, in *Geography*, a town of Germany, in the bishopric of Munster; 22 miles W. of Munster.

VELETRI, a town of the Popedom, in the Campagna di Roma. This was a very ancient town, and considerable in the time of the first Roman kings. It was taken by Ancus Martius, fourth king of the Romans, and retaken by the Volscians, under the command of Coriolanus. The Romans took it again some time after, and, removing the inhabitants, filled it with a Roman colony. It is the see of a bishop, united with Ostia, who is called the bishop of Ostia, but his residence is at Veletri; 28 miles N.N.W. of Terracina. N. lat. 41° 42'. E. long. 12° 50'.

VELEZ, a town of South America, in New Grenada; 100 miles from Santa Fé de Bogota. N. lat. 5° 50'. W. long. 73° 16'.

VELEZ de Gomera. See GOMERA.

VELEZ Malaga, a sea-port town of Spain, in the province of Grenada, near the coast of the Mediterranean. The chief article of trade is raisins. In 1487, this town was taken from the Moors by Ferdinand, king of Castile and Arragon; 13 miles E. of Malaga. N. lat. 36° 47'. W. long. 4° 18'.

VELEZ *el Rubio*, a town of Spain, in the province of Granada, near the Guadalentin. This town was, in the time of the Moors, a strong place, and furnished with a garrison; 14 miles S. of Huéca.

VELEZAR, a river of Spain, formed by the union of the little rivers Burcia and Sil, on the confines of Leon, which, after receiving several other small streams, unites with the Minho, a little above Orense.

VELEZIA, in *Botany*, was so named by Linnæus, at the recommendation of his pupil Læfing, in honour of Dr. Christoval Velez, examiner, first physician, and demonstrator of botany, at Madrid, who shewed Læfing his manuscript *Flora* of the environs of that capital, which we do not find to have ever been published.—Linn. Gen. 176. Schreb. 174. Willd. Sp. Pl. v. 1. 1329. Mart. Mill. Dict. v. 4. Sm. Prodr. Fl. Græc. Sibth. v. 1. 283. Ait. Hort. Kew. v. 2. 109. Juss. 302. Lamarck Illustr. t. 186. Gærtnd. t. 129.—Class and order, *Decandria Digynia*. (Pentandria, or Hexandria, Digynia, Linn.) Nat. Ord. *Caryophylleæ*.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, tubular, long and slender, with five angles, five intermediate furrows, and five pointed, erect, small teeth, permanent, without any appendages at the base. *Cor.* Petals five; claws linear, erect, very narrow, the length of the calyx; limbs spreading, oblong-wedged-shaped, cloven or toothed, hairy at the base, much shorter than the claws. *Stam.* Filaments ten, capillary, about the length of the calyx, inserted into the receptacle; anthers roundish, incumbent. *Pist.* Germen superior, cylindrical, short; styles two, thread-shaped, hardly so long as the stamens; stigmas simple. *Peric.* Capsule cylindrical, slender, of one valve and one cell, opening with four teeth at the summit. *Seeds* numerous, oblong, alternate, imbricated downwards, concave in front, convex at the back, inserted in a simple row, by the dorsal scar, into a thread-shaped, unconnected receptacle.

Eff. Ch. Calyx of one leaf, nearly cylindrical, furrowed, naked. Petals five, with very long claws; limb bearded at the base. Capsule superior, cylindrical, of one cell. Seeds imbricated.

A small genus of slender campion-like plants, with numerous little pink flowers, nearly related to *SAPONARIA*, (see that article,) and certainly to be placed next to it in the artificial, as well as natural, system. Linnæus knew but one species. We have a new one found by Dr. Sibthorp in Asia Minor.

1. *V. rigida*. Rigid Velezia. Linn. Sp. Pl. 474. Willd. n. 1. Ait. n. 1. Sm. Fl. Græc. Sibth. t. 390, unpubl. (Knawel majus, foliis caryophylleis; Buxb. Cent. 2. 41. t. 47. *Lychnis minima rigida* Cherleri; Bauh. Hist. v. 3. 352. *L. corniculata minor*; Bocc. Mus. 50. t. 43. Barrel. Ic. t. 1018, and probably t. 1017.)—Calyx thread-shaped, downy. Petals cloven.—Native of the south of France, Italy, Crete and Cyprus, flowering in summer. A hardy inconspicuous annual, sometimes introduced, for the sake of curiosity, into our botanic gardens. *Root* long and thread-shaped, tough. *Stems* several, diffuse, hairy, zigzag, about a span long, leafy, many-flowered. *Leaves* linear, awl-shaped, sessile, opposite at each joint of the stem, a little downy or hairy, hardly an inch long. *Flowers* axillary, solitary, sessile. *Calyx* extremely slender, and of uniform thickness, near an inch long, striated. *Limb* of the *corolla* spreading scarcely a quarter of an inch, pink, with a deep crimson angular mark on each *petal*, forming a central star. Five of the *stamens* longer than the rest. *Capsule* slender, smooth, semi-pellucid. *Seeds* black.

2. *V. quadridentata*. Four-toothed Velezia. Sm. Prodr. Fl. Græc. Sibth. n. 954. Fl. Græc. t. 391, unpubl.—Calyx club-shaped, smooth. Petals with four teeth.—Gathered by Dr. Sibthorp in Asia Minor, and, if we are not mistaken, in the isle of Patmos. This has the precise habit of the foregoing, but is rather larger, and quite smooth. The *flowers* are stalked. *Calyx* angular, swelling upwards. *Limb* of the *corolla* marked like *V. rigida*, with a central star; but each *petal* has four strong teeth, or acute lobes, instead of being only simply cloven. Each *claw* is crowned, in both species, with a transverse row of white hairs. *Stamens* in the present all of equal length. *Capsule* rather stouter, shorter, and less accurately cylindrical, than the former.

We have no doubt of this genus being equally distinct from *SAPONARIA* and *GYPSOPHILA*, (see those articles,) though the first species betrays most affinity to the former, the second to the latter. An ovate, even *calyx*, and oblong *capsule*, are proper to *Saponaria*; a bell-shaped angular *calyx*, and almost globular *capsule*, to *Gypsophila*. *Velezia* is perhaps more naturally akin to *DIANTHUS*, but wants the scales at the bottom of the *calyx*.

VELHAS, in *Geography*, a river of Brazil, which runs into the Parana.

VELIA, or HELIA, in *Ancient Geography*, a town of Italy, in Lucania, westward, on a small gulf of the same name, formed by the small stream Heles, from the Greek *Helia*, signifying a marsh.—Also, a town of Hispania Citerior, belonging to the Caristi. Ptolemy.

VELICALA, in *Geography*, a town of California, near the coast of the Pacific ocean. N. lat. 20° 35'. W. long. 115° 50'.

VELIDIA, a town of Morocco, on the coast of the Atlantic; 25 miles S.W. of Mazagan.

VELIKA, a town of Morlachia; 25 miles S.E. of Segna.—Also, a river of Croatia, which runs into the Save, near Craliova Velika.—Also, a river of Russia, which runs into the Viatka, 10 miles N.E. of Orlov, in the government of Viatka.—Also, a river of Russia, which runs into the Tchudskoi lake, near Pskov.

VELIKIE LUKI, a town of Russia, in the government of Pskov, on the Lovat; 124 miles S.E. of Pskov. N. lat. 56° 28'. E. long. 30° 14'.

VELIKOI, a small island of Russia, in the White sea. N. lat. 66° 45'. E. long. 32° 20'.

VELILLA, a town of Spain, in the province of Aragon. The author of the "Continuation of Mariana's History of Spain," speaks of a bell in this town of great celebrity, which rung sometimes without the help of man; and that a particular description of its wonders was printed at Madrid in 1657.

VELINO, a mountain of Naples, in Abruzzo Ultra; 12 miles S. of Aquila. This is one of the Apennines, and probably the highest of them. Its summit, 8397 feet above the Mediterranean, is covered with snow in June; about 46 geographical miles N.W. of Rome.—Also, a river of the Popedom, which runs into the Nera, about four miles from Terni, in the duchy of Spoleto.

VELINUS, (VELINO,) in *Ancient Geography*, a small river in the country of the Sabines, in the northern part: its sources were about twenty miles from Reate, towards the E., in mountains abounding with water. It passed southward, by a place called Vacunis, afterwards by Interoceca, where it turned towards the W., to the plain on which was situated Cutilie. Changing its direction towards the N.W., it entered an immense plain, in which were high mountains, and formed a large lake. These stagnant

flagrant sulphureous waters were found very inconvenient. M. Curius pierced a mountain and made a canal to the Velinus, so that its waters had a free passage to the sea, by a valley, which Cicero compared to the valley of Tempé. The inhabitants of Reate found here abundance of roses, whence they called it *Rosea*. The Velinus discharged itself into the Nar near Interamna.—Also, one of the seven mountains of Rome.

VELIOPASSES, *Velocassis* of Cæsar, *Vellocassis* of Pliny, and *Veneliocassii* of Ptolemy, were a people joined by Cæsar to the Caleti, and others among the Belgæ, separated by the Seine from the Celtæ. But in the division of Gaul by Augustus, the Veliocasses, as well as the Caleti, are placed in the Lyonnese, and they are referred to in that province by Ptolemy and Pliny. Their capital, Rotomagus, became the metropolis of the second Lyonnese, when the Lyonnese of Augustus was divided into two provinces.

VELISCUM, a place of Africa, in Mauritania Cæsariensis, upon the route from Rufocurrum to Celama, between Sufasar and Taranamusa Castra. Anton. Itin.

VELITES, in the *Roman Army*, one of the four kinds of foot soldiers that composed a legion, who were armed lightly with swords, bows and arrows, slings, and javelins.

For defensive armour they had only a small target, and a helmet or head-piece.

These were commonly young men of mean condition, and took their name à *volando*, or à *velocitate*, from their swiftness and expedition: and they were designed for skirmishing with the enemy before a battle, and pursuing them after a defeat.

They seem not to have been divided into any distinct bodies or companies, but to have hovered in loose order before the army.

The other classes of the Roman infantry were the *hastati*, *principes*, and *triarii*. In the day of battle, the hastati were placed in the first line, the principes in the second, and the triarii in the third. The Velites formed small flying parties both in front and rear. See BATTLE.

VELITIS, in the *Natural History of the Ancients*, the name of a peculiar sort of sand used in the manufacture of glass; for which purpose they always chose such as was found washed clean on the banks of rivers; and this they therefore called glass-sand, or *velitis*, or *hyalitis*.

VELITRÆ, or VELETRI, in *Ancient Geography*, a town of Italy, in Latium, in the country of the Volscians. It was at some distance from the Appian way, S.E. of Alba, and became considerable under the Romans. It had an amphitheatre, of which no trace now remains. Two roads led to Velitræ; one to the W. detached itself from the Appian way, the other to the E. communicated with the Latin way. See VELETRI.

VELIZ, in *Geography*, a town of Russia, in the government of Polotsk; 88 miles E. of Polotsk. N. lat. 55° 20'. E. long. 31° 4'.

VELL, in *Rural Economy*, a term applied in some districts to the bag or stomach of the calf, which is used in making running or runnet; or to the prepared stomachs of the animals or rennet for curdling the milk in cheese-making, which are often called *vells*. In some dairies, instead of making the rennet ready some time previous to its being used, a small piece, proportioned to the quantity of milk to be coagulated, is cut from the vell the over-night, and put into half a pint of water, or whey, to infuse until the morning. In this case, the vells are to be supposed to be equal in goodness; and it is probable, that the virtue may not be so fully extracted as by a longer infusion. It is suggested too as not improbable, but that the strength

of the rennet might be ascertained by means of experiment, by the application of alkaline salt, and by such means be rendered more certain in its use. See DAIRYING.

VELLA, in *Botany*, an old Latin name, used by Galen, and supposed to belong to the Water-cress. De Theis traces it from *Velar*, *Veler*, or *Belar*, Celtic appellations of some plant or plants of the cress kind; and the first of which Pliny gives as synonymous with *Erysimum*. Linnæus, finding the word unoccupied in modern botany, adopted it for a genus of the same family and qualities as the ancient *Vella*.—Linn. Hort. Cliff. 329. Gen. 331. Schreb. 435. Willd. Sp. Pl. v. 3. 422. Brown in Ait. Hort. Kew. v. 4. 79. Sm. Fl. Brit. 675. Prodr. Fl. Græc. Sibth. v. 2. 4. Juss. 241. Lamarck Illustr. t. 555. Gærtn. t. 141.—Class and order, *Tetradynamia Siliculosa*. Nat. Ord. *Siliquosæ*, Linn. *Crucifera*, Juss.

Gen. Ch. *Cal.* Perianth inferior, cylindrical, erect, of four linear, obtuse, closely converging, deciduous leaves. *Cor.* cruciform, of four obovate spreading petals, whose claws are the length of the calyx. *Stam.* Filaments fix, as long as the calyx, the two opposite ones rather shorter; anthers simple. *Pist.* Germen superior, ovate; style greatly dilated, bordered, leafy, ovate; stigma obtuse. *Peric.* Pouch orbicular, tumid, entire, of two cells, crowned with the permanent, ovate, erect, rigid style, which is a continuation of the membranous partition. *Seeds* several, roundish; "their cotyledons folded;" *Brown*.

Obf. *V. Pseudo-cytifus* has the four larger filaments destitute of anthers, and combined together in pairs. *Linnaeus*.

Ess. Ch. Pouch tumid, crowned with the leafy ovate style. Cotyledons folded. Calyx closed.

1. *V. annua*. Annual Cress-rocket. Linn. Sp. Pl. 895. Willd. n. 1. Fl. Brit. n. 1. Engl. Bot. t. 1442. (Nasturtium sylvestre valentinum; Clus. Hist. v. 2. 130. Bauh. Hist. v. 2. 920. Eruca nasturtio cognata tenuifolia; Ger. Em. 247, good.)—Leaves pinnatifid. Pouches pendulous.—Native of sandy fields in England, Spain and Greece. With us it is a very rare plant, scarcely ever observed but on Salisbury Plain, about Stonehenge, where it was first gathered by Mr. Isaac Lawson, in Ray's time, and has occasionally been seen since, flowering in June. The root is fibrous, small and annual. *Seed-leaves* permanent for some time, inversely heart-shaped, smooth. *Herb* variable as to luxuriance, erect; its stem about twelve or fifteen inches high, alternately branched, bushy, leafy, rough with deflexed bristles. *Leaves* alternate, doubly pinnatifid, roughish, with narrow blunt segments. *Spikes* terminal, many-flowered. *Calyx* purplish. *Petals* entire, sulphur-coloured, with purple veins. *Pouch* turned downwards as it ripens, about the size of a hemp-seed, rough, crowned with the smooth, spatulate, enlarged style, twice its own length. *Seeds* roundish, three or four in each cell.

2. *V. Pseudo-cytifus*. Shrubby Cress-rocket. Linn. Sp. Pl. 895. Willd. n. 2. Ait. n. 2. Cavan. Ic. v. 1. 32. t. 42. (Cytifis facie Alysson fruticans quorundam; Lob. Ic. v. 2. 49. Cytifus adulterinus, five Alysson fruticans; Ger. Em. 1306.)—Leaves undivided, obovate, fringed. Pouches erect.—Native of the neighbourhood of Aranjuez in Spain, flowering in May. Sometimes kept for curiosity as a hardy greenhouse plant, but not remarkable for beauty. The stem is shrubby, branched, roughish, two feet high. *Leaves* alternate, rather fleshy, entire, rough, scarcely an inch long, tapering down into a short footstalk, and generally accompanied by two smaller leaves. *Flowers* in long spikes, yellow, with pale veins. Permanent style broad,

nearly orbicular, scarcely longer than the *pouch*. Cavanilles says he found all the *anthers* perfect, though Linnæus is correct in his description of the combined *filaments*.

VELLA, or *Verra*, in *Geography*, a river of the Ligurian republic, which runs into the Magra, three miles above Sarzana.

VELLACHERY, a town of Hindoostan, in the Carnatic; 10 miles S.E. of Madura.

VELLADY, a town of Hindoostan, in Myfore; 14 miles S. of Damicotta.

VELLAS, a town of the island of Ceylon; 44 miles W.N.W. of Candi. N. lat. $7^{\circ} 45'$. E. long. $81^{\circ} 16'$.

VELLATOOR, a town of Hindoostan, in Myfore; 5 miles E. of Coimbatore.

VELLECHYPALEAM, a town of Hindoostan, in Myfore; 13 miles N. of Coimbatore.

VELLEIA, in *Botany*, received its name from the author of the present article, in honour of his highly valued friend Col. Thomas Velley, F.L.S., author of a descriptive work on the Submarine Plants of Britain, with coloured plates, in folio, consisting of only one fasciculus. This amiable and accomplished botanist was unfortunately killed by accident, a few years since, in the town of Reading, as he was travelling between Bath and London.—Sm. Tr. of Linn. Soc. v. 4. 217. Brown Prodr. Nov. Holl. v. 1. 580. Labillard. Nov. Holl. v. 1. 54. (Euthales; Brown Prodr. Nov. Holl. v. 1. 579. Ait. Hort. Kew. v. 1. 363.)—Class and order, *Pentandria Monogynia*. Nat. Ord. *Camparaceæ*, Linn. *Campanulaceæ*, Juss. *Goodenovicæ*, Brown.

Gen. Ch. *Cal.* Perianth inferior, unequal, either of three or five roundish leaves, or of one leaf in five segments, the upper division largest, permanent. *Cor.* of one petal, irregular; tube rather longer than the calyx, split longitudinally at the back, almost to the base, more or less tumid, or spurred, underneath; limb in five rather unequal, spreading, bordered, broad-keeled segments, almost two-lipped. *Stam.* Filaments five, thread-shaped, shorter than the tube, inserted into its membranous base, alternate with the segments of the limb; anthers erect, oblong, unconnected, of two cells, bursting lengthwise. *Pist.* Germen superior, turbinate; style angular, rather longer than the stamens; stigma thick, obtuse, encompassed with a membranous, cup-shaped, abrupt integument. *Peric.* Capsule of one cell and four rigid valves. *Seeds* several, orbicular, compressed, roughish, imbricated on both sides of a central receptacle, shorter than the valves.

Eff. Ch. Calyx inferior, three or five-cleft, unequal. Corolla tubular, five-cleft, two-lipped; tube cloven at the back. Capsule of four valves and one cell. Seeds imbricated, orbicular, compressed.

Obs. Mr. Brown's *Euthales* is so strictly united in habit and character, except the *calyx*, with our *Velleia*, that we cannot but consider it as of the same natural genus. Our learned friend, from whom we always scruple to differ, has discovered some acknowledged *Velleia* with five leaves to the *calyx*, instead of three, originally attributed to it. Here then is an approach toward the five-cleft, though single-leaved, *calyx* of *Euthales*. Linnæus has declared, Phil. Bot. sect. 170, "*Raro observatur genus in quo pars aliqua fructificationis non aberrat.*" The *calyx* appears to be the part in *Velleia* which runs wild, if we may so translate it, and strikingly confirms the above maxim. We may extend this observation to the whole order of Mr. Brown's *Goodenovicæ*, in which even the situation of the *calyx*, whether superior or inferior, is not uniform; which circumstance must lead us to mistrust other differences in the same part, when not supported by other characters.

Without attention to such principles as these, we may almost, as Linnæus says, make as many genera as species of plants.

SECT. 1. *Calyx* of one leaf, in five segments. EUTHALES. Brown.

1. *V. trinervis*. Three-ribbed *Velleia*. Labill. Nov. Holl. v. 1. 54. t. 77. (*Euthales trinervis*; Brown Prodr. Nov. Holl. v. 1. 580. *Goodenia tenella*; Andr. Repof. t. 466. Curt. Mag. t. 1137.)—Calyx tubular, of one leaf, in five acute segments. Leaves downy.—Native of the fourth coast of New Holland. Sent to Kew garden in 1803, by Mr. Peter Good. A perennial greenhouse herb, flowering most part of the year. The root is fibrous. Stem none. Leaves all radical, numerous, downy, more or less acute, tapering at the base; sometimes entire; sometimes toothed, or partly runcinate. Flower-stalks numerous, a span high, nearly erect, forked, with a pair of opposite lanceolate bractæas at each division. Flowers stalked, erect, yellow; keel of each segment green underneath; two upper ones marked in front with a dark brown spot; all emarginate; tube white, enclosing the stamens and style. The flowers seem variable in size. We should hardly, without Mr. Brown's authority, have supposed all the above synonyms to belong to the same species.

SECT. 2. *Calyx* of five leaves. Corolla with a spur at the base, which is permanent. MENCERAS (a section of *Velleia*). Brown.

2. *V. paradoxa*. Blunt-toothed Spurred *Velleia*. Br. n. 1.—"Downy. Leaves bluntly toothed."—Native of New South Wales, Van Diemen's island, and the fourth coast of New Holland. Brown.

3. *V. arguta*. Sharp-toothed Spurred *Velleia*. Br. n. 2.—"Smooth. Leaves sharply toothed."—Gathered by Mr. Brown, on the fourth coast of New Holland.

SECT. 3. *Calyx* of three leaves. Corolla a little gibbous, on one side, at the base. True VELLEIÆ. Brown.

4. *V. lyrata*. Lyrate *Velleia*. Br. n. 3.—Smooth. Bractæas distinct. Leaves lyrate, or sharply toothed at the base. Calyx-leaves roundish-ovate.—Native of Port Jackson, New South Wales. This is our original species of the genus. The leaves, all radical, much resemble those of *Crepis tectorum*. Stalks a span high, rigid, once or twice forked; one branch at each fork being sometimes wanting. Bractæas ovato-lanceolate, acute, entire, separate at the base, with a small internal tuft of hairs. Flowers yellow, on short partial stalks. Calyx-leaves quite distinct, acute, nearly entire, a quarter of an inch long, downy within; the upper one rather broadest, and almost orbicular.

5. *V. spatulata*. Spatulate *Velleia*. Br. n. 4.—"Smooth. Bractæas distinct. Leaves spatulate, almost without teeth; quite entire at the base; with axillary tufts of hairs."—Observed by Mr. Brown near Port Jackson, as well as in the tropical part of New Holland.

6. *V. pubescens*. Downy *Velleia*. Br. n. 5.—"Downy. Bractæas distinct. Leaves toothed. Calyx-leaves oblong-ovate, acute."—Native of the tropical part of New Holland. Brown.

7. *V. perfoliata*. Perfoliate *Velleia*. Br. n. 6.—"Smooth. Bractæas very large, combined, roundish, toothed."—Found by Mr. Alexander Gordon, in the neighbourhood of Port Jackson, but seen by Mr. Brown in a dried state only.

The whole genus is stemless, and we believe the flowers are all yellow.—None but the first species has hitherto made its appearance in the European gardens, though some of them might possibly prove hardy annuals, if not perennial with us.

VELLEIACIUM, in *Ancient Geography*, a town of Italy, in the midst of the hills of Gallia Cispadana, according to Pliny.

VELLEITY, **VELLEITAS**, in the *School Philosophy*, is usually defined a languid, cold, and remiss will.

Others say, it implies an impotency of obtaining what we require. Others will have it, a slight desire for something, which a person does not esteem much, or is too indolent to seek; as *Catus amat piscem, sed non vult tangere lympham*.

VELLEIUS, in *Biography*. See **PATERCULUS**.

VELLEKAT, in *Geography*, rocks in the East Indian sea, about 15 miles E. from the island of Myfol. S. lat. $2^{\circ} 1'$. E. long. $131^{\circ} 2'$.

VELLEPEKONDA, a town of Hindooftan, in Golconda; 15 miles S. of Warangole.

VELLIA, in *Ornithology*, a name used by some authors for the *lanius minor*, or *lanius tertius* of Aldrovand, called in England the *flusber*.

VELLIAM, in *Geography*, a town of Hindooftan, in Coimbatore; 16 miles S.E. of Erroad.

VELLICA, in *Ancient Geography*, a town of Hispania, in the territory of the Tarragonese. Ptolemy.

VELLICATION, among *Physicians*, the act of twitching or stimulating. The word is more particularly applied to a sort of sudden convulsions that happen to the fibres of the muscles.

VELLICULA. See **FORFICULA**.

VELLIN, in *Geography*, a town of Pomerania; 4 miles N.N.E. of Polnow.

VELLING, in *Agriculture*, a term applied to the operation or process of ploughing or cutting up and taking off the turf or upper surface of sward land, in order to its being burnt, or for other purposes. It is usually performed nearly in the same manner as baulking or wrest-baulking, except that instead of being turned over, the furrow-slice is, in some cases, cut with its turf upwards; and the work in this process is in effect the same thing; but as the outer point of the wing of the share in the plough is turned upwards, there is less necessity for holding it an oblique position. The plough too in executing this operation, is always turned to the right upon the head-land, which is contrary to that which is practised in skirting, the slice or furrow being turned towards the ploughed instead of the unploughed land. In velling, the plough is thrown so far into the land from the line of draught, as to enable the ploughman to carry with ease about twice as much land as is displaced by the ploughed slice, which is pared very thin and even, and on the land side not cut so deep as in the operation of skirting, but gradually lifted and turned neatly on its green side upon the baulk, left on the right-hand or furrow side of the plough. This manner of ploughing, in contradistinction to splitting, is called, in some districts, gathering of the land; and the day-work five or six roods. See **SPLITTING**.

In cases where the furrow-slice is not turned, it is in some places drawn out with small hooks, by the labour of women and boys, or harrowed, and then raked together in heaps, and burned. This is a mode of velling which is commonly adopted in cases where there is not time to permit the turf or sod to rot, as is the case in other methods of practice. See **PARING and Burning**, and **TURNING to Rot**.

VELLO, in *Geography*, a town of Italy, in the Veronese; 10 miles N. of Verona.

VELLON, in *Commerce*, a kind of money, in which accounts are kept in many parts of Spain. The real vellon

is the most general money of account: it consists of $8\frac{1}{2}$ quartos, 17 ochavos, or 34 maravedis vellon. Madrid, and all Castile, with most of the adjacent provinces, and also Bilboa, Malaga, and Galicia, keep accounts in reals and maravedis vellon. See **MARAVEDI** and **REAL**.

VELLOUL, in *Geography*, a town of Hindooftan, in Guzerat, on the coast; 9 miles W.N.W. of Puttan Sumnaut.

VELLUM. See **VELOM**.

VELLUM, in *Geography*, a town of Hindooftan, in the Carnatic; 5 miles S.W. of Tanjore. N. lat. $10^{\circ} 43'$. E. long. $79^{\circ} 7'$.

VELLY, **PAUL-FRANCIS**, in *Biography*, was born near Fismes, in Champagne, in 1711. Quitting the society of Jesuits after having belonged to it for about eleven years, he devoted himself to historical researches. His chief work was his "Histoire de France," in 8 vols., written in an easy and correct style, and possessing the character of candour and truth. He is charged, however, with too often attacking the privileges of the clergy, and with having borrowed freely from Voltaire's Essay on General History, and with having been misled in some instances by adopting his sentiments. This history, which he terminated with Charles le Bel, was continued to the 16th volume by Villaret. He also published a translation of Swift's "History of John Bull." He was virtuous and amiable, and of a very cheerful disposition. His death happened in 1759.

VELMES, in *Geography*, a town of France, in the department of the Dordogne; 15 miles S.W. of Mucidan.

VELOCE, Ital., in *Music*, swift; *Velocissimo*, superl. very swift.

VELOCITY, in *Mechanics*, *swiftness*; that affection of motion, by which a moveable is disposed to run over a certain space in a certain time.

It is also called *celerity*, and is always proportional to the space moved.

Huygens, Leibnitz, Bernouilli, Wolfius, and the foreign mathematicians hold, that the momenta, or forces, of falling bodies, at the end of their falls, are as the squares of their velocities into the quantity of matter: the English mathematicians, on the contrary, maintain them to be as the velocities themselves into the quantity of matter. See **MOTION**.

Velocity is conceived either as *absolute* or *relative*: the velocity we have hitherto considered is *simple* or *absolute*, with respect to a certain space moved in a certain time. *Relative* or *respective* velocity, is that with which two distant bodies approach each other, and come to meet in a longer or less time; whether only one of them moves towards the other at rest, or whether they both move; which may happen two ways, either by two bodies naturally approaching each other in the same right line, or by two bodies moving the same way in the same line, only the foremost slower than the other: for, by this means, this will overtake that; and as they come to meet in a greater or less time, the relative velocity will be greater or less. Thus, if two bodies come nearer each other by two feet in one second of time, their respective velocity is double that of two others, which only approach one foot in the same time.

Velocity is also *uniform* or *equal*, when a moving body passes through equal spaces in equal times; or *unequal*, when in equal times it passes through unequal spaces; in which case it is either *accelerated* or *retarded*; and this acceleration, or retardation, may also be equal or unequal. See **ACCELERATION** and **MOTION**.

In the doctrine of fluxions, it is usual to consider the velocity with which magnitudes flow, or are generated. Thus the velocity with which a line flows, is the same as that of the point which is supposed to describe or generate the line. The velocity with which a surface flows, is the same as the velocity of a given right line, that, by moving parallel to itself, is supposed to generate a rectangle, always equal to the surface. The velocity with which a solid flows may be measured by the velocity of a given plane surface, that, by moving parallel to itself, is supposed to generate an erect prism, or cylinder, always equal to the solid. The velocity with which an angle flows, is measured by the velocity of a point, supposed to describe the arc of a given circle, which subtends the angle, and measures it. See *Macl.* Fluxions, book i. chap. 1.

All these velocities are measured at any term of the time of the motion, by the spaces which would be described in a given point of time, by these points, lines, or surfaces, with their motions continued uniformly from that term.

The velocity with which a quantity flows at any term of the time, while it is supposed to be generated, is called its fluxion. See *FLUXION*.

VELOCITIES of Bodies moving in Curves. According to Galileo's system of the fall of heavy bodies, which is now admitted by all philosophers, the velocities of a body falling vertically are, each moment of its fall, as the roots of the heights from whence it has fallen; reckoning from the beginning of the fall. Hence that author inferred, that if a body fall along an inclined plane, the velocities it has, at the different times, will be in the same ratio; for since its velocity is altogether owing to its fall, (and it only falls as much as there is perpendicular height in the inclined plane,) the velocity should be measured by that height as if it were vertical. See *Inclined PLANE*.

The same principle, likewise, led him to conclude, that if a body fall through two contiguous inclined planes, making an angle between them, much like a stick when broken, the velocity would be regulated after the same manner, by the vertical height of the two planes taken together; for it is only this height that it falls; and from its fall it has all its velocity.

This conclusion was universally admitted till the year 1693, when M. Varignon demonstrated it to be false. From his demonstration it should seem to follow, that the velocities of a body falling along the cavity of a curve, for instance, of a cycloid, ought not to be as the roots of the heights, since a curve is only a series of an infinity of infinitely little contiguous planes, inclined towards one another; so that Galileo's proposition would seem to fail in this case too; and yet it holds good, only with some restriction.

All this mixture of truth and error, so near akin to each other, shewed that they had not got hold of the first principle; M. Varignon, therefore, undertook to clear what related to the velocities of falling bodies, and to set the whole matter in a new light. He still supposes Galileo's first system, that the velocities, at the different times of a vertical fall, are as the roots of the corresponding heights. The great principle he makes use of to attain his end, is that of compound motion.

If a body fall along two contiguous inclined planes, making an obtuse angle, or a kind of concavity between them; M. Varignon shews, from the composition of those motions, that the body, as it meets the second plane, loses somewhat of its velocity, and, of consequence, that it is not the same at the end of the fall, as it would be, had it fallen through the first plane prolonged; so that the proportion of

the roots of the heights asserted by Galileo does not here obtain.

The reason of this loss of velocity is, that the motion, which was parallel to the first plane, becomes oblique to the second, since they make an angle: this motion, which is oblique to the second plane, being conceived as compounded, that part perpendicular to the plane is lost, by the opposition thereof, and part of the velocity along with it; consequently, the less of the perpendicular there is in the oblique motion, or, which is the same thing, the less the two planes are from being one, *i. e.* the more obtuse the angle is, the less velocity does the body lose.

Now all the infinitely little, contiguous, inclined planes of which a curve consists, making infinitely obtuse angles among themselves; a body falling along the concavity of a curve, the loss of velocity it undergoes each instant is infinitely little; but a finite portion of any curve, how little soever, consisting of an infinity of infinitely little planes, a body moving through it loses an infinite number of infinitely little parts of its velocity; and an infinity of infinitely little parts makes an infinity of a higher order, *i. e.* an infinity of infinitely little parts makes a finite magnitude, if they be of the first order or kind; and an infinitely little quantity of the first order, if they be of the second, and so *in infinitum*. Therefore, if the losses of velocity of a body, falling along a curve, be of the first order, they will amount to a finite quantity in any finite part of the curve, &c.

The nature of every curve is abundantly determined by the ratio of the ordinates to the correspondent portions of the axis; and the essence of curves in general may be conceived as consisting in this ratio, which is variable in a thousand ways. Now this same ratio will be, likewise, that of two simple velocities, by whose concurrence a body will describe any curve; and, of consequence, the essence of all curves, in the general, is the same thing as the concurrence or combination of all the forces, which, taken two by two, may move the same body. Thus we have a most simple and general equation of all possible curves, and of all possible velocities.

By means of this equation, as soon as the two simple velocities of a body are known, the curve resulting from them is immediately determined. It is observable that, according to this equation, a uniform velocity, and a velocity that always varies according to the roots of the heights, produce a parabola, independent of the angle made by the two projectile forces that give the velocities; and, consequently, a cannon-ball, shot either horizontally or obliquely to the horizon, must always describe a parabola. The best mathematicians, hitherto, had laboured much to prove, that oblique projections formed parabolas as well as horizontal ones.

To have some measure of velocity, the space is to be divided into as many equal parts as the time is conceived to be divided into; for the quantity of space corresponding to that division of time, is the measure of the velocity. For an instance: suppose the moveable A passes through a space of 80 feet in 40 seconds of time: dividing 80 by 40, the quotient 2 shews the velocity of the moveable to be such, as that it passes over an interval of two feet in one second; the velocity, therefore, is rightly expressed by $\frac{80}{40}$; that is, by 2. Suppose, again, another moveable B, which in 30 seconds of time travels 90 feet; the index of the celerity will be 3. Wherefore, since in each case the measure of the space is a foot, which is supposed every where of the same length, and the measure of time a second, which is conceived every where of the same duration; the

VELOCITY.

the indices of the velocities 2 and 3 are homogeneal, and therefore the velocity of A is to the velocity of B, a 2 to 3.

Hence, if the space be = s , and the time = t , the velocity may be expressed by $\frac{s}{t}$; the space being in a ratio of

the time and the velocity. See MOTION.

VELOCITY, *Circular*. See CIRCULAR.

VELOCITY, *Initial*, in *Gunnery*, denotes the velocity with which military projectiles issue from the piece by which they are discharged. This is now known to be much more considerable than was formerly apprehended. For the method of estimating it, and the result of a variety of experiments by Mr. Robins, Dr. Hutton, &c. see GUN, GUNNERY, PROJECTILE, and RESISTANCE.

We shall here add, that Mr. Thompson (Count Rumford) has lately published the result of a variety of experiments upon gunpowder, and also an account of a new method of determining the velocities of all kinds of military projectiles. From the equality of action and re-action, it appears, says Mr. Thompson, that the momentum of a gun must be precisely equal to the momentum of its charge; or that the weight of the gun, multiplied into the velocity of its recoil, is just equal to the weight of the bullet and of the powder (or the elastic fluid that is generated from it) multiplied into their respective velocities: for every particle of matter, whether solid or fluid, that issues out of the mouth of a piece, must be impelled by the action of some power, which power must re-act with equal force against the bottom of the bore.

It is easy to determine the velocity of the recoil in any given case, by suspending the gun in a horizontal position by two pendulous rods, and measuring the arc of its ascent by means of a ribbon, according to the method which Mr. Thompson has described, and this will give the momentum of the gun, its weight being known, and consequently the momentum of its charge.

But in order to determine the velocity of the bullet from the recoil, it will be necessary to find how much the weight and velocity of the elastic fluid contribute to it. That part of the recoil which arises from the expansion of this fluid is always very nearly the same, whether the powder is fired alone, or whether the charge is made to impel one or more bullets, as Mr. Thompson has determined by various experiments.

If, therefore, a gun, suspended according to the method proposed, is fired with any given charge of powder, but without any bullet or wad, and the recoil is observed; and if the same piece is afterwards fired with the same quantity of powder, and a bullet of a known weight; the excess of the velocity in the latter case above that in the former, will be proportional to the velocity of the bullet; for the difference of these velocities, multiplied into the weight of the gun, will be equal to the weight of the bullet multiplied into its velocity.

Accordingly, if W is put for the weight of the gun; U , for the velocity of its recoil, when it is fired with any given charge of powder, without any bullet; V , for the velocity of the recoil when the same charge is made to impel a bullet; B , for the weight of the bullet, and v for its velocity; we

shall have $v = \frac{V - U \times W}{B}$. Let $B = 580$ grains, $W =$

336,000 grains; and, therefore, $B : W :: 580 : 336,000$;

i. e. :: 1 : 579.31 nearly, and $V - U$ is found by experiment to be equal to 1.8522; and, consequently, $v = 1.8522 \times 579.31 = 1073$ feet in a second; which is very near 1083 feet in a second, the mean of the velocities determined by the pendulum after the manner of Mr. Robins.

But the theorem will be rendered more simple by putting c for the chord of the recoil in English inches, when the piece is fired with powder only, and C for the chord when a bullet is discharged by the same charge; and then $C - c$ will be as $V - U$; and consequently, as $\frac{V - U \times W}{B}$,

which measures the velocity of the bullet, the ratio of W to B remaining the same.

Supposing, therefore, $C - c = 1$ inch, and the velocity of the bullet to be computed from that chord; the velocity in any other case, in which $C - c$ is greater or less than one inch, will be found by multiplying the difference of the chords C and c by the velocity that answers to a difference of one inch. Or the velocity of the bullet, expressed in feet per second, may in all cases be found by multiplying the difference of the chords C and c by 118.35; the weight of the barrel, the length of the suspending rods, and the weight of the bullet, remaining the same, whatever be the charge of powder or its strength.

According to this rule, Mr. Thompson has computed by several experiments the velocities of bullets from the recoil, and compared them with the velocities obtained by the pendulum. The result, making the necessary allowances for the difference in the conclusions arising from these two methods, leads Mr. Thompson to infer, that there is the greatest probability that the velocities of bullets may in all cases be determined by the recoil with great accuracy; and if this method succeeds with musquet-bullets, it may also be applied as well to cannon-balls and bomb-shells of the largest dimensions: he apprehends also, that it will be much preferable to any other method hitherto known, not only as it may be applied indifferently to all kinds of military projectiles, with little trouble or expence, but also because by this method the velocities with which bullets are actually projected are determined; whereas, by the pendulum, their velocities can only be ascertained at some distance from the gun, after they have lost a part of their initial velocities by the resistance of the air through which they are obliged to pass to arrive at the pendulum.

Those who advert to what has been delivered under the article GUNNERY, will find that, according to Mr. Robins's theory, farther confirmed by Dr. Hutton's experiments, when bullets of the same diameter, but different weights, are discharged from the same piece by the same quantity of powder, their velocities should be in the subduplicate ratio of their weights.

But this theory, says Mr. Thompson, is founded upon a supposition, that the action of the elastic fluid, generated from the gunpowder, is always the same in every given part of the bore when the charge is the same, whatever may be the weight of the bullet; and as no allowance is made for the expenditure of force required to put the fluid itself in motion, or for the loss of it by the vent, he concludes that the theory is defective. And from a variety of experiments, made with a view of ascertaining this point, he infers, that the ratio of the velocities of bullets to their weights is different from that which Mr. Robins's theory supposes; and from other experiments he finds, that the velocities computed, according to the reciprocal sub-triplicate ratio of the weights, agree much better with the conclusions deduced

duced from those experiments, than those computed upon Mr. Robins's principles; though, in this mode of computation, the difference between the actual and computed velocities was in some of the experiments inconsiderable. But as the powder itself is heavy, it may be considered as a weight put in motion along with the bullet; and if the density of the generated fluid be supposed always uniform from the bullet to the breech, the velocity of the centre of gravity of the powder, or of the elastic fluid, and the gross matter generated from it, will be just half as great as the velocity of the bullet; putting, therefore, P to denote the weight of the powder, B the weight of the bullet, and v its initial velocity; then $Bv + \frac{1}{2}Pv = B + \frac{1}{2}P \times v$ will express the momentum of the charge at the instant when the bullet quits the bore. Instead, therefore, of ascertaining the relation of the velocities to the weights of the bullets, α e proposes to add half the weight of the powder to the weight of the bullet, and to compute the velocities from the reciprocal sub-triplicate ratio of the quantity $B + \frac{1}{2}P$: and the result of several experiments shews an agreement between the actual and computed velocities that is very remarkable.

We shall only add, that Mr. Thompson disputes the justness of Mr. Robins's conclusion with respect to the force of gunpowder, which makes it 1000 times greater than the mean pressure of the atmosphere; whereas, from the result of one of his experiments, its force appears to be at least 1308 times greater than the mean pressure of the atmosphere. Phil. Transf. vol. lxxi. part ii. p. 229—321.

VELOCITY, *Measure of*. See MEASURE.

VELOCITY of Light, Sound, Wind, &c. See LIGHT, SOUND, WIND, &c.

VELOM, or VELLUM, is a kind of parchment (which see), that is finer, even, and more white than the common parchment.

The word is formed from the French *velin*, of the Latin *vitulinus*, belonging to a calf. See ABORTIVE.

For regulations relating to makers of vellum, and duty on the same, see LEATHER.

VELORE, in *Geography*, a town of Hindoostan, in the Carnatic; 14 miles W. of Arcot. N. lat. $12^{\circ} 54'$. E. long. $79^{\circ} 15'$.

VELOSO, a town of Portugal, in the province of Beira; 14 miles S. of St. Joao da Pefqueira.

VELPE, a river of Brabant, which joins the Demer, at Halen.

VELPI, in *Ancient Geography*, mountains of the Cyrenaica, on the confines of Africa Propria. These mountains were inhabited by the Macatute, according to Ptolemy.

VELSER, or WELSER, MARK, in *Biography*, was born at Augsburg, of an ancient and opulent family, in 1558, and educated at Rome under the celebrated Muret. Upon his return to his native city he practised at the bar, and became a senator in 1592, and having attained the highest rank in the government of the city, he was regarded as its chief ornament; nor was he less distinguished as the promoter of literature and science. He died in 1614, at the age of 56. The principal of his works, which were numerous, are "Rerum Augustanarum Vindelicarum Lib. VIII." Venet. 1594, and "Rerum Boicarum Libri V." Aug. Vind. 1602. He was a principal contributor to Gruter's Collection of Inscriptions, and he aided many others in their publications. A collection of his writings was published in a folio volume at Nuremberg, in 1682. Bayle. Gen. Biog.

VELT, or VELTE, in *Commerce*, a measure for brandy

in several parts of France. At Bourdeaux, brandy is contained in casks of 50 velts, more or less; but it is sold by the barrique of 32 velts, or about 60 English gallons: 5 velts proof of Bourdeaux make 4 velts proof, by which it is sold in London. At Cognac, it is sold by the 27 velts; and 11 velts proof of Cognac make 10 velts proof, by which it is sold in London. At Rochelle, brandy from this place, Cognac, Isle de Rhé, and the river Charente, is in casks of 3 barriques, containing in all 75 or 90 velts, and is sold by the 27 velts: 16 velts = about 31 English gallons. At Bourdeaux, 1.64 barrique = 100 English gallons, and each barrique measures 14,033 cubic inches: 52.74 velts = 100 English gallons, and each velt = 438 cubic inches. At Cognac, 51.68 velts = 100 English gallons, and each velt measures 447 cubic inches. At Nantes, 67.34 velts = 100 English gallons, and each velt measures 343 cubic inches. At Rochelle, 2.17 wine barriques = 100 English gallons, and each barrique measures 10,636 cubic inches; and 51.79 brandy velts = 100 English gallons, and each velt measures 446 cubic inches.

VELTÆ, in *Ancient Geography*, a people of European Sarmatia, in a part of the Venedic gulf.

VELTHAUSEN, in *Geography*, a town of Germany, in the county of Bentheim; 2 miles N.N.E. of Nienhuus.

VELTHEIMIA, in *Botany*, received its name from professor Gleditsch, in the Berlin Transactions for 1769, in compliment to a German nobleman, Augustus Ferdinand von Veltheim, author of several mineralogical works, and reported to have been also a lover and patron of botany.—Willd. Sp. Pl. v. 2. 181. Ait. Hort. Kew. v. 2. 289. Poiret in Lam. Dict. v. 8. 448.—Class and order, *Hexandria Monogynia*. Nat. Ord. *Coronaria*, Linn. *Asphodeli*, Juss.

Gen. Ch. Cal. none. Cor. of one petal, tubular, nearly cylindrical; limb regular, in six very short, broad, almost equal, segments. Stam. Filaments six, thread-shaped, inserted into the tube and not projecting beyond it; anthers ovate, cloven at the base. Pist. Germen superior, roundish; style thread-shaped, declining; stigma simple, acute. Peric. Capsule membranous, somewhat pellucid, three-lobed, three-celled, each lobe extended into a compressed rounded wing. Seeds mostly solitary, obovate, rather compressed.

Eff. Ch. Corolla tubular, with six teeth. Stamens inserted into the tube. Capsule membranous, with three wings, and three cells, with solitary seeds.

Obs. This genus, confounded by Linnæus with his ALETIS, is well separated therefrom, as well as from TRITOMA, (see those articles,) both on account of their habits and characters. The genuine *Aletis* has a funnel-shaped corrugated corolla, into the base of whose segments the stamens are inserted; and many seeds in each cell of the capsule. *Tritoma* is distinguished by its long stamens, inserted into the receptacle, and projecting far out of the flower.

1. *V. viridifolia*. Waved-leaved Veltheimia. Willd. n. 1. Ait. n. 1. Jacq. Hort. Schoenbr. v. 1. 41. t. 78. (*V. capensis*; Redout. Liliac. t. 193. *Aletis capensis*; Linn. Sp. Pl. 456. Curt. Mag. t. 501.)—Leaves lanceolate, obtuse, with wavy plaits. Teeth of the corolla rounded, erect.—Native of the Cape of Good Hope, from whence its bulbs are said to have been first imported into this country in 1768, by the late Mr. Malcolm. The plant is now frequent in most good greenhouses, flowering copiously in the winter and spring, yet it is not easily increased, either by root or by seed. The bulb is ovate, larger than a hen's egg. Leaves numerous, all radical, spreading, smooth, a span long,

long, entire, broadly undulated; of a deep grass-green above; pale and glaucous beneath. *Stalk* solitary, erect, straight, naked, eighteen or twenty inches high, elegantly spotted and streaked with blood-red or purple, bearing a long, dense, ovate *cluster*, of pendulous inodorous *flowers*, each accompanied by an awlshaped pink *bractea*, much longer than its *stalk*. The *corolla* is of a waxy pink, or glaucous rose-colour, pale yellow, or greenish, about the extremity; its length about an inch and a half. *Capsules* nearly the same length, of a tender bladdery texture, pale and pellucid, so as to shew the black *seeds* within.

2. *V. glauca*. Glaucous-leaved Veltheimia. Willd. n. 2. Ait. n. 2. Curt. Mag. t. 1091. Jacq. Hort. Schoenbr. v. 1. 40. t. 77. (*Aletris glauca*; Ait. ed. 1. v. 1. 463.)—Leaves lanceolate, glaucous, tipped with a small point; somewhat crisped at the margin. Teeth of the corolla spreading.—Native likewise of the Cape of Good Hope, from whence it was brought to Kew garden by George Wynch, esq. in 1781, being among the many new species of plants, chiefly from that country or from America, for the knowledge of which the botanical world is indebted to the late Mr. Aiton, and his learned coadjutors, in the first edition of the *Hortus Kewensis*. The number of such is greatly increased in the second edition, principally from New Holland and the East Indies. No work of the kind has furnished so many. The plant before us differs from the preceding in having a more oblong pointed *bulb*; much straighter and more erect *leaves*, glaucous on both sides, whose marginal undulations are slight and very small. The *flowers* are smaller, paler, and less showy; their marginal segments more expanded. This is much more rare than *V. viridifolia*, being more difficult of culture and less handsome. It flowers from January to April. For the two other species referred to this genus by Willdenow, *Uvaria* and *pumila*, see TRITOMA.

VELTZEN, or ULZEN, in *Geography*, a town of Westphalia, in the principality of Luneburg; 20 miles E. of Lucko.

VELVALEG, a town of Grand Bucharia; 5 miles S. of Arhenk.

VELUCA, in *Ancient Geography*, a town of Hispania Citerior, belonging to the Arevaci. Ptolemy.

VELVET, a rich kind of stuff, all silk, covered on the outside with a close, short, fine, soft shag, the other side being very strong and close.

The word is formed of the French *velours*, which signifies the same, and which comes from *velu*, a thing covered with hair.

The knap or shag, called also the *velveting*, of this stuff, is formed of part of the threads of the warp, which the workman puts on a long narrow channelled ruler, or needle, or wire; and which he afterwards cuts, by drawing a sharp steel tool along the channel of the needle to the ends of the warp.

The principal and best manufactories of velvet are in France and Italy, particularly at Venice, Milan, Florence, Genoa, and Lucca; there are others in Holland, set up by the French refugees, of which that at Haerlem is the most considerable.

Velvets are now made to great perfection at Manchester and other parts of England.

There are some brought from China, but they are the worst of all.

There are velvets of various kinds, as *plain*, that is, uniform and smooth, without either figures or stripes:—*figured*, that is, adorned and worked with divers figures, though the

ground be the same with the figures; that is, the whole surface velveted:—*ramage*, or *branched*, representing long stalks, branches, &c. on a fatten ground, which is sometimes of the same colour with the velvet, but more usually of a different one. Sometimes, instead of fatten, they make the ground of gold and silver, whence the denominations of *velvets with gold grounds*, &c.:—*uncut*, that in which the threads that make the velveting, have been ranged over the channelled ruler, or wire, but not cut there:—*striped*, that in which there are stripes of divers colours running along the warp; whether those stripes be partly velvet and partly fatten, or all velveted:—*cut*, that in which the ground is a kind of taffety, or gros de Tours, and the figures velvet.

Velvets are likewise distinguished, with regard to their different degrees of strength and goodness, into velvet of four threads, three threads, two threads, and a thread and a half: the first are those where there are eight threads of shag, or velveting, to each tooth of the reed; the second have only six, and the rest four.

In general, all velvets, both worked and cut, shorn and flowered, are to have their warp and shag of organzine, spun and twisted, or thrown in the mill, and their woof of silk well boiled, &c. They are all of the same breadth.

VELUM, in *Ecclesiastical Writers*, the same with what is otherwise called *brandeum*.

VELUM *Quadragesimale*, a veil or piece of hangings, anciently drawn before the altar in Lent, as a token of mourning and sorrow.

VELUM, in *Anatomy*, a part in the brain. See BRAIN.

VELUM *Palati*, or *Pendulum*, the soft palate. See DEGLUTITION.

VERNANIA, called *Viana* by Ptolemy, in *Ancient Geography*, a place of Rhætia, upon the route from Pannonia in the Gauls, in passing by Sopianæ, between Campodunum and Brigantia. Itin. Anton.

VERMETSTOSTE, or WEMMELSTOSTE, in *Geography*, a town of Denmark, on the E. coast of the island of Zealand; 6 miles S.W. of Heding.

VERPESUM, in *Ancient Geography*, a town of Italy, in Latium. Ptolemy.

VERNA, in *Geography*, a town of Naples, in Calabria Ultra; 9 miles N.W. of Squillace.

VERNA, in *Mythology*. See VINA.

VERNA, *Vein*, in *Anatomy*. See VEIN.

VENABULUM, in *Antiquity*, a long kind of spear, used in hunting wild beasts.

VENÆ LACTEÆ, in *Anatomy*, the absorbing vessels, so called because they were supposed to be veins. See LACTEA *Vasa*.

VENÆ *Lymphaticæ*. See LYMPHATICS.

VENAFRO, in *Geography*, a town of Naples, in Lavora, the see of a bishop, suffragan of Capua; 14 miles N. of Sezza. N. lat. 41° 30'. E. long. 13° 58'.

VENAFRUM, (VENAFRO,) in *Ancient Geography*, a town of Italy, in Campania, northwards, towards the Samnium, which became a Roman colony. It was famous for its olives and oils.

VENAÏSSIN, *Comtat de*, *County of Venaissin*, in *Geography*, a country of France, bounded on the N. by the department of the Drôme, on the E. by the department of the Lower Alps, on the S. by the department of the Mouths of the Rhone, and on the W. by the Rhone, which separates it from the department of the Gard, about 12 leagues in length, and 7 in breadth. It takes its name from Venafque, the Vendanica or Vendasca of the ancients, and was possessed, after the 11th century, by the counts of Touloufe,

Toulouse, but reassumed again in the 13th century, and held by count Raymond the elder. The popes laid claim to the sovereignty of this country from the time of count Raymond de St. Gilles, although it is certain that the emperors, as kings of Arles, had exercised that power. In the year 1234, the emperor Frederick II. transferred the imperial rights of the county of Venaissin to Raymond the younger. And the pope found himself compelled to relinquish them to him. From the descendants of Raymond, it came to Philip the Bold, king of France, who in the year 1273, restored it to pope Gregory X. as a fief of the see of Rome, and it has been governed under the popes, by officers called rectores. The soil is fertile, the climate mild, and the air pure; the productions are corn, olives, silk, saffron, and excellent wine. Carpentras was the capital. This country now belongs to France, and forms part of the department of the Vaucluse, being formally ceded by the pope on the 19th of February 1797.

VENAL, or VENOUS, among *Anatomists*, something that bears relation to a vein.

The extremities of the cava and pulmonary veins, where they enter the auricles of the heart, are called *venous sinuses*. See VEIN.

VENAL, formed from *venalis, to be sold*, is also used for something bought with money, or procured by bribes.

Thus we say, venal bards; courtizans and flatterers are venal; even justice, in Turkey, is venal, and must be bought of the bashaws.

In England, there are several offices in the revenue, policy, &c. venal; but this venality of offices is no where so considerable as they were in France, where all offices of judicature were bought of the king, and only municipal officers are elected. Offices in England are venal only by a kind of connivance; in France it was a thing solemn and authorized. The venality was first introduced by Louis XII. who, to clear those immense debts contracted by his predecessor for Charles VIII. without burdening his people with new taxes, bethought himself to sell the offices of finance; and, in reality, he made a vast sum by it; but he forbade, by an edict in 1508, the sale of offices of judicature. Francis I. made an advantage of the same expedient to get money, and sold his posts, not excepting the offices of judicature, openly: under this king, it was only accounted a kind of loan; but that loan was no more than a name to disguise a real sale. However, it is said, that the sale of offices of judicature was established by edicts of Charles IX. and that military offices were sold under the reign of Henry III.

The parliament, not being able to relish the venality of offices, always made the buyer take an oath that he did not buy his post, either directly or indirectly; but there was a tacit exception made, of monies lent the king for being put into them. At length the parliament, finding its oppositions were in vain, and that the traffick of offices was publicly authorized, abolished the oath in 1597.

VENAMALI, in *Mythology*. See VANAMALI.

VENANA, in *Botany*, an unexplained name.—Lamarck Illustr. "v. 2. 59." t. 131. Dict. (by Poiret), v. 8. 450.—Class and order, *Pentandria Monogynia*. Nat. Ord. undetermined.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, cup-shaped, short, with five rounded marginal lobes. *Cor.* Petals five, regular, obovate, rounded, spreading, thrice the length of the calyx. *Stam.* Filaments five, awl-shaped, dilated at the base, the length of the petals; anthers oval, versatile, incumbent. *Pist.* Germen superior, ovate; style short and thick; stigma obtuse, nearly triangular. *Recept.*

befet with numerous bristles, about half as long as the stamens, surrounding the pistil. *Peric.* and *seeds* unknown.

Ess. Ch. Petals five, rounded. Calyx inferior, with five notches. Stigma obtuse, slightly triangular. Receptacle bristly.

1. *V. madagascariensis*.—Native of Madagascar, as its uncouth specific name denotes, where it was found by Commerçon. The stem is arborescent, with alternate, cylindrical, smooth branches. Leaves simple, alternate, stalked, obovate, obtuse, entire, smooth, an inch or two long, with one rib and many fine transverse veins. Clusters terminal, their partial stalks alternate, an inch or two in length, compressed, gradually, though slightly, dilated upwards, smooth, each bearing a little terminal head, of eight or ten small sessile flowers.

VENANGO, in *Geography*. See FORT Franklin.

VENANGO, a county of Pennsylvania, containing eight townships, with 3060 inhabitants. Fort Franklin is the chief place.—Also, a township of Pennsylvania, in Crawford county, containing 434 inhabitants: the county contains 6178.—Also, a township of Pennsylvania, in Butler county, containing 377 inhabitants.

VENANT, St. See St. *Venant*.

VENANTIUS HONORIUS FORTUNATUS, in *Biography*, a Christian poet of the sixth century, was born near Trivigi, in Italy, studied at Ravenna, and became eminently skilful in grammar, rhetoric, and poetry. Superstitiously conceiving that he had obtained relief in a disorder of his eyes at the intercession of St. Martin, he wrote the history of that saint in verse. At Poitiers he was ordained priest about the year 1565, and afterwards elected bishop of that church. He is supposed to have died about the beginning of the seventh century, and an annual festival is kept at Poitiers in honour of his memory.

His works are mostly written in verse. His writings are chiefly the lives of saints. Father Brower, a Jesuit, published his works in one vol. 4to. 1616, and they were also published by M. A. Luchii, at Rome, in 2 vols. 4to. 1786–87. His poems have found a place in the *Corpus Poetarum of Mattaire*. *Nouv. Dict. Hist. Gen. Biog.*

VENASCA, or VENASQUE, or *Benasca*, in *Geography*, a town of Spain, in Aragon, on the river Eßora, in a valley to which it gives name, on the frontiers of France; 45 miles N. of Balbastro.

VENASII, in *Ancient Geography*, a people of Asia, in Cappadocia. Strabo.

VENASQUE, in *Geography*, a town of France, in the department of the Vaucluse, formerly the capital of the Venaissin, on the Nasque; 14 miles E.N.E. of Avignon.

VENCATIGHERRY, a town of Hindoostan, in Mysore; taken in 1791 by the British, under captain Read; 51 miles E. of Bangalore. N. lat. 12° 57'. E. long. 78° 38'.—Also, a town of Hindoostan, in the Carnatic; 23 miles S.W. of Nellore. N. lat. 14°. E. long. 79° 6'.

VENCATRAM, a town of Hindoostan, in Mysore; 25 miles E. of Rydroog.

VENCE, a town of France, in the department of the Var. Before the revolution, the see of a bishop, suffragan of Embrun; 6 miles N.E. of Grasse.

VENCU, in *Botany*, the Chinese name for an excellent fruit found in that country, which the Portuguese call *jamboa*, and the Dutch *pompebinos*. It grows on prickly trees, like the limon-tree, only larger. Its flowers are white, exactly the same in shape with those of the limon, and have an exceeding sweet smell: a very fragrant water is distilled from them. The fruit itself far exceeds the
citron

citron in bulk, being in size equal to, and sometimes exceeding a man's head; the rind is like that of the golden rennet; the pulp is of a reddish colour, and its taste partakes of sweet and acid, resembling that of grapes not fully ripe. A liquor is pressed from it, as in Europe from apples, pears, &c. It will keep for a whole year.

VENDEE, in *Law*, the person to whom any thing is sold, in contradistinction to vendor, or the seller.

VENDÉE, in *Geography*, a river of France, which rises about eight miles N.N.E. from Fontenai-le-Comté, and runs into the Sevre Niortoise, about a mile E. of Marans.

VENDÉE, one of the nine departments of the western region of France, formerly Lower Poitou, lying between Charente and Lower Loire, in N. lat. $46^{\circ} 30'$; bounded on the N. by the departments of the Lower Loire and Mayne and Loire, on the E. by the department of the Two Sevres, on the S. by that of the Lower Charente, and on the S.W. and W. by the sea. Its territorial extent is $7242\frac{1}{2}$ kilometres, or 373 square leagues, and the number of its inhabitants is 270,271. It is divided into 3 circles or districts, 29 cantons, and 324 communes. The three circles are, Sables d'Olonne, including 87,653 inhabitants; Montaigne, 65,943; and Fontenai-le-Peuple, 116,675. According to Hassenfratz, its extent in French leagues is 24 in length, and 21 in breadth; its circles are 6, its cantons 58, and its population 305,610. Its capital is Fontenay. Its contributions, in the eleventh year of the French era, were 2,438,463 fr.; and its expences for administration, judiciary, and for public instruction, were 201,615 fr. 33 cents. This department, watered by many copious streams, is one of the most fertile in France. It is divided by nature into the thicket, the marsh, and the plain. The first, so called on account of the great quantity of wood that covers it, includes nearly five-ninths of the whole territory. Its soil is of various qualities, yielding grain, wine, and excellent pastures. The second, lying on the W. and S. coasts, formerly covered by the sea, is impregnated with saline substances. Nevertheless it is fertile, producing plentiful crops of grain, flax, hemp, and pastures. The third is a fertile and well-cultivated strip of land, inclosed between the thicket and the S. border of the department.

Bouin, an island containing about three square leagues, participates in all the qualities of the marsh. It was separated, not many years ago, from the main land by a narrow channel, which has now almost disappeared. *Noirmontier* (which see) is a fertile island containing about three square leagues, opposite to the N. extremity of the department. It has a port capable of receiving vessels of fifty or sixty tons. But downs of fine sand, near its N.W. coast, are frequently raised by the wind, and driven into the interior part of the island. *Ile Dieu* is a very small island, covered with a thin bed of vegetable soil, mixed with sand, and not productive.

VENDELIA, in *Ancient Geography*, a town of Hispania Citerior, belonging to the Antrigones. Ptolemy.

VENDELÓS, in *Geography*, a town of the island of Ceylon; 64 miles N.E. of Candi.

VENDEN, a mountain of the Tyrolese; 14 miles N.N.E. of Brixen.

VENDEN, a town of Russia, in the government of Riga, on the Aa. In the year 1577, Magnus, duke of Holstein, was brought to this town by Ivan Vassilievitch II. czar of Russia, to be made king of Livonia; but the new monarch was prevailed upon by his subjects, ever averse to the Russian yoke, to form a secret alliance with the king of Poland, and to counteract the czar's progress in Livonia. Ivan, soon apprized of this negociation, laid immediate siege to Venden, with so numerous an army, that the inhabitants, finding all

opposition ineffectual, proposed to capitulate. Magnus himself carried the terms of capitulation, and advancing to supplicate the incensed monarch, threw himself at his feet, and interceded for the town. The czar, spurning at him with his foot, and striking him in the face, loaded him with reproaches for his ingratitude, and ordered him to prison; then entering the town, his troops committed every species of horror and devastation. Many of the principal inhabitants, retiring into the citadel, determined to defend it to the last extremity; but soon perceiving all resistance to be fruitless, and expecting no quarter, they calmly assembled, received the sacrament, and then destroyed themselves, by blowing up the citadel; 36 miles N.E. of Riga. N. lat. $57^{\circ} 12'$. E. long. $25^{\circ} 14'$.

VENDENTIS, in *Ancient Geography*, a town of Upper Mœsia, at a distance from the Danube. Ptolemy.

VENDEVIL, in *Geography*, a town of France, in the department of the Aisne; 8 miles S. of St. Quintin.

VENDITIONI EXPONAS, in *Law*, is a judicial writ, directed to the sheriff, commanding him to sell goods, which he has formerly, by commandment, taken into his hands, for the satisfying of a judgment given in the king's court.

VENDITOR REGIS, the king's saleman, or person who exposed to sale goods or chattels seized or distrained to answer any debt to the king. This office was granted by king Edward I. to Philip de Lardimer, in the county of York, "Ita quod ipse, vel certus suus attorney, ibit ad mandatum vicecomitis de loco in locum infra com. præd. fumptibus suis, ad venditiones faciendas, & capiat de unaquaque venditione pro feodo suo xxxii. den.;" but the office was seized into the king's hands for the abuse thereof, anno 2 Ed. II.

VENDOEUVRES, in *Geography*, a town of France, in the department of the Aube; 11 miles W. of Bar-sur-Aube.

VENDOME, a town of France, and principal place of a district, in the department of the Loir and Cher, on the Loir. Before the revolution, it gave name to a county in Beauce, called Vendomois; $7\frac{1}{2}$ posts N.E. of Tours. N. lat. $47^{\circ} 48'$. E. long. $1^{\circ} 8'$.

VENDRE le Port, a small sea-port town of France, in the department of the Eastern Pyrenees; 12 miles S.S.E. of Perpignan.

VENDRELL, a town of Spain, in the province of Catalonia; 25 miles W.S.W. of Barcelona.

VENDRESSE, a town of France, in the department of the Ardennes; 9 miles S. of Charleville.

VENDUE, denotes an auction or public sale.

VENDUM, in *Ancient Geography*, the name of one of the four towns possessed by the Japodes, in the country that extended itself from the Pannonians to the Adriatic sea. Strabo.

VENECA, a town of Asia, in the interior of Media. Ptolemy.

VENEDI, a people originally of Sarmatia, who occupied the whole coast of the Venedic gulf, and who passed from thence into Germania with the Slavi, where they inhabited the territory abandoned by the Germans. Ptolemy. Jornandes says that these people, before this migration, had been vanquished and subjugated by Hermanicus, king of the Goths.

VENEDICI MONTES, mountains of European Sarmatia. Ptolemy.

VENEDICUS SINUS, a port of the Baltic sea, in which were found the mouths of the Turuntua, Chefinus, Rubo, and Chronus. Ptolemy.

VENEDITOVA, in *Geography*, a town of Russia, in the

the government of Irkutsk, on the Amur; 8 miles E.N.E. of Nertchinsk.

VENEERING, **VANEERING**, or *Fineering*, a kind of marquetry, or inlaying, by which several thin slices, or leaves of fine wood, of different kinds, are applied and fastened on a ground of some common wood.

There are two kinds of inlaying; the one, which is the more ordinary, goes no farther than the making of compartments of different woods; the other requires much more art, and represents flowers, birds, and the like figures.

The first kind is what we properly call veneering; the latter we have already described under **MARQUETRY**.

The wood intended for veneering is first sawed out into slices, or leaves, about a line thick: in order to saw them, the blocks or planks are placed upright, in a kind of sawing-press; the description of which may be seen under the article **PRESS**.

These slices are afterwards cut into slips, and fashioned divers ways, according to the design proposed; then the joints being carefully adjusted, and the pieces brought down to their proper thickness, with several planes for the purpose, they are glued down on a ground, or block of dry wood, with good strong English glue.

The pieces thus joined and glued, the work, if small, is put in a press; if large, it is laid on the bench, covered with a board, and pressed down with poles, or pieces of wood; one end of which reaches to the ceiling of the room, and the other bears on the boards.

When the glue is quite dry, they take it out of the press and finish it, first with little planes, then with divers scrapers, some of which resemble rasps, which take off dents, &c. left by the planes.

When sufficiently scraped, the work is polished with the skin of a sea-dog, wax, and a brush and polisher of shave-grass: which is the last operation.

VENELI, or **VENELLI**, in *Ancient Geography*, a people who inhabited the maritime part of Lyonnese Gaul, and whose capital was the town of Crociatonum. Ptolemy.

VENELLIS. See *VICIS & venellis mundandis*.

VENENUM COCCI, a term used by many of the ancients for the purple tinge, which the kermes berry, as it is usually called (see **KERMES**), gave to linen, or other things.

The word *venenum* being generally understood to express poison, it has been supposed by many, that the kermes was esteemed poisonous, or that there were two sorts of this drug; the one a harmless medicine, the other poisonous. But there is no warrant for this in any of the old writers, and the whole seems indeed but a mistake about the sense of the word *venenum*, which we find by many passages of the best authors, signified a stain, as well as a poison.

The ancients called the vestments dyed scarlet with the kermes indifferently, by the names of *flammae* or *venenate*. Servius tells us, that in certain sacred ceremonies, it was necessary that the priest should be clothed in a scarlet robe; and he uses the word *venenato* to express it in some places, and *flammeo* in others.

VENER, one of the many names by which the chemists call mercury.

VENERE, **CAPE**, or *Capo di Venere*, in *Geography*, a cape on the coast of Genoa. N. lat. 44° 4'. E. long. 9° 40'.

VENEREA CONCHA, in *Natural History*, the name of a very large and elegant genus of shells, more usually called *porcellanae*. See **PORCELAIN Shell**.

VENEREAL, something belonging to Venus.

A venereal person is one addicted to venery, or venereal pleasures. Venereal medicines are called *aphrodisiacs*, *provocatives*, &c.

VENEREAL Virus, in *Surgery*. Of all the maladies which afflict human nature, none has excited greater controversy than that to which we now refer. Fortunately, however, it is likely in the end to prove a means of inducing an accuracy in description, a closeness of reasoning, and legitimacy of induction, for which we have in vain looked in the healing art. A diseased taint, as it was called, was supposed to be every where present, to remain for ever with a person once infected, and to descend to his posterity. Even Astruc, who detected some of the laws of this poison, assimilates it to a Pandora's box, and describes the supposed changes it has undergone at different periods of the world, as similar to the revolutions of empires; thus eluding the most important question in his whole dissertation by a poetical image, and by an illustration of the immutable laws of nature, taken from the vicissitudes of human institutions. Yet even Astruc was rational compared with some of his successors. He at least described the primary symptoms with accuracy: in the others, he seems puzzled by an attempt to reconcile contradictory opinions, and we ought to add, by a want of confidence in his own observation: this however can only be said of primary symptoms. On secondary symptoms, he was as much at a loss as every honest man before and since his time; and his only error was in attempting to account for these difficulties, instead of acknowledging his incapacity to do so. Boerhaave did not scruple to consider himself a Tyro in this disease, after all Europe had pronounced him qualified to be a teacher in the whole science of medicine. Sydenham, with every other writer of any celebrity, will be found either admitting his ignorance, evading the question, or solving it in an unsatisfactory manner.

After all we have already said, (see **MORBID Poison**, and **LUES Venerea**.) it might seem unnecessary to return to the subject, were it not, that even in so short a time since the publication of those articles, new facts have occurred; and we shall shew in this, as in most inquiries into nature, every new discovery proves not only a confirmation, but in some measure an illustration of what Mr. Hunter taught us. We might add, as a farther apology, that his manner of conducting this single inquiry by the facts he produced, now universally admitted, by the caution with which he drew his inferences, and the legitimate inductions which necessarily followed, affords, if not the first, the most perfect model of this mode of reasoning to be met with in the whole science of pathology.

The first consideration was to establish the true character of the venereal ulcer, or *chancre*. For want of this, every ulcer found in suspicious parts was considered the effect of that morbid poison; and from this unhappy error, the firmest constitutions were often destroyed by repeated salivations to cure diseases, which, if not the effect of, were exasperated by mercury. During his life-time, Mr. Hunter had the happiness to see some little remission of this cruel practice. But unfortunately, when he could be no longer consulted in person, another error arose, namely, that all such ulcers as yielded to this remedy were venereal. Hence arose a practice the most truly empirical, that of prescribing for a disease by its supposed name, and judging of its reality by the effect of our remedy. In vain was it argued from his writings, that the cure by the same remedy was no proof of the identity of diseases, and that even this proof, if sufficient, was rarely present: for that those ulcers which had not the true venereal character, yielded to mercury with a readiness very different from that constitutional effect which was necessary for the cure of the true venereal chancre.

Dr. Adams has since shewn, (see his **Morbid Poisons**,) that

VENEREAL VIRUS.

all these ulcers, excepting the venereal, were well known to Celsus, who describes with much accuracy in his chapter *de obscenarum partium vitiiis* all those ulcers on the genitals which are mentioned by writers since the appearance of syphilis as varieties of or anomalies in the venereal character. Yet it is hardly credible, that almost to this day there are writers who will conceive that local diseases, different in character in all their stages, in their mode of spreading and healing, and requiring different modes of treatment, must still be the same; who, while they admit that the venereal disease is of comparatively recent origin, will still confound it with appearances most accurately described more than twelve centuries past.

Mr. Hunter, with that accuracy which distinguishes all his remarks, began by fixing the character of the disease, and even shewing, that from the laws of the economy, as ascertained in all other local diseases, such must be the character of an ulcer arising from some external cause, and for the cure of which animal economy had made no provision.

First: In every local irritation, he shewed that a secretion of some fluid would take place, by which the irritating subject might be removed. The venereal matter, therefore, irritating a solid part, induces ulceration, that the part may rid itself of this irritating cause. But from the nature of a morbid poison, the effect of that irritation is to produce a local action, by which a substance is secreted similar to that which induced the irritation. In some cases, as in small-pox, as soon as this effect is produced it ceases, and the parts heal as readily as after any other loss of substance; but such is not the case with an ulcer from venereal poison. When this is once set up, its action continues until some substance induces a more powerful irritation, and thus supercedes the venereal.

Secondly: When the curative process of a sore from any cause is interrupted, it must spread, or a new action must be set up. This new action, in common ulcers, is the formation of thick, or, as they are usually called, callous edges, after which the ulcer remains stationary. This was well remarked by Celsus, who gives this process the name of *vetustas*, describing the thickened lips, and remarking, that whilst they continue, no applications to the ulcer are of any use.

Thirdly: The peculiarity which distinguishes the venereal ulcer from all others is, that the incapacity in the part to alter the diseased action, produces the same effect as in parts where there is any other impediment to healing; namely, the thickened edge and base. But though the attempt at healing is given up, still the irritation continues from the constant presence of the virus, and consequently the ulceration also, in order to rid the part of the cause of such irritation. Hence we have what is not to be met with in any other ulcer, namely, a continued ulceration, attended with or accompanied by a hard edge and base. This is the only true primary venereal ulcer, and the only ulcer or *vitiium* not described by Celsus in the chapter before alluded to.

The next question was, in what manner a disease incurable of itself was always relieved by mercury. For this a thousand whimsical causes were assigned, the most common of which was, that *mercury was its antidote*. This no one could doubt, but did such an expression do more than assign a word where we were looking for an action? At length Mr. Hunter shewed, that this also was perfectly consistent with what had been before observed; namely, if the venereal ulcer is the effect of an action arising from the irritation of a specific substance, the cure must be effected by the use of another substance, the effect of whose irritation

would be greater than the irritation excited by venereal matter; and the manner in which the disease always yields to the remedy, confirms the doctrine. For no quantity of this antidote, as it is called, will produce any effect on a venereal ulcer, unless an excitement is induced greater than the venereal: that is, if the chancre is recent, a very slight mercurial irritation will be sufficient to alter its action; if more inveterate, the mercurial irritation must be excited proportionally higher, and be longer continued.

It may at first seem that we have gained little, inasmuch as we have now a more severe disease than before. But it will readily occur, that the parts themselves are capable of forming venereal matter, which is the cause of the first irritation, and which will continue till the action excited by that irritation is superceded. But the parts are not capable of forming mercury, by which the second irritation is induced; we might therefore expect, as actually happens, that when the use of mercury is discontinued, the action excited by it would gradually cease also, and the parts be restored to their original or healthy action.

But other difficulties remained. After the ulceration of the genitals was perfectly healed, it sometimes happened, at uncertain periods, that the throat, the skin, or the bones, or all of them, would shew diseased actions, which, though very different from those on the genitals, were equally incurable without the remedy; and which, from their uniformity in so many subjects, whether during the primary symptoms, or after they were healed, evidently arose from the same cause. The ignorance of former practitioners induced them to suspect that these symptoms of confirmed pox, as they were called, arose from an insufficient use of the remedy when the chancre was healed. Yet it was impossible they should be ignorant, that in many instances in which but comparatively little mercury had been used, none of these symptoms on distant parts of the body had occurred; and in others in which the mercury had been used to a very great excess, the patient had been a second or a third time affected, though always in different parts, and with local complaints, different from primary ulcers, yet arising from a similar cause. Besides, if the disease occurred from the want of a sufficient use of mercury, how did it happen that the parts first affected should remain sound, and parts not previously shewing any diseased action, should now become in a state of open ulceration?

To account for this, Mr. Hunter shewed, that though it is now well ascertained, that mercury will with certainty cure every form of the venereal disease which we can detect; it does not follow that it will cure it before such an action has commenced, as evinces itself by some alteration in the texture of the part; in other words, that it will supercede the venereal action by its higher irritation; but in order to do this, the venereal action must have commenced. But it is urged, that doubtless the venereal action has commenced before we can trace it by our senses, and that therefore mercury ought in this state to supercede it, and to prevent its arriving at open ulceration. In answer to that, Mr. Hunter produces his facts, and shews that when the action has appeared, it invariably yields to mercury, and never appears again from the same source of infection in the same order of parts. He taught us also what is now universally admitted, that in the skin and throat it is always curable by a much slighter course of mercury, than was necessary for curing the primary chancre. Consequently, if mercury could prevent the venereal action in these secondary parts, the first course would prove sufficient for that purpose. But the concurrent testimony of all the best writers goes to prove, that none of them knew when to expect nor how to

VENEREAL VIRUS.

prevent the appearance of the disease in more distant parts of the body, after it had been cured in the parts first affected; yet all knew how to cure it when it appeared in those distant parts. Boerhaave fancied he had discovered the cause of these difficulties, by comparing the solid texture of the bones with the more yielding condition of the softer parts. Both he and Dr. Swan were sensible how easy it was to cure the disease when it occurred in the skin and throat; but, as honest men, they were forced to confess their incapacity to prevent it, or even after they had cured it in those parts, to prevent its re-appearance in the bones, though in them also they could cure it with equal certainty after the diseased action had commenced.

An accurate attention to all these events induced Mr. Hunter to construct a series of experiments, by which he might ascertain the laws which govern the actions excited by this poison, and thus meet all the difficulties of former writers. His first object was to fix the precise character of the chancre, or primary venereal ulcer. Having done this, he watched, by every possible means, those cases in which secondary symptoms occurred, and was convinced that it did not depend on any causes which could with certainty be controlled. This he urged was not different from many other morbid poisons. In inoculating for small-pox, no one can ascertain whether the patient will have pustules beyond the spot inoculated. Had he lived to witness the effect of cow-pox, he would have found a still more striking analogy. It is well known that secondary vesicles from cow-pox, that is, a cutaneous eruption usually fourteen days after inoculation, and some few days after the inoculated part has scabbed, will sometimes appear at distant parts of the body; but we have no means of ascertaining under what circumstances these secondary eruptions occur, nor of preventing them, nor of producing them.

The conclusions drawn by Mr. Hunter were, first, that from every local action arising from a morbid poison, absorption takes place; secondly, that the absorbed virus circulates with the blood, and is ejected at some of the emunctories, probably the skin; thirdly, that for the most part it passes without contaminating any part in its passage; but that sometimes the throat, or the skin, or the bone, or all three are contaminated. In these cases the parts thus contaminated take on the diseased action at certain periods, according to the nature of their structure, and the property of the morbid poison; for it is well known that few, if any, morbid poisons produce their effect, till a certain period after their application. The small-pox effluvia are received usually from ten to fourteen days, before the disease shews itself; and the effect then commences on the face several days before the lower extremities exhibit any pustules. Under inoculation, the pustules on distant parts of the body appear at periods later than on the inoculated parts. But though every morbid poison requires a certain period between its application and the effect produced, and though this period is different in different morbid poisons, yet there is a medium in each; and Mr. Hunter ascertained, that the medium for the appearance of the secondary symptoms of syphilis is usually on the skin or throat, six weeks after the cessation of the irritation excited by the mercurial course which cured the primary disease or chancre: that the appearance on the bones is usually three months after the same event; and that if the patient remains well longer than those periods after the healing of the chancre, he may for the most part consider himself free from any further danger from that source of infection. It must be admitted, that these periods are not always precise; but the same may be said of the small-pox, cow-pox, and other morbid poisons;

and when we consider that the medium in one instance is from ten to fourteen days, and in the other from six weeks to three months, it must follow that the variations in each are not greater than their comparative medium would lead us to expect.

From these facts Mr. Hunter improved the practice in this disease so much, that we are often led to believe the disease itself to be milder than heretofore. But the truth is, that we now have some method in directing our treatment, which till his time could hardly be said to be the case. It was known, indeed, that mercury would prove a cure; but neither was the character of the disease accurately ascertained, nor the laws by which it yielded to the remedy, nor to which the secondary symptoms were imputable. Hence mercury was indiscriminately applied to all ulcers on those parts, and many were greatly exasperated by it: and as in the true disease secondary symptoms sometimes occurred, the patient was overwhelmed with a disgusting and deleterious remedy, to prevent what could not be prevented, though it rarely occurred; and when it did occur, was readily cured. But the mode of treatment was far from being the only advantage of Mr. Hunter's discovery. By ascertaining the laws of the disease, he relieved the practitioner from every embarrassment, when secondary symptoms occurred; and the patient from the perpetual dread of an evil, from which it was supposed neither he nor his offspring were ever secure.

It is not to be wondered if the obscurity of Mr. Hunter's mode of writing on a subject familiar to himself, but new to every reader, for a long time precluded the world from the benefit they have since derived from his discoveries. For this benefit we are indebted to Dr. Adams, and perhaps to those writers who attempted to controvert the doctrine itself. The latter were very numerous, and, as often happens, few were acquainted with the subject they opposed. Dr. Adams explained the difficulties principally by shewing the errors of his master's antagonists, and at this time we believe the doctrine is universally admitted by all those who take the trouble to study it. That is, that the antidotal property of mercury consists in the high irritation it excites; that no ulcer on the genitals is syphilitic, unless it continues to spread with a hard edge and base; that it is useless to give mercury in order to prevent the secondary symptoms of the disease, either in the skin or bones, though that remedy will always cure them, if they should appear; and that if these secondary symptoms do not appear before a certain period after the primary ones, there is no reason to apprehend their appearing at all, unless the patient exposes himself again to the same cause. Such is the general doctrine of Mr. Hunter, divested of certain expressions, by which *action* is with more technical precision distinguished from *disposition*. As this language is not necessary we have not introduced it, but refer such of our readers as wish to be acquainted with the precise terms of the discoverer, to the article *Lues Venerea*.

Dr. Adams has carried one of Mr. Hunter's opinions somewhat further than the inventor. Mr. Hunter had observed, that after the venereal action of the primary ulcer was superseded by the mercurial irritation, *new flesh* would sometimes arise, but that it rarely happened that such new flesh would regularly cicatrize or heal. His commentator shewed that this was not peculiar to this disease, but extends to all morbid poisons; that in the small-pox and cow-pox it produces the pitting from the first, and indentation from the second; and that in all other morbid poisons where there is a loss of substance, that loss is never restored by the common

means of incarnation, called granulations. That if such an attempt is ever made it produces a fungus, called by Mr. Hunter *new flesh*, which will not heal, and which requires the application of caustic before any attempt at skinning will commence. After this application, Mr. H. remarks the readiness with which the whole will *skin over*. In this language, the surgical reader will observe the caution with which Mr. Hunter avoids the common terms of *granulation* and *cicatrization*, by substituting for the first *new flesh*, which will not heal, and for the second, *skinning*, which rapidly takes place over the whole sore, whereas it is well known that cicatrization is the most tedious part of the healing process in all other ulcers. In this manner the writer of this article conceives we are to reconcile ourselves to that remark on the granulating property of chancre mentioned under the article *LUES Venerea*; which see. See also *MORBID Poisons*.

VENERIA, or **APHRODISIUM**, *Faradese*, in *Ancient Geography*, a town of Africa, situated on the sea-coast, N.N.W. of Adrumetum. Ptolemy.

VENERIE, LA, in *Geography*, a town of France, in the department of the Po, which took its name from a royal palace built by Emanuel II. duke of Savoy, for a hunting seat: in this town are carried on manufactures of wool and silk. The palace was magnificent, and the adjacent country abounds with game; 3 miles N.N.W. of Turin.

VENERIS Ænadis Templum, in *Ancient Geography*, the name of a temple built by the Trojans in honour of Venus, when they landed on the coast of Epirus, and took possession of the peninsula called Leucas. Dion. Halic. This temple was on the promontory of Actium.

VENERIS Arsinoes Fanum, a temple of Egypt, on the promontory Zephyrium, between Canopus and Alexandria. Strabo.

VENERIS Aureæ Campus, a territory of Egypt, in that of Memphis. Diod. Sic.

VENERIS Insula, an island of the Arabic gulf, on the coast of Egypt. Pliny.

VENERIS Lacus, a lake situated, according to Pliny, at Hierapolis in Syria. It was a marsh, near a temple of Juno, according to Lucian.

VENERIS Mons, a mountain of Spain, S. of the Tagus, and near the country of the Carpetani, according to Appian.

VENERIS Portus, a port of Gallia Narbonensis, on the Mediterranean sea, between the promontories of the Pyrenees, and N. of Cervaria. This port was famous for a temple of Venus.—Also, a port of Italy, in Liguria, on the confines of Etruria, between Segesta and Portus Delphini. Anton. Itin.—Also, a port of Egypt, upon the Arabic gulf. It was anciently named “Myos Hormus,” or “Muris Statio;” also called “Magnus Portus,” and afterwards “Veneris Portus,” according to Ptolemy, who says that it was near the promontory Drepanum.

VENERIS Æstrum, the *stimulus* or *incentive* of *venery*, is an appellation given, by some anatomists, to the clitoris.

VENERIS Æstrum is also used, by others, for the transport of love, or the utmost ecstacy of desire or enjoyment in coition.

Some are of opinion, that infectious women are the most apt to communicate the poison when they are thus excited with desire; whereas, with indifference, they may admit the same intercourse, without giving the infection.

VENERIS Ens. See **ENS**.

VENERIQUE, in *Geography*, a town of France, in the department of the Upper Garonne; 10 miles S. of Toulouse.

VENERY is used for the act of copulation, or coition, of the two sexes.

It takes its name from Venus, the supposed deity of the passion of love.

VENERY also denotes the art or exercise of hunting wild beasts; which are also called *beasts of venery*, and *beasts of the forest*.

Such are the hare, hart, hind, boar, and wolf. See **BEAST, GAME, and HUNTING**.

VENESECTION, in *Surgery*, the operation of opening a vein, for the purpose of taking away blood for the relief of diseases. See **BLEEDING**.

VENESS, in *Geography*, a cape on the S.E. coast of the island of Eday. N. lat. 59° 1'. W. long. 2° 38'.

VENETA BOLUS, a fine red earth used in painting, and called in the colour-shops *Venetian red*. See **RED**.

It is improperly denominated a bole, being a genuine species of red ochre. It is of a fine bright, and not very deep red, approaching, in some degree, to the colour of minium, or red-lead, and is moderately heavy, and of an even and smooth texture, yet very friable, and of a dusty surface: it adheres firmly to the tongue, is very smooth, and soft to the touch, easily crumbles to pieces between the fingers, and very much stains the skin in handling. It has a slight astringent taste, effervesces considerably with aquafortis, and in water immediately breaks into a fine powder.

It is dug in Carinthia, and sent from Venice into all parts of the world, being an excellent colour, and very cheap; our colourmen, however, find too many ways of adulterating it. Hill and Da-Costa.

VENETI, in *Ancient Geography*, a people of Italy, in Venetia, of Celtic origin. According to some historians they were the descendants of a colony of Trojans, who came to establish themselves here on the ruin of their own country; but Herodotus says that they were an Illyric nation.—Also, a people of Gallia Celtica, in Armorica, who inhabited the peninsula above the Namneti, according to Cæsar (De Bel. Gall. lib. iii. c. 8.) who ascribes to them the glory of being the most powerful of all the people who inhabited this coast, and who availed themselves of their shipping, and of the science and practice of navigation. Ptolemy calls their capital Dariorigum. Cæsar denominates their territory Venetia, although the Veneti, who inhabited that promontory of Gaul which is now called Brittany, excelled, as Cæsar says, all the nations on the continent in their knowledge of maritime affairs, and in the number and strength of their ships; yet, when they were preparing to fight a decisive battle against the Romans by sea, they asked and obtained auxiliaries from Britain; which they certainly would not have done, if the Britons could have assisted them only with a few wicker-boats, covered with skins. It is therefore probable, that the people of Britain had ships much of the same form and construction with those of their friends and allies the Veneti, with which they joined their fleet on that occasion. These ships of the Veneti are described by Cæsar as very large, lofty, and strong, built entirely of thick planks of oak, and so solid, that the beaks of the Roman ships could make no impression upon them. The combined fleets of the Veneti and Britons, in the famous sea-fight off the coast of Armorica, now Brittany, against the Romans, consisted of two hundred and twenty of these large and strong ships, which were almost all destroyed in that unfortunate engagement; by which the naval power both of Gaul and Britain was entirely ruined. This great disaster is believed, by some of the best of our antiquaries and historians, to have been the

reason that the Britons never attempted to make any opposition to Cæsar by sea, when the very year after it he invaded their country.

VENETIA, a country of Italy, which commenced E. of Gaul, near the lake Benacus, and the river Mincius, which flowed from it. Its boundaries to the N.E. were not very distinctly ascertained. Its principal rivers, beside the Po, were the Athesis, the Medoacus Major, and the Plavis. It was very fertile in pasture, and furnished excellent horses. The people were denominated Veneti or Heneti. Their principal towns were Hadria, Ateste, Patavium, Verona, Vicentia, Altinum, Tarvisium, &c. See **VENICE**.

VENETICÆ INSULÆ, or *Venetorum Insula*, comprehended, under this denomination, a great number of islands situated on the western coast of Gallia Celtica or Lyonnensis. This general appellation included Bellise, Houat, Hedic, Groa or Grouais, now Quiberon. These islands occupied that part of the sea which was opposite to the continent inhabited by the *Veneti*; which see.

VENETICO, in *Geography*, a small island in the Mediterranean, near the coast of the Morea. N. lat. $26^{\circ} 41'$. E. long. $25^{\circ} 53'$.—Also, a small island in the Grecian Archipelago, near the S. coast of the island of Scio.

VENETORI, a town of Walachia; 24 miles W. of Bucharest.

VENETUS LACUS, in *Ancient Geography*, the name of one of those two lakes, which the Rhine formed near its source in the Alps. The lake now called Boden-see, or more commonly the lake of Constance, is called "Brigantinus" by Pliny, and "Brigantia" by Ammianus Marcellinus. Strabo assigns to it 300 stadia of length, and 200 of breadth. Its name Boden-see is derived from a place called Bodman, situated at the extremity of the lake opposite to which is Bregentz, whence the appellations Brigantia and Brigantinus.

VENEV, in *Geography*, a town of Ruffia, in the government of Tula, on the Oser; 40 miles N.N.E. of Tula. N. lat. $54^{\circ} 20'$. E. long. $38^{\circ} 14'$.

VENEW. See **VENUE**.

VENEZIANO, ANTONIO, in *Biography*. Of this early painter the birth-place is not exactly known, as he is by one author supposed to have been a Venetian, and by another a Florentine. His principal works are at Pisa and Florence, and in the Ducal palace at Venice. He certainly improved upon the style of those painters who preceded him, if we except Giotto; his manner was less formal, and he is said to have painted well in fresco, and to have carried the management of it to a considerable degree of perfection. He died in 1384, at the age of 74.

VENEZIANO, DOMENICO, was born at Venice in 1420, and was a disciple of Antonio da Messina, after he had, as Vafari relates, learned the secret of oil painting from J. V. Eyck; and to him Messina communicated his secret. He painted several pictures at Loretto and Perugia, and afterwards settled at Florence; where the novelty of his manner, and the ability with which he executed it, acquired for him considerable renown. Unfortunately for him, he formed an intimacy with Andrea Castagno, an eminent Tuscan painter, and taught him the management of oil colours; when his treacherous friend conceived the horrible design of assassinating him, that he might remain sole possessor of the secret, and effected his detestable purpose in 1476, when Domenico had attained his 56th year.

VENEZIANU, ANTONI, a Sicilian poet, was born in 1543, at Monreale, and acquired great celebrity in science

and polite literature, so that it was fashionable to cultivate acquaintance with him; and amongst those who fought this honour was Tasso. In 1578 he was taken, on a voyage to Rome, by an Algerine corsair, but redeemed; on his return to his native country, he was imprisoned under a suspicion of being the author of some writing against the viceroy of Sicily, and being confined at Palermo, he was destroyed in the castle by the explosion of a powder-magazine in August 1593. His writings consist chiefly of sonnets and lyric poems in the Sicilian dialect; and some of his compositions in pure Italian were printed at Palermo in 1572. A large collection of his Sicilian poems exists in MS. Gen. Biog.

VENEZUELA, in *Geography*, a province of the eastern part of Terra Firma, or of Spanish America, included within the jurisdiction of the captain-generalship of Caraccas, which is not only the capital of this province, but the metropolis of the captain-generalship, the seat of the royal audience and of the intendency, whose authority extends over the provinces of Venezuela, Maracaibo, Varinas, Cumana, Guiana, and the island of Margareta; extending from N. lat. 12° to the equator, and from 62° to 75° long. W. from the meridian of Paris. The name of Venezuela, which is in Spanish a diminutive of Venice, was given to this province on account of some Indian villages, which the first conquerors found on the lakes of Maracaibo. Others have erroneously ascribed the origin of this name to the following circumstance; viz. that Alphonso Ojeda, having landed here in 1499, caused some huts to be constructed upon poles, in order to elevate them above the stagnant water which covered the plain; but though it is true that Ojeda, in 1499, visited the eastern shore of Terra Firma, he never thought of erecting any huts over its stagnant waters. The chief place of the province of Venezuela has never been nearly on a level with the water. Caraccas is at least sixty toises above the level of the sea, and has no other water besides that of three brooks which pass rapidly through it, and of a small river which bounds it on the south. The first settlement of the Spaniards on the borders of the lake of Maracaibo took place in 1527. The population of Venezuela, including Varinas, consisted, in 1801, of 500,000 persons; that of the government of Maracaibo, of 100,000; of Cumana, 80,000; of Spanish Guiana, 34,000; and of the isle of Margareta, 14,000; making a total, according to the statement of Depons, of 728,000. The population of Caraccas, in 1802, is stated at from 41,000 to 42,000, consisting of whites, slaves, freed persons, and very few Indians; the first class forming nearly a fourth of the whole, the slaves a third, the Indians a twentieth, and the freed persons the rest. All the whites are either planters, merchants, military men, priests, monks, or persons employed in the administration of justice or finance. In this population, the whites are computed at two-tenths, the slaves at three, the descendants of freed-men at four, and the Indians compose the remainder. A late writer, professing himself a "South American," in his "Outline of the Revolution in Spanish America," (1817), says, that in the town of Caraccas alone there were 45,000 inhabitants; and the whole population of Venezuela, including the several provinces, above enumerated, amounted in 1811 to more than 800,000. The soil of Venezuela is fertile, and yields, with prodigal liberality (says Depons), all the productions which are to be met with in the West India islands, besides many others which they do not possess. If a man labour, he must grow rich; and if he vegetate merely in indolence and sloth, he has only to stoop, in order to gather from the soil more than sufficient to satisfy the wants of nature. The cacao of this province is abundant and excellent. It likewise furnishes

VENEZUELA.

nishes Indian corn, indigo, tobacco, cotton, sugar and coffee. Its vanilla, produced from a creeping plant, which, like the wild vine and ivy, entwines round the trees, is obtained in great plenty. Wild cochineal is also the product of this country, and with due cultivation, it might be made to furnish a variety of woods, barks, and plants for the dyer; and also gums, resins of balsam and medicinal oils: its sarsaparilla is said to exceed the consumption of the whole of Europe; saffras and liquorice abound; squills are plentiful; so are likewise storax, cassia, aloes, &c. The horned cattle, affording the article of exportation (hides), the horses, mules, sheep, and deer, are here very numerous. It abounds in all kinds of game, and its rivers and lakes supply plenty of fish.

In order to give a brief account of the revolution that has lately taken place in this province, and in other parts of Spanish America, we shall trace the origin and progress of the Spanish establishments in this part of the world. Terra Firma was discovered by Christopher Columbus in 1498, in his third voyage from Spain to America. After having discovered the gulf of Paria, he coasted along Terra Firma as far west as the Testigo islands, from which point he sailed with a fair wind to St. Domingo. Ojeda obtained permission from the Spanish government to pursue the discovery; and having arrived at the territory of Maracapna, in the year 1499, he followed the coast as far as Cape de la Vela, entering several ports in order to collect more minute information. From Cape de la Vela he sailed for St. Domingo, according to Oviedo and Robertson; but according to Charlevoix, he returned before that to Maracapna, a village upon the coast of Cumana, and there had a brig built. Not long after, the account which Columbus had given to the Spanish government attracted to Terra Firma another vessel from Spain, whose real object was commerce, but which concealed its design under a permission from the king to prosecute the discovery of the country. This vessel, commanded by Christopher Guerra, touched on the coast of Paria, at Margareta, Cubagua and Cumanagola, now called Barcelona. In these places, in exchange for trinkets, he obtained a great quantity of pearls, gold, Brazil wood, &c. of which he formed a very rich cargo. Guerra pursued his course along the coast to the westward, and landed only at Coro, where he found, to his great astonishment, some Indians, as much disposed to take away from him whatever he had got, as those on the eastern coast had been to give them to him. He had too much to lose to run the risk of a war, by which neither glory nor emolument was to be acquired. He, therefore, wisely took the resolution of returning to Spain, in order to place his riches out of the reach of danger.

The report of his arrival and fortune spread over the whole kingdom, and immediately from every part expeditions were fitted out for Terra Firma. At the same time, Charles V. gave permission to make slaves of the Indians who should impede or embarrass the conquest; a grant so much the more deplorable to humanity, as it strongly excited the avarice of those in whose breasts money usurped the place of every other consideration. It is easy to imagine, that upon those coasts, where pillage had nothing to fear either from the vigilance of the magistrate, or the sword of justice, there must have been established a nefarious commerce which had no other object than insatiable avarice, no other result but rapacity, tyranny, and ferocity. The crimes committed by that swarm of robbers, who contended with one another for superiority in feats of plunder, were so great and so numerous, that the cries of the victims reached the audience of St. Domingo, who are entitled to our applause for having immediately taken measures to make it appear to the inha-

bitants of the new world, whom they wished to lead rather than to drive into obedience, that the enormities of that scum of the Spanish nation were not properly chargeable on the nation itself. The audience sent thither, in quality of commissary and governor, a man of very great merit, named John Ampues, who arrived on the Coriana coast in 1527, with sixty men. His mildness, affability, and knowledge soon gained the confidence of the cacique of the Coriana nation; and a solemn treaty confirmed the union and alliance which they formed, and the cacique took the oath of allegiance and vassalage to the Spanish monarch. On the 26th of July, 1527, Ampues laid the foundation of Coro. Thus the province of Venezuela had the pleasing prospect of arriving, without commotion, to a degree of prosperity which would crown the happiness of its inhabitants. However, the commercial house of the Welfers, established at Augsburg, being considerably in advance to Charles V., the emperor submitted to the demand which they made of granting to them, under the title of an hereditary fief of the crown, the province of Venezuela, from Cape de la Vela as far as Maracapna, with the right of extending indefinitely towards the south. But the province having suffered much from the monopoly and tyranny of the agents of the Welfers, the treaty with them was rescinded, and the emperor appointed as governor the licentiate John Peres de Tolosa, who, according to Oviedo, had likewise the title of captain-general. This new reform produced a favourable change in the system and mode of conquest; and it was an established point, that instead of committing devastation, the conquerors should form settlements; and instead of plundering, respect property. Laws, which had been enacted in 1526, 1540, 1542, 1550, and 1552, were put into execution. These laws declare the Indians to be free, not even excepting those who should be taken prisoners in the act of bearing arms. As soon as an Indian nation was subjected to the Spaniards, a convenient site was chosen on which to build a town, for the better security of the conquest. One hundred Spaniards formed the population of the new city, to which a cabildo was attached. They afterwards divided the city in portions among the new inhabitants, according to their rank and merit; and after having made an enumeration of the Indians, they shared them among the Spaniards, who thus acquired over them a right, not of property, but of superintendance. This is what is called "repartimientos de Indios," the dividing of the Indians. This measure was followed by more fixed regulations, under the name of "encomiendas;" the effect of which was to place under the immediate superintendance and authority of a Spaniard, exemplary for his morals, the Indians who lived within a limited extent of ground, corresponding to that of the communes in France. In return for these attentions, the Indians were to pay the commissioned superintendants of the encomiendas, who were called encomenderos, a yearly tribute in labour, fruits, or money. When this tribute was once paid, the Indians were exempted from every other personal service. It appears that, according to the solemn and special contract entered into between the kings of Spain and the discoverers, conquerors, and settlers in Spanish America, politically divided by the Spanish government, and comprehending the viceroalties of New Spain or Mexico, Santa Fé de Bogota or New Grenada, Peru, Buenos Ayres, or the provinces of Rio de la Plata, and the captain-generalships of Guatemala, Venezuela, and Chili; these last were to remain lords of the country, on the basis of feudal vassalage, under the names of "encomenderos." Such, however, was the inhuman conduct of the first of these towards the natives, that Charles V. and his successors were under the necessity

of gradually abolishing many of their privileges, and the "encomiendas" fell at length, in most of the provinces, to the crown; and certain inferior privileges were then granted to the settlers, in lieu of those originally possessed, with the titles of marquis, count, &c. Spanish America was from that time considered as a kingdom, independent in itself, yet united to Spain, as being both under the government of one king. The incorporation of this country to the crown of Castile was decreed by Charles V. in Barcelona, September 14, 1519, and confirmed by Donna Juana, Philip II. and Charles II. Accordingly, in the opening of the royal decree published in the year 1524, for the nomination of a supreme council for the Indies, the term kingdom is expressly used, and its use admits, that the inhabitants had a natural right to hold the appointments of profit and honour in the country. The energetic remonstrances of Montefino, Cordova, Las Casas, and others, to the court of Spain, against the arbitrary measures of the conquerors and settlers, gave rise to the establishment of the Council of the Indies. (See *COUNCIL of the Indies*.) Whilst the legislative power of the kingdom of the Indies rested in this council and the king, the executive power belonged to the viceroys and captain-general. The viceroys were also invested with *royal power*, that is, they were authorized by a special commission to act with plenitude of power in extraordinary and delicate emergencies.

From the most exact calculations, it is concluded that the continental part of Spanish America contains thirteen millions of inhabitants; part of which population is employed in agriculture, particularly in Venezuela, Guatimala, Guayaquil, Chili, Carthagená, &c.; and many in the care of cattle, especially in the provinces of Rio de la Plata and part of Venezuela; while the inhabitants of several provinces of Mexico, Peru, and New Grenada, are almost wholly employed in working the mines. The Indians and Negroes have retained, in a great measure, their primitive customs; the Creoles have received theirs from the Spaniards. The Catholic religion being that of Spanish America, the church government and ecclesiastical dignities are the same as in the mother-country. The inquisition was also established in the new continent: all access to the Spanish settlements was not merely closed against foreigners, but even the inhabitants of the different provinces were prohibited from intercourse with one another. Commerce was exclusively carried on with Spain, and was almost entirely in the hands of Spaniards; about the end of the last century, however, some special licences were obtained from the viceroys and captains-general to trade with the Antilles, when communication with the mother-country was very difficult; and in 1797 the court of Madrid was obliged to allow some of the ports of Terra Firma to be opened for the advantage of commerce. Urged by similar motives, Cisneros, the viceroy of the provinces of Rio de la Plata in 1809, opened the ports of Buenos Ayres, that a free trade might be carried on with the nations in alliance with Spain.

The court of Madrid long maintained its power in the new continent, by a small number of Spanish troops, as the Creoles were cordially attached to the mother-country, and the Indians unable to free themselves; but about the middle of the last century, a plan of conspiracy was formed in Caraccas, with a view of destroying the company of Guipuscoa, to which the privilege had been granted of exclusively trading with Venezuela. The design was discovered, and the head of the conspiracy condemned to death. (See *CARACCAS and GUIPUSCOA*.) The oppressions of the repartimientos, and other grievances, gave rise also to the insurrection which took place in Peru in 1780. By the system of

the repartimientos, the Indians were obliged to receive their necessary supplies of goods, hardware, and mules from the corregidores (officers named by the king), at the prices they fixed, and on the credit they thought proper to give. In 1781, some reforms and additional taxes were introduced in New Grenada, in the province of Socorro, one of the most populous of the viceroyalty; but the province openly declared against these changes, and having assembled near 17,000 men, marched against Santa Fé de Bogota, exclaiming, "Long live the king, but death to our bad governors."

Some few Creoles and Spaniards, well acquainted with the principles laid down by the French politicians in the early period of the French revolution, and with those of the writers who preceded that period, formed a plan for revolution in Caraccas in 1797. They treated the Spanish government with contempt, and trusted to the protection of the English, in consequence of Mr. Pitt's well-known plan of giving independence to Terra Firma. The conspiracy was discovered, and the ostensible leaders made their escape; but one of them was afterwards apprehended and hanged. Sir Thomas Picton, governor of Trinidad, issued at this time a proclamation, in which he says, towards encouraging the inhabitants (of the continent near to Trinidad) to resist the oppressive authority of their government; "I have little more to say, than that they may be certain, that whenever they are in that disposition, they may receive all the succours to be expected from His Britannic Majesty, be it with forces, or with arms and ammunition to any extent; with the assurance, that the views of His Britannic Majesty go no further than to secure to them their independence, without pretending to any sovereignty over their country, nor even to interfere in the privileges of the people, nor in their political, civil, or religious rights." To assist the revolutionary party in Spanish America, the English cabinet is said to have paid the expedition of Miranda to Venezuela in 1806, and to have sent that of Whitelocke to Buenos Ayres in 1807, both of which failed. It is certain that the inhabitants of Spanish America have been long discontented, and that they have complained of various grievances to the court of Madrid. This court, however, knew how to answer petitions without redressing grievances. But Napoleon Bonaparte, when he became in fact master of the Peninsula, and possessor of the wealth of America by the influence he had in this court, having invaded the kingdom and seized the royal family of Spain, loosened those bonds which united the new to the old world, and gave rise to a revolution which, from the wide extent of the country in which it is seated, its character, and its consequences, is unparalleled in the annals of history. When Bonaparte had not only invaded the kingdom, but seized king Ferdinand, and assemblies under the denomination of "juntas" were established in various provinces of Spain, each assuming in its respective district the supreme authority, the Spanish Americans were perplexed and dubious as to the conduct which they ought to pursue. The moment for freedom seemed at length to present itself, after they had been wearied and exhausted by a series of sufferings for three centuries. However, Spanish America was still attached to the mother-country: and when it was announced at Caraccas, in July 1808, that Joseph Bonaparte had taken possession of the Spanish throne, the city was immediately in arms: 10,000 of its inhabitants surrounded the residence of the captain-general, and demanded the proclamation of Ferdinand VII. as their king: which he promised to do next day. But such was their ardour, that they proclaimed him that evening by heralds in form, throughout the city, and placed his portrait, illuminated, in the gallery of

VENEZUELA.

of the town-house. Some months after this wonderful display of attachment to the mother-country and its sovereign, many respectable families of Caracas concurred in presenting a petition to the captain-general, Casas, for permission to elect a junta similar to those in Spain. The petitioners indeed were arrested; but after a confinement of very few days they were released. About the end of July, 1808, Liniers, viceroy of Buenos Ayres, received intelligence of the events that had occurred in the Peninsula; and in a proclamation addressed to the people, he exhorted them, in the name of Bonaparte, to remain quiet. Xavier Elio, the governor of Monte-Video, accused him of disloyalty, and thus separated the country under his command from its allegiance to him, by forming a junta resembling those of Spain.

The news of the general insurrection in Spain reached Mexico on the 29th of July, 1808; and a junta was immediately established. La Paz, which was the capital of one of the districts under the dominion of the audiencia of Charcas, considering Spain too feeble to free herself from the power of the French, wished to provide for its own security; and, in the beginning of the year 1809, formed a government for itself, composed of many respectable persons, which was styled "junta intuitiva." The viceroy of Buenos Ayres sent an army to oppose this motion; and Goyeneche marched, by order of the viceroy of Peru, against La Paz, who succeeding, ordered numbers of the patriots to be ignominiously and cruelly executed. Quito, nevertheless, capital of the audience bearing its name, established a separate government, August 10th, 1809. But the viceroy of Santa Fé de Bogota hastened to destroy the junta of Quito by force of arms; and Abascal, the viceroy of Peru, did the same. The defenders of the junta were obliged to yield to superiority of force, receiving a promise from the Spanish president of Quito, that past events should be forgotten. But regardless of this promise, many patriots, amounting to more than 300, were murdered in cold blood. In 1810, the junta of Caracas commemorated the fate of these victims with funeral honours equally magnificent and solemn. Upon the dispersion of the central junta in Spain, and an illegal election of a regency, the inhabitants of Caracas resolved to try to obtain by force what reasonable representation had failed to gain for them. The municipal body, in conjunction with many persons named by the voice of the people, assumed the reins of government, and the appellation of "junta suprema." The acts of the junta were published in the name of king Ferdinand VII. The establishment of the junta of Buenos Ayres was effected with more tranquillity than that of Caracas. A junta was formed at Chili in September; and disaffection, occasioned in Mexico by violent measures, produced an insurrection, September 16th, 1810, in the town of Doleras, near Guanajuato; which insurrection soon extended through the whole country.

When the council of regency received intelligence of the proceedings at Caracas, by which the inhabitants declared themselves independent of the mother-country, and determined upon forming a governing junta to exercise this supposed independent authority, it resolved to adopt vigorous measures for preventing the progress of this evil; and, for this purpose, consulted the council of Spain and the Indies. Accordingly the regency declared the province of Caracas in a state of rigorous blockade. The measures now adopted evinced the prevalent spirit that actuated the Spanish Americans, though the different provinces were not acting in concert with each other. War seemed to be the wish of the merchants of Cadiz, and of the cortes that had been assembled by the regency; and various methods were used

to excite and encourage it. Its long continuance, and the savage manner in which it is prosecuted, evince the irreconcilable animosity of the contending parties. "The Spaniards fight for reconquering their once possessed territories, and the Spanish Americans to obtain independence: the first are cruel in the hour of triumph, and with adversity their enmity increases; the latter are courageous in attack, and, when defeated, ready to place confidence in their leaders, and to rally under their banners. The first possess great military skill; the latter, superiority of number. Both have uniformly shewn a firmness and decision in action suited to the high objects they have in view, and to the great obstacles they have to overcome. In these contests, the blood of thousands has already inundated an extent of country of more than 1600 leagues, which comprise the Spanish settlements in the new continent; and as if the mortality in the field of battle were not sufficient, numbers are daily murdered in cold blood."—"The Spanish chiefs and rulers, it is said, gave the first example of violating capitulations, of shooting prisoners, and of refusing all means of accommodation, in the cruel war carried on in the new continent, by the authority of the cortes of Spain, and by Ferdinand VII. The old Spaniards of either world must be altogether unable to find an excuse, or even a palliation, for their want of humanity, and breaches of faith, since the beginning of the revolution. The cruelty of the Spanish chiefs, and tokens of approbation on the part of the regency and cortes, have exasperated the newly-formed governments in Spanish America, and given strength to their decisions. At first the revolutionary spirit was confined to very few persons, but it soon spread through the whole continent. This sufficiently appears in the spirit and language of the act of independence published by the congress of Venezuela, July the 5th, 1811. Similar declarations to those of the congress of Venezuela were made in Mexico, and in Carthagena, Socorro, Tunja, Pamplona, Antioquia, and the other provinces, which composed the confederation of New Grenada, and more lately by the congress of Buenos Ayres."

When king Ferdinand, in his decree of the 4th of June, 1814, announced to the South Americans his return to his country, he ordered that they should lay down their arms; and this order was enforced by an army of 10,000 men, equipped at Cadiz, and placed under the command of Morillo. This army appeared on the coast of Venezuela in April, 1815. All hopes of reconciliation were now abandoned, and a revolt in Spanish America against Ferdinand VII. may be dated from this period. From Campano general Morillo proceeded to Margareta, and from thence to Caracas; and in the following August he besieged Carthagena. Although dissensions had occurred between Bolivar and Castello, both commanders of the South American forces, and lessened the means of defence which Carthagena possessed, the inhabitants, nevertheless, supported by nearly 2000 regular troops, prepared for a vigorous resistance. But provisions failed, and more than 3000 persons died of famine. On the 5th of December, 1815, the governor and garrison of Carthagena evacuated the place, and on the following morning the king's troops entered. General Morillo, thus possessed of Carthagena, was enabled to conquer New Grenada. He entered Santa Fé de Bogota in June, 1816, and remained there till November. More than 600 persons of those who composed the congress and provincial governments, as well as the chiefs of the independent army, were shot, hanged, or exiled; and the prisons were full of others waiting their fate.

The first decree of the junta suprema of Caracas, formed

April 19th, 1810, contained orders to arrest the captain-general, and the members of the audiencia, who were sent to the United States of America: it was decreed that the alcabala, or duty on selling any commodity, should be abolished, the tribute paid by the Indians, and the slave-trade; that freedom of commerce, agriculture, &c. should be established; and that these political changes should be made public, and communicated to the English government. Juntas were formed for similar purposes in different provinces. The regency of Spain was incensed, and it declared all the ports attached to the new government to be in a state of blockade; and orders were given for reducing Venezuela to its former subjection. When these orders proved ineffectual, spies and emissaries of every description were sent to all parts of Venezuela, for the purpose of effecting a counter-revolution. General Miranda reached the shores of Caraccas in the end of 1810, notwithstanding the instructions given by the junta suprema for opposing the return of the general to his native country, with a view of evincing the moderate plan of conduct which the junta had adopted towards Spain. A general congress met, and the plan of a confederation, as the best sort of government for Venezuela, was formed and adopted. Miranda, however, opposed it, and his conduct gave offence. In April, 1811, the congress nominated three persons, who were to constitute the executive power, which was very limited. Although several persons were secretly desirous of reunion with the mother-country, they durst not avow it, so earnest were the inhabitants of Caraccas for independence. The anniversary of the revolution, on the 19th of April, was kept with great rejoicings. A most alarming conspiracy was just ready to break out in June, 1811, but it was discovered and defeated. In the midst of the prosperity of Venezuela, it was visited, March 26th, 1812, by a most tremendous earthquake, which destroyed nearly 20,000 persons. The towns of Caraccas, La Guayra, Mayquetia, Merida, and San Felipe, were totally demolished; and Barquisimeto, Valencia, La Victoria, and others, suffered very considerably. At this crisis, general Miranda had the command of the army, and general Monteverde commanded the royalists. Caraccas at length fell under the power of the royalists; the republican army was disbanded; and Miranda, with many others, proceeded to La Guayra, intending there to embark for Carthagena. But Miranda was betrayed, and he, with nearly 1000 patriots, were thrown into dungeons at La Guayra and Puerto Cabello. In consequence of this disaster, Cumana and Barcelona acknowledged the authority of Monteverde; and other similar events occurring, the Spanish government resumed its authority in Venezuela. Vengeance filled the mind of Monteverde. The Spaniards thought, by destroying the inhabitants of Venezuela, the first province which had shaken off their yoke, to punish in them the insurrection of the whole southern continent. Every royalist became a public accuser; every prison was filled with patriots; and almost the whole population were under confinement. This conduct of the royalists, instead of conciliating, excited the hatred of the inhabitants; and the courage of those who were attached to the cause of independence revived. The province of Cumana first opposed the oppression of Monteverde; and here he was twice defeated. Don Simon Bolivar, one of the most distinguished natives of Caraccas, obtained from the congress of New Grenada near 600 men; and with these he felt confident that he should be able to conquer the enemies of his country. Bolivar, after a variety of prosperous adventures, was rapidly advancing towards Caraccas, where the inhabitants waited for him, as their

deliverer. A junta was assembled, and it was proposed to make proposals of capitulation to Bolivar. The general accepted the offered treaty, and granted leave to any person, who was desirous of it, to emigrate from Venezuela, and to withdraw his property. The articles of the treaty, though they were extremely liberal, were disapproved by the captain-general Monteverde, because it was derogatory to the dignity of the Spanish nation to treat with insurgents. Bolivar made his triumphant entry into the city of Caraccas, amidst the congratulations of the inhabitants, on the 4th of August, 1813. The dungeons of La Guayra were thrown open, and those who had survived a year's confinement were restored to their country and friends; while the people, shouting with joy, blessed their deliverer, at the sight of every individual who rushed from the prisons. In the midst of this popular ferment, none of the Spaniards were insulted. The provinces which formed the republic of Venezuela were again in the power of the patriots; but Monteverde obstinately persisted in refusing to treat with Bolivar. In the mean while, Monteverde received from Spain a reinforcement of about 1200 Spanish troops; and thinking himself warranted to act offensively, he attacked the republicans, but was completely defeated. Almost all the Spaniards were killed or taken prisoners, and Monteverde himself was severely wounded. After this defeat, Bolivar laid siege to Puerto Cabello both by sea and land. But the royalists retiring into the fortrefs, determined not to surrender. Bolivar, in invading Venezuela under the protection of the congress of New Grenada, had received orders to reinstate the republican congress; but this he did not think it advisable to do. Bolivar, however, having given an account of his intentions and operations, in the invasion of Venezuela, to an assembly that had been convened of persons of all ranks, resigned the supreme authority which he held. But the governor of Caraccas proposed, and his proposal was agreed to, that Bolivar, denominated the "Libertador de Venezuela," should be invested with dictatorial authority, till the reunion of the provinces of Venezuela to those of New Grenada, under the same representative form of government. The Spaniards, not being able to subdue Venezuela, determined to destroy it. Accordingly the slaves were to be raised in rebellion against their masters. The number of slaves in Venezuela amounted to 70,000; and one of the most formidable emissaries for this purpose was Boves, over whom Bolivar obtained a signal victory at La Vittoria. After gaining several other considerable advantages over the royalists, Bolivar considered himself as secure in the possession of Venezuela; and turned his attention to Coro and Los Llanos, whither the enemy had fled. But as the three divisions of the republican army were separated many leagues from each other, Bolivar was attacked by Boves on a plain called La Puerta, nearly 50 leagues from Caraccas, and, after many hours fighting, compelled to abandon the field to Boves. Other disasters also occurred, and from this time confusion reigned among the patriots, and there was no longer any army for the protection of Caraccas. Success no longer attended Bolivar; his former good fortune had forsaken him; and even the commander of his flotilla, which protected the coast, refused to obey his orders. Despairing of the independence of his country, he and a few of his chosen officers, who were willing to partake his ill fortune, embarked for Carthagena. From Carthagena he proceeded to the town of Tunja, where the congress of New Grenada was sitting; and he was commissioned by the congress to compel by force the city of Santa Fé de Bogota to acknowledge its authority. In this he succeeded; after which he was sent with 3000

men to reduce to allegiance the province of Santa Marta. Carthagena was to contribute troops and guns; but it was prevailed upon to refuse the demanded supply, under pretence of Bolivar's ambitious views, and his sanguinary career in Venezuela. Bolivar marched against Carthagena; but intelligence having been received of the expedition from Spain having reached this city, Bolivar gave up his plan, quitted the army, and his troops united to those of Carthagena to defend that city. The royalists entered Carthagena about four months after the siege had begun; but in the mean while, Bolivar, who had gone to Jamaica, proposed to assist Carthagena by landing an expedition on her shores. The capture of Carthagena prevented the execution of his plan, and he again turned his attention to Venezuela. Stimulated by the hopes of once flattering prospects, Bolivar planned an expedition for assisting the efforts of the patriots of Margareta; and joining Borion, an affluent native of Curaçoa, assembled the emigrants from Venezuela, and part of the garrison which had evacuated Carthagena. Borion was appointed commander of the maritime forces, which were to be employed on this occasion. Sailing from Aux Cayes at the end of March, 1816, they landed in the beginning of May at La Margarita. From Margarita Bolivar failed for Carapano, about five leagues west of the town of Cumana, of which he dispossessed the royalists; and having armed many of the corps of guerillas, who had advanced to join him, they failed for Ocumara. When he landed at Ocumara, he issued a proclamation, giving liberty to the slaves. This proclamation, dated July 6th, 1816, does honour to his judgment and feelings. "Your tyrants," says he, "shall be destroyed or expelled, and you shall be restored to your rights, your country, and peace."—"No Spaniard shall be put to death, unless in battle. No American shall suffer the least injury for having joined the king's party, or for having committed acts of hostility against his fellow-citizens."—"That unhappy portion of our brethren, which has groaned under the miseries of slavery, is now set free. Nature, justice, and policy, demand the emancipation of the slaves: henceforward there shall be only one class of people in Venezuela—all shall be citizens."

Bolivar, who after the defeat at Ocumara had returned to Aux Cayes, brought new reinforcements to Margarita, where he landed in December, 1816. There he published a proclamation, convoking the representatives of Venezuela to a general congress; and went afterwards to Barcelona, where he organized a provisional government. In this place he repulsed the royalists under Real and Morales, in February or March, with great loss. Although the patriots lost the town of Barcelona on the 7th of April this year (1817), and the royalist forces in Venezuela received an addition of 1600 men from Spain in May last, it is now (August) reported, that Bolivar has succeeded in completely establishing the republic of Venezuela.—Travels in South America, by Depons, in 2 vols. 1807. Outline of the Revolution in Spanish America, by a South American, 1817.

VENEZUELA. See CORO.

VENGAMBOOR, a town of Hindoostan, in Myfore; 17 miles S.E. of Erroad.

VENGAPALEAM, a town of Hindoostan, in Myfore; 11 miles N.N.W. of Daraporum.

VENGOLINA, in Ornithology, an African bird, which seems not to have been described by any of the ornithologists. According to the Hon. Daines Barrington's account, it is of the *finch* tribe, and about the same size with our aberdavine, or fiskin; the colours are grey and white, and the cock hath a bright yellow spot upon the rump; it is a very

familiar bird, and sings better than any of those which are not European, except the American mocking-bird. Phil. Transf. vol. lxxiii. part ii. p. 254.

VENHUYSEN, in Geography, a town of Holland; 4 miles S.W. of Enckhuysen.

VENIA, among our *Ancient Writers*, denotes a kneeling, or low prostration, to the ground; used by penitents. See GENUFLEXION.

Walsingham, p. 196. "Rege interim prostrato in longa venia. Per venias, centum verrunt barbis pavementum."

VENIAL, a term in the Romish *Theology*, applied to slight sins, and such as easily obtain pardon.

In confessing to the priest, people are not obliged to accuse themselves of all their venial sins. The thing that gives the greatest embarrass to the Romish casuists is, to distinguish between venial and mortal sins. See POPERY.

The reformed reject this distinction of venial and mortal sins; and maintain, that all sins, how grievous soever, are venial; and all sins, how slight soever, may be mortal: and the reason they urge is, that all sins, though of their own nature mortal, yet become venial, or pardonable, by virtue of our Saviour's passion, to all such as fulfil the conditions on which it is offered in the Gospel. To which the Romanists answer, that the chief of these conditions is confession.

VENICE, in Geography, a city of Italy, and for a long time the capital of a republic. This city makes a very grand appearance at a distance, as seeming, from its being built on a multitude of islands, to float on the sea; or rather, with its stately buildings and steeples, as it were, rising out of it. The number of these islands is uncertain: some reckoning 60, others 72, and others again making them amount to 138. The Laguna, or marshy lake, which lies between the city and the continent, and is five Italian miles in breadth, is too shallow for large ships; but, by the attention of the republic, was prevented from becoming part of the continent, and from being ever frozen so as to bear an army. Towards the sea, the access to the city is also difficult; but the safe and navigable parts are indicated by piles; which, at the approach of an enemy's fleet, can be cut away. Besides, as a considerable number of galleys and men of war could be fitted out very expeditiously for sea from the docks, which contained vast quantities of naval stores, the city was strong without fortifications. The fish, caught even at the very doors of the houses, might be reputed a good preservative against famine. The return of the sea is sometimes later here than every sixth hour, and it generally rises between four and five feet, keeping the water between the islands of the city in continual motion. Some of the canals being very narrow, the mud is not so effectually carried off as to prevent ill smells in hot weather. The great canal, which winds through the city, and divides it into two parts, is 1300 paces long. The best way of going up and down the city is in gondolas, which, indeed, strike the eye with a mournful appearance, being all lined either with black cloth or serge, or painted black. Over the several canals are laid four hundred and fifty (some say upwards of five hundred) bridges, great and small, and the better part of them stone: the highest and longest is the Rialto. (See BRIDGE.) The city may, indeed, every where be traversed on foot; but the streets are very narrow, and the free-stone pavement very slippery in wet weather. The many small bridges, with their steps, are also not a little troublesome. The whole city is said to be six Italian miles in circumference; and to make the tour of it in a gondola, takes up somewhat more than two hours. Venice contains seventy parish-churches, besides others, fifty-four convents

of monks, twenty-six nunneries, seventeen rich hospitals, eighteen oratories, forty religious fraternities with their chapels, and fifty-three squares. The buildings, indeed, are all of stone; but the greater part mean, without beauty or elegance. St. Mark's square, it is true, is very fine, and so are the several stately marble palaces that border upon the grand canal, though most of them are of Gothic architecture. In the churches and convents, the most admirable parts are the paintings; and indeed Venice, highly renowned for fine paintings, is said, in this very respect, to have surpassed even Rome itself. Venice, from the fertility of its neighbourhood, and the facility of carriage, enjoys a constant plenty. The spring-water being very indifferent, almost every house has a cistern, into which the rain-water is conveyed from the roof, and clarified by being filtrated through sand. Water is also brought from the river Brenta, and preserved in cisterns. Among the diversions of Venice, the carnival is accounted the chief: it usually begins the second day of Christmas, and continues till Shrove-Tuesday; consisting chiefly of masquerades and *ridottos*: St. Mark's place is the general rendezvous. Other diversions are plays and operas. The trade in cloth, especially scarlet, silk goods, and looking-glasses, is still very considerable. Here also gold and silver stuffs are manufactured; which, although not so beautiful as those of France, have a very good sale in the Levant. The brocatellas, a kind of stuff like brocade, made of coarse silk, are much used for carpets. Venice is divided into six parts, called *Sestieri di Sestiera*. S. Marco contains the piazza di S. Marco, with the adjacent buildings. This square, the pride of the city, forms a right angle, the shortest side of which, two hundred and forty paces long, and seventy-five broad, reaches along the ducal palace. The ducal palace, towards the water-side and St. Mark's place, is entirely Gothic; but on the side of the small canal, and in the court, of modern architecture, and mostly of marble. It not only served for the residence of the doge, but also for the meeting of the council. The finest ornaments of the council-chamber and other apartments, are the paintings of famous ancient masters. In one side of the palace, towards the canal, Rio di palazzo, were dark prisons, strongly secured with iron grates. The lower gallery, or arched walk, on the side of St. Mark's square, together with the opposite hall, is called Broglio. Here, at a certain hour of the day, the nobles took their walks, and at this time no Venetian of an inferior rank must be seen on it; though a foreigner, as supposed unacquainted with the custom, is not desired to quit the place. Between these two buildings and the piazza were two pillars of Oriental granite, on one of which stood St. Mark's lion in brass, and on the other a marble statue of St. Theodore. Between these is the place for the public execution of malefactors, through which no nobleman is ever seen to pass. A galley, completely rigged and armed, lay close to the Broglio, for the defence of the ducal palace on any sudden emergency. Contiguous to the north part of the doge's palace is St. Mark's church, also styled the doge's chapel. Its materials justify it to be called magnificent, being, both on the out and inside, covered with fine marble; but the architecture is entirely Gothic. The best part of it consists of the Mosaic paintings, and the four brass horses, formerly gilt, standing over the great door, and said to have been brought here from Constantinople. In the church treasury is kept a very famous manuscript of the gospel of St. Mark, pretended to be autographical; but the dampness of the place where it lies has spoiled it to such a degree, that no part of it is any longer legible, and it is not so much as certain whether it be written in Latin or Greek. In the *Sestiera di Castello* is the arsenal or dock,

two Italian miles and a half in circuit, walled and moated in, with twelve towers along its walls; and within the inclosure a great variety of buildings, in which every thing requisite for a land or sea armament is kept in readiness; with shops, store-houses, and basons and slips for ship-building, &c. Within it lie the men of war, frigates, galleys, and other vessels, with the Bucentauro, which is also laid up here. In the *Sestiera di Canale Regio* is the theatre, and in this quarter the Jews live, to the amount of fifteen hundred, who must wear a scrap of red cloth in their hats, by way of distinction from Christians. *Sestiera di S. Pavolo* contains the exchange, the bank, &c. On the invasion of Italy, in the fifth century, by the Huns, under their king Attila, and the general desolation that every where appeared, great numbers of the people who lived near the Adriatic took shelter in those islands where now stands the famous city of Venice; and which islands, about the year 421, particularly Rialto, had, in some measure, been built upon by the Paduans, for the advantage of commerce. (See VENETIA.) Here having settled their small places or states, they were at first governed by consuls; afterwards by tribunes; and formed a kind of republic, the council of which was represented by the persons of these magistrates. These islands became still better inhabited on the succeeding incursions of the Goths and Longobardi into Italy; multitudes from Rome and other large cities repairing thither, so that this state became soon able to make some head against these bold invaders. At length the chiefs of the islands and the Longobardi came to an agreement, by which the former were to remain unmolested. This was the commencement of the city and state of Venice. About the beginning of the eighth, or end of the seventh century, the former government of these islands was abolished, and an unlimited power conferred on Paulucio Anafesto, with the title of duke. Under this sovereignty the state greatly increased, till the people, justly becoming weary of the ills of domestic despotism, chose, in the year 1171, another duke, but curtailed his power, by assigning him a council of 240 persons, composed of commons as well as nobles. Duke Ziani sided with pope Alexander III. against the emperor Frederick, and obtained over him such a signal victory at sea, that the pope presented him with a ring, which he was to drop into the Adriatic, as a sign of his marriage with, and perpetual sovereignty over it. The Venetians, who had already extended their dominion into Istria, Dalmatia, Syria, Lombardy, and other places, made a very considerable acquisition in the beginning of the thirteenth century, by possessing themselves of the principal islands in the Archipelago and Mediterranean, particularly that of Candia. From this time they alone carried on, at an immense profit, the trade for East India goods, which they imported from Alexandria, in Egypt, to which place they were brought across the Red sea, and by the way of Suez. Under duke Marino Morosino was introduced the form of electing the doge; and it was at this juncture that jealousy and envy fomented the war with Genoa, which, after continuing 130 years, was at last put an end to by a treaty, in 1381. During this war, duke Peter Grandonigo, in the year 1296, ordained that the nobility alone should be capable of sitting in the grand council. Thus the government became aristocratical. In the 14th century, the Venetians extended their possessions in Lombardy; and, in 1473, the last king of Cyprus appointed the state of Venice his heir. Towards the end of the 15th century, the Venetian commerce, and consequently power, began to decline, when the Portuguese discovered a route by sea to the East Indies, which opened the trade to all nations. In the 16th century, the pope, the emperor, France, and Spain, joining in a league against them, they

VENICE.

were dispossessed of all their towns and places in the kingdom of Naples, the ecclesiastical state, and the Milanese. They received another severe blow from the Turks, who drove them out of the island of Cyprus. In the 17th century a sharp contest arose between the state, the clergy, and the pope, in which, however, they had the advantage. They were also long engaged in troublesome wars with the Turks, losing Candia, and gaining part of Dalmatia, and all Morea; but the greater part of these have been lost in succeeding wars. Thus the republic of Venice continued upwards of 1300 years, amidst many foreign wars and intestine commotions. Its grandeur was chiefly owing to trade and liberty; and since the decline of the former, its strength and consequence must have suffered a considerable diminution. The power was lodged in the hands of the nobility, said to be near 2000, including those whom public employments in the provinces obliged to reside out of Venice. On the birth of a nobleman's son, his name was entered in the golden book, otherwise he forfeited his nobility. Every noble was, indeed, a member of the senate; and on this account it was a received maxim, that they all were equal in dignity. But the difference, notwithstanding, between the interest and authority of families, was very considerable. To the first class belonged the ancient houses, whose ancestors chose the first duke, and who, from thence, were called "Le Case Eletterali;" and on them, preferably to others, were conferred the higher offices. Next follow eight houses, almost as ancient. The second class had its origin from the Serrar del Consiglio; duke Grandonigo having passed a law that the council should perpetually consist of the families which then composed it, and some others which he ennobled. This produced a second class of nobility, who, accordingly, were then registered in the golden book. It consisted of upwards of eighty families, and some of great wealth and reputation. With these were also included families raised to nobility after the Genoese war, on account of their large contributions towards carrying it on with vigour. The third and last class was composed of the Cittadini, or citizens, whose nobility was purchased for 100,000 Venetian ducats, a resource of the republic for raising money in necessitous times. Crowned heads, German and other princes, have not thought it any degradation to be made nobles of Venice. The habit of the nobility, whilst at Venice, was a black furred gown, reaching to their heels, with a belt about three inches broad, and plated with silver. Instead of hats they had long caps. The head of the republic was the doge, or duke, who, on the demise of the former, was chosen in a peculiar manner, by forty-one nobles, selected for this purpose by a process which it is needless to describe. These forty-one electors were confirmed by the grand council; and, being shut up in a chamber of the ducal palace, there remained till they had chosen a new doge. To the due and legal election of a doge, it was required, that out of the forty-one he should have twenty-nine votes. His election was followed by a kind of coronation; the ducal cap being placed with great ceremony on his head. This was performed at his public entrance into St. Mark's church. His yearly income was 12,000 Venetian ducats. He was subject to a variety of restrictions; and he was under the inspection and controul of the council of ten, who kept a watchful eye over his whole administration, and, at any time, could come and search his most private apartments. In general, his authority, essentially considered, was no greater than that of a private person, unless he could influence the whole council. On his death a formal inquiry was made, whether he had abused his power; whether, from a care of his own concerns, he neglected those of the pub-

lic; whether he lived agreeably to his dignity, &c. If found guilty of any thing alleged to his charge, his heirs were fined in proportion to the nature of the crime. On Ascension-day, the doge, or, in case of illness, the vice-doge, performed the annual frivolous ceremony of marrying the Adriatic sea. (See DOGE.) In the grand council, all nobles of the age of twenty-five years might take their place, though some younger found means to obtain admittance. The senate, or *pregadi*, were a committee of the grand council, by whom they were also chosen. This senate had the management of the most secret and important state affairs, as the making alliances and peace, declaring war, sending ambassadors, coining money, filling up offices, imposing taxes, &c. Next was the collegium, in which all public instruments directed to the state and doge were read, audiences given to foreign ministers, and other matters of importance transacted. The procurators of St. Mark had not only the inspection of the church of St. Mark, its library, and the records of the republic, but likewise managed all affairs relating to the poor, together with wills, guardianships, redemption of Christian slaves, and bringing over-rigid creditors to a reasonable composition. Their number never exceeded nine: their office was of great authority, and during life; and out of them the doge was generally chosen. Titular or extraordinary procurators of St. Mark were more numerous; the republic gladly selling these titles in a public scarcity of money. Il consiglio di dieci was a high penal court, which consisted of ten counsellors, the doge, who was president, and his six consiglieri. The established religion was the Roman Catholic; but Greeks, Armenians, and Jews, were allowed the public exercise of their worship, and Protestants, observing privacy, remained unmolested. The patriarch of Venice, the chief ecclesiastic of the republic, was chosen by the senate; and though confirmed by the pope, must, in all other respects, be independent of the papal chair. The territories of the republic were under governors chosen out of the nobility, changed at the expiration of a certain term of years. The annual revenue of the republic was computed at 8,200,000 ducats, and was under the direction of three *governatori dell' Entrate*. In war-time, both the nobles and the other subjects, even the doge, contributed, proportionably to their incomes, towards defraying the public expences. The states of Italy subject to the Venetians were the Dogado, the Paduan, the Polesine di Rovigo, the Veronese, the Vicentin, the Bressan, the Bergamasco, the Cremasco, the Trevigiano, the Feltrin, the Bellunese, the Cadornin, great part of Friuli and Istria; to these may be added a part of Dalmatia, the islands of Corfu, Zante, Cephalonia, and some others. The number of inhabitants in the city of Venice was estimated at 160,000, and, of the whole state, at 2,500,000. In the year 1797, in consequence of some partialities which the Venetians shewed to Austria, the French attacked and made themselves masters of the city. By the peace of Luneville, Venice with its dominions was given to Austria; but by the peace of Presburg transferred to the new kingdom of Italy. In December 1807, prince Eugene Napoleon was created prince of Venice by the emperor Napoleon.

Venice has always been renowned for its cultivation of the fine arts, and for giving birth to great professors, particularly in painting, architecture, and music. At the head of the first, Titian, Paul Veronese, and Tintoret; of the second, Palladio and Scamozzi; and of the third, Zarlino, Lotti, Marcello, and Galuppi; names that can never be heard without pleasure by the votaries of those arts. Printing, too, has been carried on at Venice with great spirit ever since the year 1459, when it was established there by

Nicholas Jansen; and in the beginning of the next century, pursued by the Aldi with more accuracy than in any other part of Europe.

But Venice has long manifested its attachment to music by the establishment of its conservatorios, or musical schools, of which it has four; the Ospidale della Pietà, the Mendicanti, the Incurabile, and the Ospidaleto a S. Giovanni e Paolo; at each of which there is a performance every Saturday and Sunday evening, as well as on great festivals. The performers at them all, both vocal and instrumental, are females: the organs, violins, flutes, violoncellos, and even French horns and double-basses, are supplied by these females. See CONSERVATORIO.

Though the composers of the Venetian school are, in general, good contrapuntists, yet their chief characteristics are delicacy of taste and fertility of invention; but many circumstances concur to render the music of Venice better, and more general, than elsewhere. The Venetians have few amusements but what the theatres afford; walking, riding, and all field-sports, are denied them. This in some degree accounts for music being so much, and in so costly a manner, cultivated; the number too of theatres, in all which the gondoliers have admission gratis, may account for the superior manner in which they sing, compared with people of the same class elsewhere. And in the private families, into which the girls of the conservatorios marry, it is natural to suppose that good taste and a love for music are introduced.

Venice, in 1639, was the first city in Italy that opened public theatres for the performance of operas; and in less than a century from that period, 658 musical dramas were brought on the several stages of that city, the chief part of which were produced by natives of the Venetian state. In the last century, not only the poetry and music of the lyric theatre were greatly superior to those of preceding times, but the performers; for at Venice all the great vocal talents to which the opera had given birth, were more constantly summoned, patronised, and cherished, than in any other city of Europe.

Accounts are kept at Venice in lire of 20 soldi or marchetti; and each foldo is divided into 12 denari di lira. They are also kept in ducats of 24 grossi; and the grosso is divided into 12 grossetti, or denari di ducato. A ducato of account is worth $6\frac{1}{2}$ lire, or 124 marchetti. The gold coins of the old republic are zecchini, or sequins, with halves and quarters. The sequin is commonly reckoned at 22 lire, but its agio fluctuates, and in the year 1805 it was 37 *per cent*. The silver coins are the scudo Veneto, or della croce, of 12 lire 8 soldi, and halves and quarters in proportion; the ducato, or giustina, of 11 lire; the ducato effettivo of 8 lire, with halves and quarters; and base silver pieces of 30 soldi, called lirazze, and of 20, 15, 10, and 5 soldi. There are pieces of 10 lire, which were coined in 1796. The copper coins are soldi and half soldi, or bagattini.

When Venice became subject to Austria, in 1797, a base silver money was introduced, called moneta provinciale, which, in 1802, was declared to be out of currency; and a new coinage took place, consisting of pieces of $1\frac{1}{2}$, 1, and $\frac{1}{2}$ lira, or, in Austrian money, of 18, 12, and 6 creutzers, which contained only a fourth of fine silver, but they were heavier than the former coinage. This money was called "moneta di nuovo stampo." The Austrian government also introduced copper pieces of 6 and 3 creutzers, or 10 and 5 soldi, and pieces of 2 and 1 soldi. All the above-mentioned monies and coins are now valued in "moneta piccola," which is the effective currency of Venice.

The bank of Venice was instituted in 1587; its original capital being five millions of ducats. The owners received no

interest for their money, but could draw it out on demand or transfer it in payment, like the banks of Amsterdam, Hamburg, and other banks of deposit. Bills of exchange were mostly paid in banco, and also wholesale bargains of merchandize above 300 ducats. The bank received no money but sequins and silver ducats. The bank of Venice was in high credit and prosperity from its first institution to the year 1797, when the French seized upon the city, and ceded it to Austria; from this period it declined. In 1805 Venice was incorporated with the kingdom of Italy; and in 1808, the bank was totally discontinued.

According to the rate of coinage at Venice, $68\frac{3}{4}$ sequins are to contain a Venetian mark of fine gold, with a very small, but uncertain, quantity of alloy. No remedy was allowed at the mint of Venice, either in the weight or fineness of its coins. The Venetian sequin, weighing nearly 54 English grains, is therefore worth 9s. 6d. sterling. The silver ducat weighs $351\frac{1}{2}$ English grains, and is 9 oz. $18\frac{1}{2}$ dwts. fine, which gives its value at $40\frac{1}{2}$ d. sterling; hence the ducat of account of $6\frac{1}{2}$ lire piccola is worth $31\frac{1}{2}$ d. nearly, and the lira about 5d. sterling; or, more exactly, 1l. sterling = 47 lire 8 soldi piccoli. But taking the value of the lira from the coinage introduced by the Austrian government, it will be found worth about $4\frac{1}{4}$ d.; and 1l. sterling = 56 lire $9\frac{1}{2}$ soldi piccoli.

Venice has two different weights for merchandize, *viz.* peso grosso, or large weight; and peso sottile, or small weight: the pound of the former is divided into 12 oz. and 192 carats, in all 2304 carats; and the pound of the latter into 12 oz. and 144 carats, in all 1728 carats. The pound peso grosso weighs 19 oz. peso sottile; hence 12 lbs. peso grosso = 19 lbs. peso sottile; and 18 lbs. peso grosso, or $28\frac{1}{2}$ peso sottile = 19 lbs. avoirdupois. A carica is 400 lbs. peso sottile. The ounce for weighing silk and thread is divided into six faggi or fazi, and these into halves, quarters, &c. Oil is sold either by weight or measure: a miglajo weight contains 40 miri, each 25 lbs., in all 1000 lbs. peso grosso. A miglajo measure should contain 1210 lbs., or 40 miri, each $30\frac{1}{4}$ lbs. peso grosso: such a miro answers to about $4\frac{1}{4}$ English gallons. The amphora, a wine measure, contains 4 bigoncio; a bigoncia, 4 quartari, 16 secchie, or 256 lbs. peso grosso; but a bigoncia of brandy is only 14 secchie.

Two sorts of long measure are used at Venice, both of which are called the braccio; that for woollens is $26\frac{3}{8}$ English inches, and that for silks is $24\frac{5}{8}$ English inches. The Venetian foot is 154 French lines, or $13\frac{2}{3}$ English inches; hence 36 Venetian feet = 41 English feet.

Venice exchanges with London 50 lire piccola, more or less, for 1l. sterling, at three months' date. The usance for bills drawn from London is three months after date. Bills are allowed six days grace, after which they must be either paid or protested. Protests are made by the fanti or clerks of the commercial college, who enter all the bills they have protested in a book, to which every merchant has free access. Thus many bills, which would otherwise be returned, are accepted and paid for the honour of the drawer or indorser. This practice is likewise useful in giving early notice of approaching insolvency. (Kelly's Un. Cambist.) Venice is situated 216 miles N. of Rome. N. lat. $45^{\circ} 28'$. E. long. $12^{\circ} 18'$.

VENICE, *Gulf of*. See ADRIATIC.

VENICIUM, in *Ancient Geography*, a town in the interior of the isle of Corsica, according to Ptolemy.

VENICNII, a people who inhabited the western coast of Hibernia. Ptol.

VENICNIUM PROMONTORIUM, a promontory on the northern coast of Hibernia. Ptol.

VENICONTES, a people of Britain, S. of the Caledonii to the W. whose town was Orrea. Ptol.

VENIERO, DOMENICO, in *Biography*, an Italian poet, was born of a noble family at Venice in 1517; and after receiving a good education, and being introduced to the friendship of Bembo, and having been thus led into the way of advancement to honourable and lucrative stations, he lost the use of his limbs at the age of thirty-two, and was confined to his chamber for life. In this condition he sought solace from poetry and the conversation of his learned friends, who in great numbers resorted to his house. These meetings laid the foundation of the celebrated Venetian academy, of which Veniero was the principal ornament. Notwithstanding the pain which he experienced, his poems are distinguished by liveliness of imagery and force of expression. He died in 1582, at the age of sixty-five. His poems were first printed in the collections of Dolce and Ruccelli; and they were edited at Bergamo in 1751 and 1753, with those of his nephews, Maffeo and Luigi Veniero, the former of whom was archbishop of Corfu. Their father Lorenzo was also a poet. Gen. Biog.

VENIRE FACIAS, in *Law*, is a judicial writ, lying where two parties plead, and come to issue; directed to the sheriff, to cause twelve men, of the same neighbourhood, to meet to try the same, and recognize the truth upon the issue taken.

Afterwards a compulsive process is awarded against the jurors, called *habeas corpora juratorum*, or *distringas*, that they may appear upon the day appointed. See JURY.

VENIRE *Facias* is also the name of a writ, which is the proper process in an indictment for any petty misdemeanor, or on a penal statute, and which is in the nature of a summons, to cause the party to appear. And if by the return to such *venire* it appears, that the party hath lands in the county by which he may be distrained, then a *distrains infinite* shall be issued from time to time till he appears. But if the sheriff returns that he hath no lands in his bailiwick, then, upon his non-appearance, a writ of *capias* shall issue; and if he cannot be taken upon the first *capias*, a second and a third shall issue, called an *alias*, and a *pluries capias*.

VENIRE *Facias tot Matronas*. See VENTRE *Inspiciendo*.

VENISON, VENAISON; the flesh of beasts of game, or of animals to be caught in the way of game, *i. e.* by hunting, &c, as deer, hare, &c.

The word is French, *venaison*; formed of the Latin *venatio*, hunting.

The old huntsmen have determined, that every beast of the forest, that is food for man, is venison. In many parts of the world the bears are as regularly hunted as the hare and buck, &c. are with us, and there are called venison; but with us, at present, the word venison seems limited to the flesh of the hart, the hind, the buck, the doe, and the other creatures of that kind.

Some have extended the signification of the word to the beasts of the forest which were chased as game, and afforded the diversion of hunting, whether their flesh were eaten or not; thus, in some places, the wolf and the fox are reckoned among the venison beasts.

VENIUS, or VAN-VEEN, OTHO, in *Biography*, was of a distinguished family in Holland, and was born at Leyden in 1556. He received an excellent education from his parents, and though his progress in literature was unusual, yet he was permitted to pursue his desire of becoming a painter. He received lessons in design from Isaac Nicholas, but is more indebted to John Van Winghen. The war in the Low Countries drove him to Liege at the age of fifteen, and there he continued to prosecute his studies in literature

and the arts. He acquired the favour of cardinal Grosbeck, at that time prince bishop of Liege, who, desirous of his advancement, advised him to visit Rome, and furnished him with letters of recommendation to cardinal Marduccio, then in that city. On his arrival there he was kindly received and entertained by his eminence, and he became a disciple of Fred. Zucharo, by whose instructions, and his own industry in studying the beautiful works of antiquity with which he was surrounded, he acquired a very great degree of correctness in design, and a more elevated taste than his countrymen usually exhibited in their works.

Having devoted seven years to his studies in Italy, he visited Germany, where he staid some time, and received a flattering invitation to remain in the court of the emperor; but his desire to revisit his native country prevailed, and he declined this honourable proposal. As he passed through Munich and Cologne, he was employed by the duke of Bavaria and the elector; and on his arrival at Brussels, the governor, Alexander Farnese, appointed him his principal engineer and painter, and sat to him for his portrait.

After the death of his patron he established himself at Antwerp, where he was much engaged in painting historical works for the churches, &c. and gained a great reputation; which has not been diminished by his having had for his disciple so renowned an artist as Rubens.

When the archduke Albert was appointed governor of the Netherlands, Otho Venius made the designs for the triumphal arches erected on his entrance, with which the archduke was so much gratified, that he invited him to Brussels, and appointed him his principal painter, and master of the mint, which situations he occupied till his death in 1634, at the age of 78.

Otho Venius did not confine himself to painting, he wrote and published several works adorned with prints, chiefly engraved by his brother, Gilbert Venius, from his designs. Among them are, a translation of part of Tacitus; Horace's Emblems, with notes and observations; the Life of Thomas Aquinas; and the Emblems of Love, divine and profane.

VENIZY, in *Geography*, a town of France, in the department of the Yonne; 3 miles N. of St. Florentin.

VENLO, a town of France, in the department of the Lower Meuse, late the duchy of Guelderland, situated on the E. side of the Meuse, takes its name from the two Flemish words *Veenen* and *Loo*, which signify a low meadow. Before the year 1343, it was only a small town, when Renaud II. duke of Gueldres, fortified it, and gave it the title and privileges of a city. It has only one parish-church, which is dedicated to St. John. After several changes of possessors, it was ceded, in 1715, to the States-General by the barrier treaty. In this town was made the first trial of bombs, about 1588; and they were first used by Alexander Farnese, duke of Parma, at the siege of Watchendonck, not long after. In 1794, it was taken by the French; 12 miles N.N.E. of Ruremond. N. lat. 51° 27'. E. long. 6° 2'.

VENNO, a town of the republic of Lucca; 5 miles S.S.W. of Lucca.

VENOE, a small Danish island, in the gulf of Lymford. N. lat. 56° 34'. E. long. 8° 38'.

VENOM, VENENUM. See POISON.

The terms *venom* and *poison* only differ from each other in this, that the latter is more frequently used where the noxious matter is taken inwardly, as in foods, drinks, &c.; and the former, where it is applied outwardly, as in stings and bites of serpents, scorpions, vipers, spiders, &c.

The pike is said to have a venomous tooth. All venomous beasts, in the general, have that quality in a greater degree, when

when bred in mountains and dry places, than when in wet and marshy places; and the southern more than the northern; those hungry and enraged, more than others; and all of them in summer more than winter. See VIPER.

VENONIS, in *Ancient Geography*, a town of Britain, in the 9th Iter of Antonine, situated between Ratis or Leicester, at the distance of 12 miles from it, and Bannavantium near Daventry; supposed to be the present Cleycester.

VENOSA, CARLO GESUALDO, *Prince of*, in *Biography*, a Neapolitan nobleman, whose fame has been extended by his musical productions more than by his high rank, though this rank will be found reciprocally to have added lustre to the compositions, was nephew to cardinal Alfonso Gesualdo, archbishop of Naples, and had his title from the place which gave birth to Horace, the Venusium of the ancients. Pomponius Nenna, a voluminous and celebrated composer of madrigals, had the honour to instruct him in music. His productions consist of six sets of madrigals for five voices, and one for six. The principal editor of his works was Simone Molinaro, maestro di capella at Genoa, who, in 1585, published the first five books in separate parts; and, in 1613, the same madrigals, with the addition of a sixth book, in score.

The numerous editions of these madrigals in different parts of Europe, and the eulogies bestowed on the author by persons who rank high in literature, as well as music, made us extremely curious to see and examine them. Gerard Vossius, Bianconi, Bap. Doni, Taffoni, and many others, speak of him as the greatest composer of modern times; as one who, quitting the beaten track of other musicians, had discovered new melodies, new measures, new harmonies, and new modulation; so that singers, and players on instruments, despising all other music, were only pleased with that of this prince.

Taffoni tells us, that James I. king of Scotland, had not only composed sacred music, but invented a new species of plaintive melody, different from all others; "in which he has been imitated by the prince of Venosa, who, in our times, has embellished music with many admirable inventions."

This passage in Taffoni, which has so often been cited by Scots writers, seems to imply, not only that James, king of Scotland, had invented a new species of melody, but that his melody had been imitated by the prince of Venosa; at least, this is the sense in which the passage has been understood by the natives of Scotland, and indeed by ourselves, till, on finding no kind of similarity between the national tunes of North Britain and the melodies of the prince of Venosa, we examined the passage anew, with more attention; when it appeared to us as if Taffoni's words did not imply that the prince of Venosa had *adopted* or *imitated* the melodies of king James; but that these princely dilettanti were *equally* cultivators and inventors of music. See DAVID RIZZIO, *SCOTS Tunes*, and OSSIAN.

The Neapolitan prince seems to merit as little praise on account of the expression of words, for which he has been celebrated by Doni, as for his counterpoint; for the syllables are constantly made long or short, just as it best suited his melody; and in the repetition of words, we frequently see the same syllable long in one bar, and short in another, or the contrary; by which it is manifest that their just accentuation was never thought of.

The remarks of Taffoni certainly must have been hazarded either from conjecture or report; as is but too frequently practised by men of letters, when they become musical critics, without either industry or science sufficient to verify their assertions.

The prince of Venosa was perpetually straining at new expression and modulation, but seldom succeeded to the satisfaction of posterity, however dazzled his contemporaries may have been by his rank, and the character he bore among the learned, who so frequently get their musical information from tradition, that whether they praise or censure, it is usually *sans connoissance de cause*.

Dilettanti usually decide in the same summary way, with an additional prejudice in favour of their own little knowledge, and a disposition to censure whatever they are unable to acquire, be it science or execution.

Cicero has long since said, that "it is not with philosophy and science, as with other arts; for what can a man say of geometry or music, who has never studied them? He must either hold his tongue, or talk nonsense."

With respect to the *excellencies* which have been so liberally bestowed on this author, who died in 1614, they are all disputable, and such as, by a careful examination of his works, he seemed by no means entitled to. They have lately been said to consist in "fine *contrivance*, *original harmony*, and the *sweetest modulation conceivable*." As to *contrivance*, it must be owned that much has been attempted by this prince; but he is so far from being happy in this particular, that his points of imitation are generally unmanageable, and brought in so indiscriminately on concords and discords, and on accented and unaccented parts of a bar, that, when performed, there is more confusion in the general effect than in the music of any other composer of madrigals with whose works we are acquainted.

His *original harmony*, after scoring a great part of his madrigals, particularly those that have been the most celebrated, is difficult to discover; for had there been any warrantable combinations of sounds that Palestrina, Luca Marenzio, and many of his predecessors, had not used before him, in figuring the bases, they would have appeared. And as to his *modulation*, it is so far from being the *sweetest conceivable*, that, to us, it seems forced, affected, and disgusting.

We have bestowed more remarks on this prince of musicians, and more time in the examination of his works, than perhaps they now deserve, in order to furnish our readers with what seems, to our comprehension, a truer idea of their worth, than that which partiality and ignorance have hitherto given. A score of one of his madrigals in the 3d vol. of Burney's *Gen. Hist. of Mus.* p. 223. will justify our censures of the musical productions of this tuneful prince.

VENOSA, in *Geography*, a town of Naples, in Basilicata, the see of a bishop, suffragan of Matera. It contains seven churches, and as many convents. In the 9th century, Venosa was taken by the Saracens, and in 1528 by the French; 9 miles N.N.W. of Acerenza. N. lat. 40° 58'. E. long. 15° 48'.

VENOSA Arteria. See ARTERIA Venosa.

VENOSTA, in *Geography*, a valley of the Tyrolese, on the banks of the Adige; 20 miles S. of Glurentz.

VENOSUM FOLIUM, in *Botany* and *Vegetable Physiology*, a veiny leaf. See LEAF and VEIN.

VENOUS, VENOSUS. See VENAL.

VENT, in *Geography*, a river of England, in the county of Cumberland, which runs into the South Tyne.

VENT, formed from *ventus*, *wind*, *vent-hole*, or *spicacle*, a little aperture left in the tubes or pipes of fountains, to facilitate the air's escape; or, on occasion, to give them air; as in frosty weather, &c. for want of which they are apt to burst.

A Vent, taken in this sense, is properly the end of a pipe, placed

placed erect, and reaching above the ground; usually soldered to the turns, or elbows, of pipes. The vents of large pipes are to be as high as the superficies of the reservoir, unless there be a valve in them.

VENT is also used for a little hole, pierced in vessels of wine, beer, &c. that are on tap; and which admits air enough to make the liquor run, but not so much as to corrupt and spoil it.

VENT, again, is applied to the covers in wind-furnaces, by which the air enters, which serves them for bellows; and which are stopped with registers, or slices, according to the degree of heat required: as in the furnaces of glass-houses, assayers, &c.

VENT is also used for a pipe of lead, or other matter; one end of which opens into the cell of a necessary-house, and the other reaches to the roof of the house, to give room for the corrupt fetid air to exhale.

There are also vents, or apertures, made in the walls which sustain terraces, to furnish air, and give a passage for the waters.

This kind of vent the Italians, and we from them, call a *barbacane*.

VENT, in *Gunnery*. See *TOUCH-Hole*.

The common method of placing the vent is within about a quarter of an inch from the bottom of the chamber or bore. Some, however, have thought, that if the vent was to come out at the middle of the charge, the powder would be inflamed in less time than in any other case; but Mr. Muller, by firing mortars with two vents, one at the bottom and the other in the middle, and so contrived that one was shut whilst the other served to fire, found always the range of the shell greater when the lower vent was used, than when the powder was fired by the middle one. *Artillery*, p. 83.

Mr. Thompson (Count Rumford) has lately made a number of experiments, in order to determine the best position of the vent; from the result of which it appears, that the effect of placing the vent in different positions with respect to the bottom of the chamber, is different in different charges; but the difference in the force exerted by the powder, which arose from the particular position of the vent, was in all cases so inconsiderable, as to afford occasion for concluding, that any given charge of powder exerts nearly the same force, whatever is the position of the vent. He infers, upon the whole, that in the formation of fire-arms no regard need be had to any supposed advantages that gunsmiths and others have proposed to derive from particular situations for the vent; such as diminishing the recoil, increasing the force of the charge, &c.; but the vent may be indifferently in any part of the chamber where it will best answer upon other accounts; and he thinks there is little doubt but the same thing will hold good in great guns, and all kinds of heavy artillery. Workmen in general agree, that the vent in fire-arms should be as low or far back as possible, in order, as they conceive, to lessen the recoil: accordingly some make the bottom of the chamber flat, and bring the vent out even with the end of the breech-pin; others make the vent slanting through the breech-pin, in such a manner as to enter the bore just in its axis; others again make the bottom of the chamber conical; and there are those who make a little cylindrical cavity in the breech-pin, of about two-tenths of an inch in diameter, and near half an inch in length, coinciding with the axis of the bore, and bring out the vent even with the bottom of this little cavity.

The objection to the first method is, that the vent is apt to be stopped up by the foul matter that adheres to the

piece after firing, and which is apt to accumulate, especially in damp weather. The same inconvenience in a greater degree attends the other methods, with the addition of another, arising from the increased length of the vent; for the vent being longer, is not only more liable to be obstructed, but it takes a longer time for the flame to pass through it into the chamber; in consequence of which the piece is slower in going off, or, as sportsmen term it, is apt to hang fire. Mr. Thompson proposes, that the bottom of the bore should be in form of a hemisphere; and that the vent should be brought out directly through the side of the barrel, in a line perpendicular to its axis, and pointing to the centre of the hemispheric concavity of the chamber. In this case the vent would be the shortest possible; it would be the least liable to be obstructed, and the piece would be more easily cleaned. Similar advantages, he apprehends, would be gained by making the bottom of the bore and vent of the great guns in the same manner. *Phil. Trans.* vol. lxxi. part ii. p. 272, &c.

From a variety of experiments made by order of the king of Prussia in 1765 and 1766, it appears, that the concave chamber produced the greatest ranges, and that the bottom of the chamber is the best place for the vent.

VENT-*Afragal*, is that part of a gun or howitz which determines the vent-field.

VENT-*Field*, is the part of a gun or howitz between the breech-mouldings and the afragal.

VENT, *Port*. See *PORT-VENT*.

VENTA, in *Ancient Geography*, a name given to several British towns, of which our antiquaries have given different etymologies. Mr. Baxter's conjecture may be allowed to be most probable, who supposes that it is derived from *wend*, or *went*, which signifies head or chief. For it is observable, that all the towns which were named Venta, were the capitals or chief towns of the nations or people to whom they belonged.

VENTA *Belgarum*, a town of Britain, placed in the seventh Iter or route of Antonine, from Regnum or Chichester to London, between Clausentum or Old Southampton, and Calleva Atrebatum or Silchester; and situated at the present Winchester, as our antiquaries agree. It was the capital of the Belgæ.

VENTA *Icenorum*, a town of Britain, placed at the head of the ninth Iter or route of Antonine, 128 miles from London. This town was probably the capital of the Icenii, or ancient inhabitants of Norfolk, Suffolk, Cambridgeshire, and Huntingdonshire; and it is generally supposed by our antiquaries to have been situated at Caister, upon the river Yare, about three miles from Norwich, which is thought to have arisen out of the ruins of this ancient city. Here have been found some faint vestiges of this ancient capital of the Icenii.

VENTA *Silurum*, a British town, placed in the fourteenth Iter or route of Antonine, from Isca or Caerleon, to Calleva or Silchester. This was a considerable town of the Silures, between Isca and Abona. It is our Caerwent. See *SILURES*.

VENTA *Cibay, La*, in *Geography*, a town of Spain, in Guipuscoa; 6 miles from Trevigno.

VENTA *de Cruz*, a sea-port town of America, on the isthmus of Darien, on the river Chagre, where the merchandise from Panama is put on board barks to be conveyed to Porto Bello; 20 miles N. of Panama. N. lat. 9° 26'.

VENTA *Quemada*, a town of Spain, in the province of Jaen; 42 miles N. of Jaen.

VENTA *de en Medio*, a town of Peru; 20 miles N. of Ouro.

VENTA *Sierra*, mountains of South America, in the province of Venezuela.

VENTALDA, a town of Sweden, in the province of Smaland; 34 miles S.E. of Jonkiöping.

VENTAROLI, a name given in Sicily, &c. to grottoes formed under their houses, from which issues a constant extreme cold wind, and at times with impetuosity, and a noise like water dashing upon rocks. These are shut up with doors like cellars, and made use of as such, as also to keep provisions fresh, and to cool liquors. At Cefi, in the Roman state, there are many such ventaroli; and the inhabitants of that town, by means of leaden pipes, conduct the fresh air from these into the rooms of their houses, so that by turning a cock they can cool them to any degree. Some who have refined still more upon this luxury, by smaller pipes, bring cold air under the dining table, so as to cool the bottle of liquor upon it. On mount Ætna and Vesuvius, and in the island of Ischia, there are many caverns of this kind. Phil. Transf. vol. lxx. part i. p. 73.

VENTENATIA, in *Botany*, was so named by M. Palissot-Beauvois, in honour of the late M. E. P. Ventenat, member of the National Institute, a distinguished French botanist, who was formerly an ecclesiastic, and, if we mistake not, of some religious order; but he took advantage of the revolution to free himself from such unnatural and immoral shackles, in order to fulfil the duties of a man and a Christian. He has distinguished himself by the publication of a *Tableau du Regne Végétal, selon la Méthode de Jussieu*, in 4 vols. 8vo.; as well as the magnificent *Jardin de la Malmaison*, with coloured plates, in large folio; and the uncoloured *Jardin de Cels*, and *Choix de Plantes*; the latter having been soon cut short by his death. The writer of this article had dedicated to the name of M. Ventenat, a New Holland genus, (see *STYLIDIUM*,) which now yields to the prior right of the genus before us.—Palissot Beauv. Fl. d'Oware et de Benin, fasc. 2. De Theis 479. Poiret in Lamarck Dict. v. 8. 450.—Class and order, *Polyandria Monogynia*. Nat. Ord. *Tiliaceæ* Juss.?

Gen. Ch. Cal. Perianth inferior, in three deep, equal, oblong, obtuse, concave, coriaceous, deciduous segments. Cor. Petals numerous (eleven or twelve), spatulate, spreading, strongly veined; rounded at the extremity; contracted into a claw at the base. Stam. Filaments numerous, thread-shaped, erect, unequal, much shorter than the petals, inserted, like them, into the receptacle; anthers Pist. Germen superior, oval; style thread-shaped, undivided, longer than the stamens; stigma thick, obscurely five-lobed. Peric. Berry oval-oblong, of five cells, furrowed longitudinally, terminating in a kind of mammillary point. Seeds numerous in each cell.

Ess. Ch. Petals numerous. Calyx in three deep deciduous segments. Berry superior, of five cells, with many seeds.

Obf. M. Palissot Beauvois remarks, that this genus is obviously referrible to Jussieu's 13th class, (Poiret by mistake says the 3d), but its order in that class is not so easily determined. Dissections of the ripe seed are wanting to ascertain this point. The fruit nearly accords with Jussieu's *Aurantia*, but the structure of the flower, and the want of pellucid dots in the leaves, exclude it from that order. The want of stipulas prevents its perfect agreement with the *Tiliaceæ*, and M. Beauvois considers this genus as probably making one of a new order, confounded by Jussieu with his *Tiliaceæ*.

1. *V. glauca*. Glauous Ventenatia. Palissot Beauv. Fl. d'Oware et de Benin, 29. t. 17. Poiret n. 1.—Native of elevated, airy, open situations, near Agathon, on the coast

of Africa. A *shrub*, with alternate, round, smooth branches. Leaves alternate, stalked, very large, elliptic-oblong, entire, tipped with a long acute point; rounded at the base; smooth on both sides; covered on the under surface with a kind of glaucous viscosity, which when dry becomes almost powdery. Stipulas none. Flowers lateral, towards the extremity of each branch, solitary, stalked, alternate, sometimes opposite to the leaves; their stalks half the length of the leaves, cylindrical. Calyx short, smooth. Corolla large, of a fine crimson, beautifully veined. Poiret.

VENTER, in *Anatomy*, the abdomen; called also minus venter. See ABDOMEN.

VENTER is also used for the womb, or uterus, of women. And hence the writ *de ventre inspiciendo*.

Hence, also, in the civil law, we say, *partus sequitur ventrem*, the child follows the belly; meaning, that its condition is either free or servile, according to that of its mother.

They also say, to appoint a curator for the belly, with regard to posthumous children, yet in the mother's womb. With regard to princes, the venter, or belly, has been sometimes crowned in form.

VENTER is also used, in speaking of a partition of the effects of a father and mother, among children born, or accruing, from different marriages.

This partition is so ordered, as that a single child of one marriage, or venter, takes as much as several of another marriage, or venter; in order to which, the estate is divided into so many parts as there have been venters, or marriages.

VENTER, or *Belly*, of a muscle. See BELLY of a Muscle.

VENTER *Draconis*, *Dragon's Belly*, in *Astronomy*. See *DRAGON'S BELLY*. See also DRAGON, in *Astronomy*.

VENTER *Equi*, *Horse's Belly*, among *Chemists*, denotes horse-dung, or a dunghill, on which are inclosed certain vessels for particular operations, to be performed by means of the gentle heat of it.

VENTES *les Grandes*, in *Geography*, a town of France, in the department of the Lower Seine; 9 miles N.W. of Neufchâtel.

VENTHIE, LA, a town of France, in the department of the Straits of Calais; 9 miles N.E. of Bethune.

VENTIA, in *Ancient Geography*, or *Venetsium Civitas*, a town situated in the Maritime Alps. Dion Cassius, speaking of an expedition, dated in the year of Rome 693, against the Allobroges, who had revolted, mentions a town under this name, at a small distance from the Isere. According to some circumstances pertaining to this expedition, there is reason to believe that it is Vinet, between Moirène, or Tullin and St. Marcellin, at some distance from the right bank of the Isere.

VENTIDUCTS, in *Building*, are spiracles, or subterraneous places, where fresh cool winds, being kept, are made to communicate by means of tubes, funnels, or vaults, with the chambers, or other apartments of a house, to cool them in sultry weather.

These are much in use in Italy, where they are called *ventidotti*. Among the French they are denominated *prisons des vents*, and *palais d'Eole*. See VENTAROLI.

VENTILAGO, in *Botany*, so called by Gærtner, because the appendage to the seed-vessel was thought to bear some resemblance to a winnow or flapper, *ventilabrum*. It does not answer to the common idea of a fan, being neither plaited, nor much dilated upwards.—Gærtner. v. 1. 223. t. 49. Willd. Sp. Pl. v. 1. 1106. Roxb. Coromand. v. 1. 55. Mart. Mill. Dict. v. 4. Poiret in Lamarck Dict. v. 8. 452.

—Class

—Class and order, *Pentandria Monogynia*. Nat. Ord. *Dumose*, Linn. *Rhamnii*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, cup-shaped, with five equal, triangular, deciduous, marginal segments. *Cor.* Petals five, spatulate, inserted into the rim of the calyx, alternate with its segments, and rather longer. *Stam.* Filaments five, awl-shaped, opposite to the petals, the length of the calyx; anthers of two round lobes. *Pist.* Germen superior, invested below with the tube of the calyx, nearly globose; style short, cloven half way down; stigmas two, divaricated, acute. *Peric.* Capsule globular, of one cell, and two valves; splitting at the base; crowned at the summit with an elliptic-oblong, flat, coriaceous, ribbed wing, many times longer than the capsule. *Seed* solitary, globose.

Ess. Ch. Calyx cup-shaped, with five deciduous segments. Petals five, opposite to the stamens. Capsule of one cell, crowned by an elongated wing. Seed solitary.

Obs. Gærtner did not see the capsule in a sufficiently advanced state to discover that it has really two valves, which separate at the base, continuing connected at the apex by their long coriaceous wing, in which the most remarkable character of the genus consists. The flowers are occasionally dioecious, from the imperfection of one or other organ of impregnation.

1. *V. maderaspatana*. Yerra Chirtaly of the Telingas. Willd. n. 1. Roxb. Coromand. v. 1. 55. t. 76. (*Funis viminalis*; Rumph. Amboin. v. 5. 3. t. 2.)—Native of forests and uncultivated places, among the mountains of Hindoostan and Ceylon, and of rocky thickets on the shores of Amboyna, flowering in the cold season. The stem is woody, climbing to a great extent, with long, round, pliant, tough, leafy, often downy, branches. Leaves alternate, on short stalks, ovate, bluntish, two or three inches long, coriaceous, more or less obscurely crenate, seldom quite entire, smooth or minutely downy, furnished with one midrib, and many transverse ones, connected by extremely fine parallel veins. Flowers very numerous, small, greenish-white, in large, terminal, compound panicles, their scent highly offensive, resembling *Sterculia foetida*. Wing of the capsule entire, greenish-yellow, slightly downy, above an inch in length. — Willdenow, according to Poiret, has distinguished two species of this genus, in the new Transactions of the Berlin Society; one having entire and smooth, the other crenate and downy, leaves. But we are persuaded, from an examination of wild specimens from Roxburgh and Koenig, that these characters are variable.

VENTILATION of Mines, comprises the various modes by which impure air is removed, and a current of atmospheric air propelled through the subterranean openings and passages of mines. The health, the safety, and lives of a very large and industrious class of the community depend on the regular ventilation of mines; yet the application of the principles on which this should be undertaken has been but imperfectly understood, and it is but very recently that the subject has engaged the attention of men of science. Since the constitution of the atmosphere was ascertained, (see ATMOSPHERE,) it is well known that the one-fifth part of it, or the oxygen gas, is essentially necessary to support the processes of respiration or combustion, by which it undergoes a chemical change, and is converted into carbonic acid gas, a gas destructive of animal life, and in which flame is instantly extinguished. It is also as well known, that the remaining four parts of the atmosphere, or the azote, are equally destructive of life, and incapable of supporting flame: hence the necessity of ventilation, or a regular supply of fresh air, in all confined situations, where

men are to labour or exist, is very easily explained. Besides the destruction of oxygen gas by respiration or combustion, which takes place in confined apartments above ground, there are other causes that render the air impure in almost all subterranean passages or mines, through which there is not a regular current of wind constantly passing. The causes by which the air in mines is rendered impure, or destructive of animal life, are of three kinds. First, the respiration of men and horses in the mine, and the combustion of the lamps, &c; secondly, the production and evolution of carbonic acid gas in the beds or strata in which the mine is situated; and thirdly, the production of carburetted hydrogen or inflammable gas. For the properties of these gases, see GAS. The two former sources of impurity are much less destructive of life than the latter, the inflammable gas or *fire-damp* of the miners: when this becomes mixed to a certain degree with the air of the mine, it explodes with great violence on the approach of a lamp or candle, and occasions the most fatal accidents, destroying all the vital air in the mine, and burning or suffocating the workmen. By explosions of this nature, it was estimated that not less than six hundred persons perished during the years 1813 and 1814, in the coal-mines on the rivers Tyne and Wear, in Northumberland and Durham; and the destruction of human life in other coal districts has been perhaps equally great, in proportion to their extent. In the ventilation of mines, where the air is impure from respiration, combustion, or the evolution of carbonic acid gas, called by the miners *choak-damp*, the object of the miner is simply to introduce a current of fresh air through the works; but besides the difficulties to be overcome in effecting this, where the works are extensive, the miner who has to combat with the fire-damp must guard against the greater evil of an explosion, to which he is almost constantly exposed.

In the working of metallic mines, the veins being generally nearly vertical, the currents of water, or the natural passages, aided by the varied temperature of the mine, are frequently sufficient to insure the circulation of air; and these mines are very rarely affected by the production of the fire or choak damp. It is principally where a shaft or well is sunk, or a horizontal passage or gallery is made, that any means of artificial ventilation are necessary. The most obvious remedy, and that which is most frequently resorted to, is opening a communication with some other part of the mine, or with the surface; and when this is done, the ventilation is found to be perfect by the rushing of the currents, which often takes place with considerable force, from the different degrees of temperature in the lower and upper air, and these currents change their direction as the temperatures above and below alternate. The great objection to this mode is the expence with which it is commonly attended wherever the gallery is at a great depth, and the intervening rock of a very hard kind, and where a shaft is merely wanted to supply air, and not for the passage of the water. To avoid this, the shaft or level is sometimes divided into two distinct parts, communicating near the part intended to be ventilated, so that a current may be produced in opposite directions on each side of the partition; and this is often effectual to a certain extent. It has, however, its limits at no very great distance, and the current is but a feeble one, from the nearly equal temperature of the air on each side of the partition.

The other mode employed is to force air down tubes with a large pair of bellows worked by the hand, or by boxes or cylinders of various forms placed on the surface, with a large opening against the wind, and a smaller one communicating with the air-pipes by a cylinder and piston working

working in it, and when driven by a sufficient force, this has great power.

Mr. John Taylor, in the Transactions of the Society of Arts for 1810, has described a method of effecting this process more easily, by attaching an air-pump of a very simple construction to a small fall of water. The engine discharges more than two hundred gallons of air in a minute, and a stream of water supplied by an inch and a half bore falling twelve feet is sufficient to keep it regularly working. This method may be introduced with great advantage into narrow passages or wells, but would be obviously inadequate to ventilate the immense excavations in coal-mines, except it were directed only to some confined part of the works. In metalliferous mines, the generation of the fire-damp is much less frequent than in coal-mines, and the extent and position of the excavations make the ventilation of the latter a labour of much greater difficulty. The most valuable beds of coal in England, with the exception of Staffordshire, are from two to nine feet in thickness, and they rarely incline more than about fifteen or twenty degrees from the horizontal level, and are frequently nearly flat. Each pit has two shafts or wells, called the *downcast pit* and the *upcast pit*. The excavations or passages in the coal, which communicate from one pit to the other, are frequently not less than forty miles or more in length, through which circuitous route the air has to take its course, though the distance from the downcast to the upcast shaft, in a right line, may not be more than a few hundred yards or feet, or even much nearer. And here we cannot but observe, that as the means to force the air through a route of such extent must be very complicated, and as a failure or accident to a part might destroy the whole ventilation, we conceive that much too large a surface is frequently worked from two shafts, in order to avoid the expence of additional shafts for several detached workings of a smaller extent. By this, the risk of the workmen is greatly increased, to save expence to the owners of the coal. In the year 1813, some gentlemen in the north of England, impressed by the dreadful catastrophes which had recently taken place, very laudably established a society, with a view to inquire into the causes of these calamities, and the possible means of prevention. They entitled themselves "A Society for preventing Accidents in Coal-Mines." Mr. John Buddle, an eminent coal-viewer in Northumberland, addressed a letter to the president, which was published by the society in 1815. In this letter he details the various methods which had been employed for the prevention of accidents by fire, which, he says, "consist in a mechanical application of the atmospheric air to the removal or sweeping away of the inflammable gas, as it is generated in the workings of collieries, or as it issues from the fissures which the workings intersect in their progress." He details the various methods by which this is effected: these are explained by a number of figures and sections, without which they could not be rendered intelligible to the reader. We shall endeavour to give an idea of the principle on which the various modes of ventilating mines depend, by stating one of the simplest forms in which they can act. If two wells or shafts were sunk at a given distance, say fifty yards from each other, and a horizontal passage were cut from the bottom of one well to the other, so soon as the communication were made, there would be a tendency in the air to descend one shaft and ascend the other, whenever the temperature of the external air varied from that of the air below. The currents of air in natural caverns, that are open at each extremity, proceed from the same cause. In certain states of the atmosphere, should the current not be sufficient, or should a quantity of impure air

be generated in the passage, the circulation may be increased by kindling a fire at the top or at the bottom of one of the wells, to rarefy the air and cause it to ascend more rapidly. Or the air may be forced down the other well, by causing a stream of water to fall into it. Also by means of vanes, or by an air-pump attached to a steam-engine, the circulation may be easily increased according to the will of the engineer, and the facilities which may be presented for carrying away the water, &c. Thus little difficulty could arise in a case of simple ventilation of this kind; but if from the horizontal passage which runs from one shaft to the other, we make a number of passages on each side at right angles with it, as is done in coal-mines, the current of air which passes through it will not enter these lateral passages, or occasion any circulation in them. In order, therefore, to make the air pass through the whole series, another passage must be opened, connecting the further extremities of the lateral passages with each other: the first passage must then be closed, and the air which descends conducted along the lateral passages, up one and down the other, taking a circuitous route through the whole, until it arrives at the up-cast shaft, which it ascends. To conduct the air in this manner, a number of trap-doors and stops are necessary, in order to prevent the mixture of the air from the different passages, which would entirely destroy the ventilation. See *Plate IV. Geology, fig. 8.* which represents part of the workings of a coal-mine; the shaded part is the bed of coal, in which the workings are carried along the different passages, from the pit or shaft *a*, to the pit or shaft at *b*. The current of air is represented by darts and dotted lines. The stops and trap-doors, which close to prevent the passage of the air, and confine the currents to a particular course, are represented by double lines and cross lines, as at *t t*. This figure represents the improved system of ventilation, by which the current of air sweeps every part of the workings. By tracing the darts and dotted lines, it will be seen that the current of air from the downcast pit *a*, first passes along the main passage to *A*, and the adjoining passage *M B*, to which it has access through lateral passages, called *walls*, 1, 2, 3, 4: its further progress in every direction is closed, except at 5, where it enters the passage *C*, from which it has access to the passage *D*, through the openings 6, 7, 8, 9: at *E*, the currents unite in one stream, and enter an advanced part of the workings, called the *head-ways*, ventilating the passages *F* and *G*, being forced into them by partitions called *brattices*, placed at *X X*, round which the air must pass in its progress to *H*.

Where the current of air divides and sweeps along two passages at the same time, and unites again as above-described, it is called *double coursing*; but where it runs down one passage and up another, as may be seen in its further progress from *H* on the south side, to *H* on the north side of the mine, it is called *single coursing*.

The remaining part of the ventilation back to the passage *K K*, is in double courses, along which it is forced by the stoppings at *s, s, s, s*, and the other stoppings *r, r, r, r*, until it ascends the upcast shaft at *b*. Under this system, says Mr. Buddle, *if the stoppings, &c. be all in order*, and the passages kept sufficiently open for the current of air to circulate freely, there can be no partial stagnations in the workings,—no accumulation of inflammable gas. For in the event of a large discharge of gas, from what is called a blower, commencing at any place, as at *M, N, P, Q*, its stream is immediately carried off by the circulating current of atmospheric air, and so diluted that it cannot explode, unless indeed the discharge of inflammable air should be so copious as to mix with the current up to the *firing point*, or to that degree

VENTILATION.

degree in which it would inflame by access to a lighted candle or to fire.

This improved system of ventilation by double courses was introduced into the collieries on the Tyne and Wear about the year 1760, and has ever since continued in general use; but it is found inadequate to the intended purpose in the following cases.

1. When sudden discharges of inflammable gas mix with and raise the whole circulating mass of air to the firing point.

2. When the wind is south-east, and the weather wet or hazy, and the barometer sinks below twenty-nine inches.

In this case the atmospheric current, which under the most favourable state of the air is merely sufficient to sweep the noxious effluvia from some mines, gets so contaminated by the discharge of inflammable gas, and the slowness of its own progress, as to be exceedingly unsafe, and generally inaccessible with candles.

3. When inflammable air fills a part of the mine between the workmen and the upcast shaft.

4. When the gas is ignited by lightning, as it ascends the upcast shaft.

The presence of inflammable gas from the slightest mixture, through all its gradations to the first firing point, is readily discoverable by an experienced collier, and he judges very correctly of the degree of inflammability and danger which threaten the safety of the mine, by observing attentively the appearance of the spire upon the top of his candle. The common pit-candles vary in size, but those generally used are forty-five to the pound; the wick is of cotton, and the candle made of ox or sheep tallow: but clean ox-tallow is best.

The mode of trying the candle, as it is called, to ascertain the mixture of inflammable gas, is as follows.

In the first place, the liquid fat is wiped off, the wick snuffed close, and carefully cleansed of red embers, so that the flames may burn as purely as possible. The candle, being thus prepared, is held between the fingers and thumb of the one hand, and the palm of the other is placed between the eye of the observer and the flame, so that nothing but the fire and the flame can be seen, as it gradually towers over the upper margin of the hand. The observation is generally commenced near the floor of the mine, and the light and hand are gently raised upwards, till the true state of the circulating current be ascertained. The first indication of the presence of inflammable air, is a slight tinge of blue or a blueish-grey colour shooting up from the top of the spire to the candle, and terminating in a fine extended point. The spire increases in size, and receives a deeper tinge of blue as it rises through an increased proportion of inflammable gas, till it reaches the firing point; but the experienced collier knows accurately enough all the gradations of show (as it is called) upon the candle, and is very rarely fired upon, excepting in sudden discharges of inflammable gas. The show upon the top of the candle varies very much, according to the length of run or distance which the current of air has passed through before it is mixed with the inflammable gas. The shorter the run of the current of air before it is mixed with the inflammable gas, the less will be the show upon the candle when at the first firing point, and *vice versa*.

The same size of spire which would indicate danger in a current which had passed only one mile, might be perfectly harmless in a current that had ran five or six miles; consequently the length of run of the current of air is to be taken into consideration, as well as the appearance of the top of the candle. The air-course, too, for a short distance be-

yond a small discharge of fire-damp may be highly inflammable; but by passing a few yards further, it becomes so diluted as to be perfectly secure. The distance, therefore, within which a blower can be safely approached with candles, is regulated entirely by the magnitude of the discharge and power of the current of air. Long experience and attentive observation are consequently necessary to obtain a thorough practical knowledge of this art.

The workings of a colliery are very often inaccessible with candles near the downcast pit, called the first of the air, while they may be safely entered with any description of light near the upcast pit, called the last of the air. This arises from the inflammable gas, as it is carried from the place of its discharge, being gradually diluted by the atmospheric current. Hence the advantage of sufficient extent of pit-room, to obtain length of run to dilute the inflammable air. It is from the want of pit-room, that the explosions in newly-opened collieries are generally the most violent. The distance which the current of air passes through, between the downcast and the upcast pits, varies much according to circumstances. Mr. Buddle has known it to exceed thirty miles.

After the current of atmospheric air is so highly mixed with inflammable air as not to be accessible with lighted candles, steel-mills may be employed with safety. We shall further notice Mr. Buddle's observations on steel-mills, but we believe the discovery of the safety-lamp will entirely supersede their use. "Although the inflammable air has frequently fired at the sparks of the steel-mills, it only happens, from all the facts which I have been able to collect, when the mills are played near the place where the hydrogen gas is discharged, and this by due attention may be easily avoided.

"I never indeed witnessed an explosion from the sparks of flint; but from my own observations on their appearance in dangerous states of the air, as well as from the observations of several intelligent men, I believe that in most cases the change of the appearance of the sparks, if attentively observed, gives sufficient notice of the threatening danger. When elicited in atmospheric air, they are of a bright appearance, rather inclining to a reddish hue, and as they fly from the wheel seem sharp and pointed. In a current of air mixed with inflammable gas above the firing point with candles, they increase considerably in size and become more luminous. On approaching the firing point with steel-mills, they grow still more luminous, and assume a sort of liquid appearance, nearly resembling the sparks arising under the hammer from iron at the welding heat. They also adhere more than usual to the periphery of the wheel, encompassing it as it were with a stream of fire, and the light emanating from them is of a blueish tint. When the inflammable gas predominates in the circulating current, the sparks from the steel-mill are of a blood-red colour; and as the mixture increases, the mill totally ceases to elicit sparks. They have the same bloody colour in carbonic acid." The steel-mill here mentioned is what has been used till very recently in coal-mines, consisting of a wheel and spring, which is wound up and set in motion, whereby a constant collision of flint and steel is effected, eliciting a copious stream of sparks. With the concluding remarks of Mr. Buddle's letter we can by no means agree, when he adds, "On the strength of my own experience in collieries thus circumstanced, I freely hazard my opinion, that any further application of mechanical agency towards preventing explosion in coal-mines would be ineffectual." Among the means enumerated by this gentleman, the very obvious one of depending on the greater specific levity of the carburetted hydrogen gas is entirely omitted;

omitted; nor is it even stated, that the general inclination of the strata present facilities for the ascent of the inflammable air, were requisite precautions taken to conduct it by channels to the mouth of the upcast pit, which in many situations might be done at a trifling expence.

The public have been given to understand, that an improved and complete system of ventilation, depending on this principle, had been introduced into some of the Staffordshire collieries; but on recent inquiry at the place, we were informed, that the method of ventilation proposed by Mr. Ryan had never been carried into practice to the full extent stated, but considerable advantage had been derived from a partial application of the principle, by making channels near the roof of the mine for the escape of the inflammable gas.

Where the strata rise regularly for a considerable extent, unbroken by faults, it appears easy to discharge the inflammable gas as fast as it is generated. The specific gravity of carburetted hydrogen is little more than one-half the weight of atmospheric air, being as .555 to 1000. If, therefore, it were conducted along the roof by an unobstructed passage to the upcast shaft, it would rise and discharge itself.

Explosions not unfrequently take place at the upcast shaft, from the inflammable air passing near the fire placed at the bottom to rarefy the air and increase the circulation. The only expedient at present suggested is the use of charcoal, as the gas will not ignite at a red heat without flame; but charcoal does not promote so rapid a circulation of air as coal or wood, which produce smoke and flame. The carbonic acid gas generated by the combustion of charcoal, being also heavier than atmospheric air, would in some degree retard the ascent of air from the upcast shaft; and if a small particle of coal fell upon the charcoal fire, it would produce flame, which might cause an explosion.

A series of most interesting experiments was undertaken by Sir H. Davy in 1815, on the degree of inflammability of different admixtures of carburetted hydrogen when passed through small tubes or apertures, which led to the very important and unexpected result, that carburetted hydrogen, mixed with atmospheric air in the proportion which is most explosive, and then ignited, will not set fire to another portion of the same air, separated from it by a sieve of small wire, the meshes of which amount to two hundred and fifty in the square inch. On this principle he constructed a lamp surrounded by a small wire-sieve in the place of horn or glass, having no aperture for the admission or transmission of air but through the meshes of the sieve. This lamp, when lighted, was found to burn in explosive mixtures with perfect safety, the flame being confined within the lamp by the intervening wire-sieve. This lamp has since undergone considerable improvements, and some of the objections to which it was first exposed have been removed. Important additions to it are still making by its illustrious inventor. For a full account of its construction and recent improvements, we must refer to the article *WIRE-GAUZE SAFETY-LAMP*.

VENTILATOR, a machine by which the noxious air of any close place, as an hospital, gaol, ship, chamber, &c. may be discharged and changed for fresh.

The noxious qualities of bad air have been long known; and no one has taken greater pains to set the mischiefs arising from foul air in a just light than Dr. Hales; who has also proposed an easy and effectual remedy by the use of his ventilators; his account of which was read to the Royal Society in May, 1741. In the November following, Mr. Triewald, military architect to the king of

Sweden, informed Dr. Mortimer, secretary to the Royal Society, that he had in the preceding spring invented a machine for the use of his majesty's men of war, in order to draw out the bad air from under their decks, the least of which exhausted 36,172 cubic feet of air in an hour, or at the rate of 21,732 tons in twenty-four hours. In 1742 he sent one of them, formed for a sixty-gun ship, to France; which was approved of by the Royal Academy of Sciences at Paris; and the king of France ordered all the men of war to be furnished with the like ventilators.

The ventilators invented by Dr. Hales consist of a square box A B C D (*Plate XVII. Pneumatics, fig. 1.*) of any size: in the middle of one side of this box a broad partition, or midriff, is fixed by hinges X, and it moves up and down, from A to C, by means of an iron rod Z R, fixed at a proper distance from the other end of the midriff, and passing through a small hole in the cover of the box up to R. Two boxes of this kind may be employed at once, and the two iron rods may be fixed to a lever F G (*fig. 2.*) moving on a fixed centre O; so that by the alternate raising and pressing down of the lever F G, the midriffs are also alternately raised and depressed, by which these double bellows are at the same time both drawing in air, and pouring it out through apertures with valves made on the same side with, and placed both above and below the hinges of the midriffs. In order to render the midriffs light, they are made of four bars lengthwise, and as many across them breadthwise, the vacant spaces being filled up with thin panels of fir-board; and that they may move to and fro with the greater ease, and without touching the sides of the boxes, there is an iron regulator fixed upright to the middle of the end of the box A C (*fig. 1.*) from N to L, with a notch cut into the middle of the end of the midriff at Z, so that the midriffs, in rising and falling, suffer no other friction than what is made between the regulator and the notch. Moreover, as the midriff Z X moves with its edges only one-twentieth of an inch from the sides of the box A B C D F E, very little air will escape by the edges, and, therefore, there will be no need of leathern sides, as in the common bellows. The end of the box at A C is made a little circular, that it may be better adapted between A and C to the rising and falling midriff; and at the other end, X, of the midriff, a slip of leather may be nailed over the joints, if needful. The eight large valves, through which the air is to pass, are placed at the hinge-end of the boxes B K (*fig. 2.*) as at 1, 2, 3, &c. The valve 1 opens inward to admit the air to enter, when the midriff is depressed at the other end, by means of the lever F G. And at the same time the valve 3 in the lower ventilator is shut by the compressed air which passes out at the valve 4. But when that midriff is raised, the valve 1 shuts, and the air passes out at the valve 2. And it is the same with the valves 5, 6, &c. of the other box; so that the midriffs are alternately rising and falling, and two of the ventilators drawing in air, and two blowing it out; the air entering at the valves 1, 3, 6, 8, and passing out at the valves 2, 4, 5, 7. Before these last valves there is fixed to the ventilator a box Q Q N M (*fig. 3.*), as a common receptacle for all the air which comes out of these valves: which air passes off by the trunk P, through the wall of a building.

For a farther account of this machine we refer to the author himself, who gives a full detail of it, and of its manner of working. See Description of Ventilators, by Stephen Hales, D.D. Lond. 1743, 8vo.

The doctor has shewn the use of his ventilators very fully. As to ships, in particular, he observes, that the *wind-sail*, (see *WIND-SAIL*), made use of at sea to introduce fresh air between

VENTILATOR.

between decks, is far from being sufficient for that purpose; nor can it be used with equal safety to the sick, and those who are sleeping, by means of the strength of the wind, which conveys the air with too much violence. But when the foul air is carried off by means of ventilators, notwithstanding the great velocity with which they throw out the air, which they may do at the rate of sixty tuns in a minute, yet the motion of it downwards into the hold, to supply what was carried off, is so very gentle that it cannot be perceived; because the sum of all the open passages for it through the deck exceeds the opening of the trunk of the ventilator, in so great a proportion as 100 to 1, or more. Besides, in a calm, the wind-fail can do little or no good: nor when the ship is under fail, at which time the wind-fail is not used. And it is to be observed, that it is not the ventilating of a ship now and then with a wind-fail, when wind and weather serve, that will suffice; it ought to be done daily, if due regard be had to the health of the ship's crew. The great quantity of rancid noxious vapours, which are incessantly exhaling from a number of living human bodies, the stench that incessantly arises from the bilgewater, and from the hot, stagnant, putrid air in the hold, makes it very advisable to refresh so bad an air continually, either with the wind-fail, when that can be properly used, or else with ventilators, which are intended to supply the defects of the wind-fail.

Ventilators must also be of particular service in new ships, which are observed to be more unhealthy, on account of a greater quantity of sappy wreck which arises from new timber, and makes the confined air the more unwholesome.

They will also be an effectual preservative of horses in transports, where they are sometimes suffocated, when in a storm there is a necessity to shut the hatches down.

These ventilators will also drive out of the hold of a ship that dangerous vapour which arises from corn, which is so noxious, that sometimes they dare not venture into the hold, till after the hatches have been opened for some time.

Ventilation will not only be of service to preserve several kinds of goods, but also the timbers and planks of the hold itself, when laid up in ordinary, as well as when in use, and will make the air in the hold less noxious, though it will still be offensive to the smell, by reason of the bilgewater. But this may be made less offensive, by often letting in sweet water from the sea, and then pumping it out; which good practice ought to be continued, notwithstanding the use of the ventilators.

What is here said of the foul air of ships may be applied to that of mines, gaols, workhouses, barracks, and hospitals. In mines, ventilators may guard against the suffocations, and other terrible accidents arising from *damps*; which see. (See also VENTILATION.) The air of gaols has been often known to be infectious; and we had a fatal proof of this, by the accident that happened some years ago at the sessions at the Old Bailey. To guard against the like for the future, as well as to preserve the health of the prisoners, a worthy magistrate, in 1752, had ventilators placed in Newgate, which were wrought by a windmill; and in the beginning of the year 1753, Dr. Hales gave an account of the good success attending the use of these machines, by a remarkable decrease in the usual mortality and sickness of that place.

Although the old prison at Newgate is now taken down, and a much more commodious one erected near the same spot, it may not be improper to give a brief account of

the manner in which the ventilators of Dr. Hales were constructed, and how they were moved by the windmill annexed to them. The midribs *b, b*, (*fig. 4.*) of these two ventilators, two pair of which were laid upon one another, were each nine feet long, and four and a half wide, and moved up and down by the flat iron rods *e, f*, passing through the lower and upper ventilators, and through an iron plate at *z*, about three inches square; over which is another broader iron plate, with a wide hole in its middle, to give room for the iron rod at *g* to move sideways to and fro, with the under plate, the hole of which exactly fits the iron rod, so that no air can escape at *g*; and there are the like plates at *i*, the top of the ventilator; and at *f, g*, are joints, where the iron rods are fixed to the midribs, by which means both are moved up and down at the same time; and the iron rods of both sides of the ventilators being fixed to one common lever at *e e*, all the four midribs are thereby alternately worked up and down at the same time. The valve-holes *v, v, x, x*, &c. are twenty-three inches long, and six and a half wide, covered with buckram glued on them, and move on lifts of tanned sheep-skin, and fall on lifts of woollen cloth nailed round the valve-holes. A very large nose (*fig. 5.*) is fixed with iron hooks *k, k*, to the ventilators *l, l*; and this nose is divided into three spaces, the middle and largest of which, *m m*, receives all the foul air blown into it from the eight middle valves *x, x, x, x*, (*fig. 4.*), whence it passed through a trunk *t t*, sixteen inches wide, through the leads of the prison, into the open air; the top of this trunk being covered with weatherboards to keep the rain out, and the middle valves hanging so as to open outwards. The two other outer spaces of the nose *p p*, receive the foul air, drawn into them, from the several wards, through the trunks *p, p*, and passing off into the ventilators, through the eight outer valve-holes *v, v, v, v*, whose valves open inwards. In these outer partitions of the nose there are two holes *z, z*, (*fig. 5.*) covered with boxes, in the bottom of each of which there is a large moveable valve, opening upwards, and towards the ventilators: these are made of such a weight, as to open only when all the trunks to the several wards are shut: by which the ventilators will always be supplied with air, so as not to endanger the breaking of the midribs for want of it. These ventilators, about eighteen inches deep in the clear, were fixed in an upper room of Newgate, in order to be near the windmill on the leads, which worked them. From each of the outer nostrils there went a trunk, twelve inches in the clear withinside; and from these trunks, which descended through all the floors as far as a little below the ceiling of the ground rooms, lesser trunks, six inches square within, branched off, near the ceiling of every room; and extended more or less into the several wards, so that when the foul air was drawn out of any ward, the fresh air might enter on the opposite side, and drive out all the foul air before it. By other contrivances with sliding shutters and handles, the several wards might be ventilated at such a time, or in such a degree, as was found necessary. In the case of a prison that is built with an open area in the middle, Dr. Hales observes, that the side of the prison which is opposite to the side where the ventilators are, may be commodiously ventilated in its turn, by having a round brick air-gutter under ground; through which the foul air of those wards might easily be drawn.

The windmill for working the ventilators was contrived to move with a small degree of wind, and to obtain a sufficient power in a small compass. In *fig. 6*, *c* is one of the cross-trees which support the mill-post *d*, and the braces *e, e*; the

the cross-trees rest on the blocks *a, a*, and are fixed to the floor by strong iron bolts. The mill-post *d*, being hollow, admits the iron rod *b* to pass through from the crank of the iron axle-tree *i*; the turning-frame *g n* moves on the girder *f*, on which lies a broad circular iron plate, where is the bearing of the brass friction-wheels, whose iron axle-trees move in brass collars: the turning-frame *g n* carries the axle-tree *i i*, and the sails *l, k*, which are turned, so as always to face the wind, by the vane *h*; the frame is kept from wracking by iron braces *q, r*, represented by the double pricked lines. The crank *z* is six inches and a half long, and therefore gives a stroke of thirteen inches; but the lower end of the rod *x* is fixed to the lever of the ventilator (*fig. 4.*) at such a distance from the centre of its motion, as to raise and fall the midriffs fifteen inches. The iron axle-tree extends forward, about two feet and a half beyond the face of the sails; from the extremity of which, *s*, eight iron braces, *l, l*, go to each arm, to which they are fastened by iron screw-bolts, which bind them and the iron circle of pricked lines *m m* (*fig. 7.*) fast together: the diameter of this circle is six feet, and the sweeps or arms of the mill *k k* are seven feet three inches long, and they are mortised into the drum *y y*. A void space of about six inches breadth is left between the sails, as represented in the figure, that the direct current of the wind, as it passed through, might give a turn to the course of the wind; which otherwise, being driven obliquely from the face of the preceding sail, would be forced to act on the back of the following sail, and thereby abate the force, and retard the motion of the mill. The brake-pole (*fig. 6.*) is *n*; and the single pricked line *t* at the end of it is the sword which is to clasp round the nave to stop the mill, by pulling the rope *w: o o* is the bottom shear-tree of the turning-frame; and *p* expresses the manner of screwing the brass collars of the axle-tree nearer and nearer, as they wear away. For a farther account of this machine, see Hales's Treatise of Ventilators, part ii. 1758, p. 32, &c.

Dr. Hales farther suggests, that ventilators might be of use in making salt, in order to which there should be a stream of water to work them, or they might be worked by a windmill, and the brine should be in long narrow canals, covered with boards or canvas, about a foot above the surface of the brine, in order to confine the stream of air, so as to make it act upon the surface of the brine, and carry off the water in vapours. Thus it might be reduced to a dry salt, with a saving of fuel, in winter and summer, or in a rainy or dry state of the air. Ventilators, he apprehends, might also serve for drying linen hung in low, long, narrow galleries, especially in damp, rainy weather, and also in drying woollen cloths, after they are filled or dyed, and in this case they might be worked by the fulling water-mill. Ventilators might also be an useful appendage to malt and hop-kilns; in which case it would be best to have the air-trunk enter the kiln about eighteen or twenty-four inches from the ground, and just opposite to the fire; but in order to prevent the air's blowing too strongly on the fire, a screen of brick-work might be formed about a yard distant from the hole of the air-trunk, and a yard square; for thus the air from the ventilators would be better diffused through the whole kiln.

Dr. Hales is also of opinion, that a ventilation of warm dry air from the adjoining stove, with a cautious hand, might be of service to trees and plants in greenhouses; where it is well known that an air full of the rancid vapours, which perspire from the plants, is very unkindly to them, as well as the vapours from human bodies are to men.

For fresh air is as necessary to the healthy state of vegetables as of animals.

The larger kinds of ventilators used by the doctor, are ten feet long, five feet broad, and two feet high in the clear within. Those he used by way of experiment on board the Captain, a seventy-gun ship, were ten feet long, four feet three inches wide in the clear within, and thirteen inches deep; one inch of which being occupied by the midriff, there remained a foot depth for it to rise and fall in. A ventilator of these dimensions will, through a trunk of a foot square, drive the air at the rate of twenty-five miles in an hour, which is double of what Mariotte assigns for the velocity of a pretty strong wind.

But besides these large ventilators, the doctor made a smaller sort, four feet in length, sixteen inches in breadth, and thirteen inches deep, all in the clear within. This smaller ventilator may be very useful in preserving the bread, in the bread-room of a ship, sweet and dry. Pease also, and oatmeal, which are apt to heat and spoil in casks, may be preserved, by putting them into a large bin, with a false bottom of hair-cloth laid on bars, by which fresh air may be blown upwards through them with these small ventilators.

Ventilators are also of excellent use for the drying of corn, hops, and malt. See GRANARY.

Gunpowder may be thoroughly dried, by blowing air up through it by means of ventilators.

What advantage dry gunpowder has over that which is damp, may be seen by the experiment mentioned in the article GUNPOWDER.

These small ventilators will also serve to purify most easily and effectually the bad air of a ship's well, when there is occasion for persons to go down into it, by blowing air through a trunk, reaching within a yard of the bottom of the well, both for some time before, and during their stay there. They may be also made use of at sea to sweeten stinking water, &c. See SEA-WATER.

Dr. Hales made also several trials for curing ill-tasted milk by ventilation.

For these and other uses to which they might be applied, as well as for a particular account of the construction and disposition of ventilators in ships, hospitals, prisons, &c. and the benefits attending them, see Hales's Treatise on Ventilators, part ii. passim; and Phil. Trans. vol. xlix. p. 332, &c.

The ventilators in large ships, since the order for ventilating the fleet, issued by the lords of the Admiralty in 1756, are fixed in the gunner's fore-store-room, and generally a-head of the sail-room. The foul air is carried up through the decks and fore-castle, near the fore-mast, sometimes afore it, and sometimes abaft it, but more frequently on its starboard side; the lever, by which the ventilators are worked, is under the fore-castle in two-deck ships, and between the upper and middle decks in three-deckers; sometimes the lever is hung athwart-ships; in some ships afore and aft; and in others oblique. The iron rod, which communicates the motion from the lever, passes through the partners of the fore-mast, and is connected with another lever, suspended at or near the middle; in some ships over the ventilators; in others under them, when it is found necessary to fix them up to the deck. The best method to save room is to place the ventilators over one another, with their circular ends together; the air-trunk should be so high above deck, that the men on deck may not be incommoded by the foul air which blows out of it; and therefore the trunk comes through the upper deck, near and behind the

the fore-maft. Dr. Hales has calculated the following table for the fizes of ventilators, &c. adapted to fhips of war.

Guns.	Length.		Breadth.		Depth.		Trunk.
	Ft.	In.	Ft.	In.	Ft.	In.	Sq. In.
Three decks.	100	10 0	4 6		2 0		12
	90	10 0	4 6		1 10		11½
	80	10 0	4 6		1 8		11
	70	10 0	4 6		1 8		11
	60	10 0	4 6		1 8		11
	50	9 0	4 3		1 6		10
	40	8 6	4 0		1 6		9½
	20	8 0	4 0		1 6		9

The construction of twenty-gun fhips being various, the fizes of ventilators for thefe muft be left to the direktion of the officers of the yard.

When the hold is to be ventilated from one end to the other, the three doors of the gang-way into the gunner's ftore-room muft be opened, and all the gratings on the gun-deck be covered with tarpaulins, leaving all doors open, whofe rooms want ventilation, on the orlop and the fteward-room hatch. But when it is thought proper to ventilate between decks, then the doors of the gang-way into the gunner's ftore-room muft be fhut, and the fcuttle in the headmoft trunk or pipe upon the gun-deck muft be opened; and all the gratings of the middle deck, if the fhip be a three-decker, or of the upper deck, if it be a two-deck fhip, be laid with tarpaulins; and, if poffible, one of the ftern-pofts opened, or the aftermoft hatch-way, or a fcuttle on purpofe, through the deck, as near the ftern as poffible. Hales's Treat. part ii. p. 97, &c.

The method of drawing off air from fhips by means of fire-pipes, which fome have preferred to ventilators, was publifhed by fir Robert Moray in the Phil. Tranf. for 1665. Thefe are metalline pipes, about two inches and a half in diameter, one of which reaches from the fire-place to the well of the fhip; the other three branches go to other parts of the fhip; the ftoke-hole and afh-hole being clofed up, the fire is fupplied with air through thefe pipes. The defects of thefe, compared with ventilators, are particularly examined by Dr. Hales, ubi fupra, p. 113. See *Air-Pipe* and *SHIP*.

Mr. Erasmus King propofed to have ventilators worked by the fire-engines in mines; and Mr. Fitzgerald has fuggelted an improved method of doing this, which he has alfo illuftrated by figures. See Phil. Tranf. vol. i. p. 727, &c.

There are various ways of ventilating the air of rooms: Mr. Tidd contrived to admit frefh air into a room, by taking out the middle upper fafh-pane of glafs, and fixing in its place a frame-box, with a round hole in its middle, about fix or feven inches diameter; in which hole are fixed, behind each other, two or three fmall twirling windmills, with fails of very thin broad copper-plates, which fpread over and cover the circular hole, fo as to make the air which enters the room to fpread round in thin fheets fideways; and thus not to incommode perfons, by blowing direkly upon them, as it would do if it were not hindered by the fails, which turn on the fame axle-tree, each lefs than the other. See *ÆOLUS*.

This method of refrefhing rooms is much approved of, and ufed by many, not only in England, but alfo in other countries. For other methods of ventilating fhips, buildings, rooms, &c. fee *Air-Chamber*, *BELLOWS*, *Air-Pipe*, *Centrifugal WHEEL*, and *WIND-Sail*.

VENTILLA, in *Geography*, a town of Peru, in the diocefe of La Paz; 9 miles S. of La Paz.

VENTININA, a term ufed by Paracelfus and his followers, to exprefs the art of divining, or knowing by the winds and their courfes the good or ill effects of feafons.

VENTIS PONTE, in *Ancient Geography*, a town of Hifpania, in Betica, in the vicinity of Caracca.

VENTO, MATTEO, in *Biography*, a Neapolitan, and difciple of Jomelli. That, however, is not difcoverable in his compositions, which are eafy and graceful, but have none of the folidity or originality of his mafter. Arriving in England in 1764, at the inaufpicious termination of the reign of the Mingotti and Giardini at the Opera, he had the good fortune to be engaged by Gordon and Vincent, the new imprefarii, to compofe an opera, in which Manzoli was to perform the principal part. The opera which he had to fet was the Demofonte of Metaftafio, of which the airs are natural, graceful, and pleafing; always free from vulgarity, but never very new or learned. They were, however, in great public and private favour a confiderable time.

In 1765, on the fecond arrival of Elifi, he fet Sofonifba, in that eafy and graceful ftyle which pleafed more generally than what profefors would call better mufic. This drama was repeated more frequently than any other during the feafon, and the fongs, printed by the elder Wilckie, were long after in favour at concerts and public places, as well as among lifping miffes and diletanti.

In 1767, on the arrival of Guarducci, Vento fet the opera of "La Conquifta del Meflico," of which the airs, like thofe of his former operas, were elegant and pleafing. After this he feems to have filled up his whole time in teaching, till the arrival of Gabrielli, in 1776, when he fet "La Veftale," in his ufual eafy ftyle; and when we told him that his airs were fomewhat too familiar for great fingers, he faid, "God forbid I fhould ever compofe difficult mufic!"

This compofer's harpfichord pieces are fimfly, and fo much alike, that the invention, with refpect to melody and modulation of the eight fets, may be compreffed into two or three movements. In thefe fonatas, as well as in his fongs, he avoids vulgar paffages, and has a graceful, eafy, and flowing melody; but his bafes are too like Alberti's, and his trebles too like one another, either to improve the hand or delight the ear. He had a great number of fcholars, which ensured the expence of printing his pieces, though not their general and public favour. One or two fets of fuch eafy compositions would, indeed, have been very ufeul to fcholars in the firft ftages of their execution; but eight books, in which there is fo little variety, can never be wanted, or indeed borne, but by thofe who think it right implicitly to receive all their mafter's prefcriptions. His duos for voices are alike trivial and uninterefting, and the opera of "Artaferfe," which he compofed for the Harmonic Meeting, that was fet up in 1771 by the friends of Guadagni and Giardini againft the great Opera, under the management of Mr. Hobart, which people of the firft rank were fo impatient to hear in a clandestine way, as to run the rifk of pains and penalties for it, when publifhed, appeared to have lefs merit and novelty than any one of his former works.

Vento died in 1777, very rich, as there was every reafon of induftry, parfimony, and avarice, to imagine; but by fome ftrange difpofition of his property and affairs, none of his effects could be found at his death; and his widow and her mother were left wholly deltitute of fupport, but from charity and the loweft menial labour.

VENTOSA, SPINA. See *SPINA Ventofa*.

VENTOSITY, in *Medicine*. See *FLATULENCE* and *TYPANITES*.

VENTOSO, CAPE, in *Geography*, a cape on the N.E. coast of the island of Cabrera, in the Mediterranean. N. lat. $39^{\circ} 10'$. E. long. $2^{\circ} 55'$.

VENTOTIENA, in *Geography*, an island in the Mediterranean, near the coast of Naples, anciently called *Pandataria*; according to Sir William Hamilton, composed of volcanic matter thrown up by fire. It is now, as it seems to have been for ages, used as a place of banishment for criminals of a superior rank. Hither Julia, the daughter of Augustus, was sent, accompanied by her mother Scribonia. Some years the virtuous Agrippina was also confined here; and Octavia, wife of Nero, and daughter of Claudius, was at the instigation of Poppæa banished and murdered in this island; 17 miles W. of Ischia. N. lat. $40^{\circ} 53'$. E. long. $13^{\circ} 19'$.

VENTRÆ, in *Ancient Geography*, a town of Italy; to which the Romans sent a colony about the year 351 from the foundation of Rome, according to Diodorus Siculus.

VENTRE, in *Geography*, a town of Hindoostan, in the circur of Ellore; 7 miles W. of Ellore.

VENTRE *Inspiciendo*, in *Laws*, a writ for the search of a widow that says she is with child, and thereby holds land from him that is, otherwise, next heir at law. See *Jury of MATRONS*.

VENTREVRE, in *Geography*, a small island in the Atlantic, near the coast of France. N. lat. $47^{\circ} 28'$. W. long. $2^{\circ} 59'$.

VENTRICULUS, in *Anatomy*, the stomach. See *STOMACH*.

VENTRICULI *Cordis*, the two cavities of the heart, which propel the blood into the arteries; they are the right and left, or pulmonary and aortic. See *HEART*.

VENTRICULI or *Ventricles of the Brain*, cavities in different parts of its substance. They are the two lateral, right and left, called also tricoines; the 3d, 4th, and 5th, or ventricle of the septum lucidum. See *BRAIN*.

VENTRICULI *Ardor*. See *ARDOR*.

VENTRICULUS *Succenturiatus*, in *Medicine*, a name given by some to the duodenum, when very large. *Med. Ess.* Edinb. abr. vol. ii. p. 34.

VENTRILOQUOUS, VENTRILOQUUS, compounded of *venter*, belly, and *loquor*, I speak, *gastriloquus*, or *engastrimythus*, a term applied to persons who speak inwardly; having a peculiar art of forming speech, by drawing the air into the lungs; so that the voice, proceeding out of the thorax, to a by-stander seems to come from some distance, or in any direction. See *ENGASTRIMYTHUS*.

Such a person we had formerly in London, a smith by profession, who had the faculty in such perfection, that he could make his voice appear, now, as if it came out of the cellar; and the next minute, as if in an upper room; and nobody present could perceive that he spoke at all. Accordingly, he has frequently called a person first up, then down stairs; then out of doors, then this way, then that; and all this without stirring from his seat, or appearing to speak at all.

We cannot forbear making a few extracts on this curious subject from a work, published in 1772, entitled "Le Ventriloque," &c. or the Ventriloquist, by M. de la Chapelle, censor royal at Paris, member of the Academies at Lyons and Rouen, and F.R.S. Some faint traces of the art or faculty of ventriloquism are to be found in the writings of the ancients; but many more are to be discovered there, if we adopt this author's opinion, that the responses of many of the ancient oracles were actually delivered by persons possessing this quality, so very capable of being applied to the purposes of priestcraft and delusion. The abbé de la

Chapelle, having heard many surprising circumstances related concerning one M. St. Gille, a grocer at St. Germain-en-Laye, near Paris, whose powers as a ventriloquist had given occasion to many singular and diverting scenes, formed the resolution of seeing him. Being seated with him on the opposite side of a fire in a parlour on the ground-floor, and very attentively observing him, the abbé, after half an hour's conversation with M. St. Gille, heard himself called, on a sudden, by his name and title, in a voice that seemed to come from the roof of a house at a distance; and whilst he was pointing to the house from which the voice had appeared to him to proceed, he was yet more surprised by hearing the words "it was not from that quarter," apparently in the same kind of voice as before, but which now seemed to issue from under the earth, at one of the corners of the room. In short, this factitious voice played, as it were, every where about him, and seemed to proceed from any quarter, or distance, from which the operator chose to transmit it to him. To the abbé, though conscious that the voice proceeded from the mouth of M. St. Gille, he appeared absolutely mute, while he was exercising this talent; nor could any change in his countenance be discovered. He observed, however, that M. St. Gille presented only the profile of his face to him, while he was speaking as a ventriloquist. On another occasion, M. St. Gille sought for shelter from a storm in a neighbouring convent; and finding the community in mourning, and enquiring the cause, he was told, that one of their body much esteemed by them had lately died. Some of the religious attended him to the church, and shewing him the tomb of their deceased brother, spoke very feelingly of the scanty honours that had been bestowed on his memory; when suddenly a voice was heard, apparently proceeding from the roof of the choir, lamenting the situation of the defunct in purgatory, and reproaching the brotherhood with their want of zeal on his account. The whole community being afterwards convened into the church, the voice from the roof renewed its lamentations and reproaches, and the whole convent fell on their faces, and vowed a solemn reparation. Accordingly they first chaunted a *de profundis* in full choir, during the intervals of which the ghost occasionally expressed the comfort he received from their pious exercises and ejaculations in his behalf. The prior, when this religious service was concluded, entered into a serious conversation with M. St. Gille, and inveighed against the absurd incredulity of our modern sceptics, and pretended philosophers, on the article of ghosts and apparitions; and M. St. Gille found it difficult to convince the fathers that the whole was a ludicrous deception.

Another instance of his extraordinary powers occurred in presence of a large party, consisting of commissaries from the Royal Academy of Sciences at Paris, and other persons of the highest quality, together with a certain lady, who was not in the secret, and who was only told, that an aerial spirit had lately established itself in the forest of St. Germain-en-Laye, and that they were assembled to enquire into the reality of the fact. When the party sat down to dinner, the aerial spirit began to address the lady with a voice that seemed to be in the air over their heads; sometimes he spoke to her from the trees around them, or from the surface of the ground at a great distance, and at other times from a considerable depth under her feet. The lady, being thus addressed for more than two hours, was firmly persuaded that this was the voice of an aerial spirit; and it was some time before she was undeceived.

Several other instances of M. St. Gille's talents are related; and the abbé, in the course of his inquiries, was informed,

formed, that the baron de Mengen, a German nobleman, possessed this art in a very high degree. He also relates, from Brodeau, a learned critic in the sixteenth century, one of the singular feats performed by a capital ventriloquist in his time, who was called Louis Brabant, and was valet de chambre to Francis I. Our countryman Dickenfon speaks of him particularly, in his tract entitled "Delphi Phœnicizantes," printed in duodecimo at Oxford, in 1655. Louis had fallen in love with a beautiful and rich heiress, but was rejected by the parents as an unfuitable match, on account of his low circumstances. However, the father dying, he visits the widow; and on his first appearance in the house, she hears herself accosted in a voice resembling that of her dead husband, and which seemed to proceed from above. "Give my daughter in marriage to Louis Brabant, who is a man of great fortune, and excellent character; I now endure the inexpressible torments of purgatory, for having refused her to him; obey this admonition, and I shall be soon delivered; you will provide a worthy husband for your daughter, and procure everlasting repose to the soul of your poor husband." The dread summons, which had no appearance of proceeding from Louis, whose countenance exhibited no change, and whose lips were close and motionless, was instantly complied with; but the deceiver, in order to mend his finances for the accomplishment of the marriage-contract, applies to one Cornu, an old and rich banker at Lyons, who had accumulated immense wealth by usury and extortion, and was haunted by remorse of conscience. After some conversation on demons and spectres, the pains of purgatory, &c. during an interval of silence, a voice is heard like that of the banker's deceased father, complaining of his dreadful situation in purgatory, and calling upon him to rescue him from thence, by putting into the hands of Louis Brabant, then with him, a large sum for the redemption of Christians in slavery with the Turks; threatening him at the same time with eternal damnation, if he did not thus expiate his own sins. Upon a second interview, in which his ears were saluted with the complaints and groans of his father, and of all his deceased relations, imploring him for the love of God, and in the name of every saint in the Calendar, to have mercy on his own soul and others, Cornu obeyed the heavenly voice, and gave Louis ten thousand crowns, with which he returned to Paris, and married his mistress. The miser, being afterwards undeceived, was so mortified, that he took to his bed and died.

The abbé de la Chapelle takes occasion to account for all the circumstances attending Saul's conference with the WITCH of Endor, (which see,) and endeavours to shew that the speech, supposed to be addressed to Saul by the ghost of Samuel, actually proceeded from the mouth of the reputed forceress, whom he supposes to have been a capital ventriloquist. On these grounds he explains that transaction, and reconciles all its circumstances to the relation given of it in Scripture; where, it is to be observed, that Saul is not said to have seen Samuel, but only to have heard a voice, which a ventriloquist can produce and transmit from any quarter, and with any degree of strength whatever. He afterwards brings many instances to prove, that the ancient oracles principally supported their credit, and derived their influence, from the exercise of this particular art. Many other learned men have given the same account of the witch of Endor. Though she is said to have a *familiar spirit*, yet the Hebrew word *ob*, and the plural *oboth*, is generally rendered by the LXX *ὑψαστεμυθοί*, *ventriloquists*. Thus it is rendered Isaiah, xix. 3. It appears from Plutarch (De Defect. Orac. tom. ii. p. 414.), Suidas (tom. i. ad voc. *ὑψαστεμυθοί*, p. 667.), and Josephus (Antiq. lib. xiv. p. 354.),

that those who were anciently called ventriloquists had afterwards the name of *Pythoneffes*, which implies a pretence to divination. Accordingly *Pythos* is the word used by the Vulgate version, 1 Sam. xxviii. 7, 8; though not, as Voltaire seems to intimate, in the Hebrew; and, therefore, there is no ground for the conclusion which he draws, *viz.* that the history was not written till the Jews traded with the Greeks, after the time of Alexander, *i. e.* for determining the date of a Hebrew book from the use of a word in a Latin translation, made many hundred years after it, and not to be found in the original.

From baron de Mengen's account of himself, and the observations made by M. de la Chapelle in his frequent examinations of M. St. Gille, it seems that the factitious voice produced by a ventriloquist does not (as the etymology of the word imports) proceed from the belly, but is formed in the inner parts of the mouth and throat. The art, according to this author, does not depend on a particular structure or organization of these parts, peculiar to a few individuals, and very rarely occurring, but may be acquired by almost any ardently desirous of attaining it, and determined to persevere in repeated trials. The judgments we form concerning the situation and distance of bodies, by means of the senses mutually assisting and correcting each other, seem to be entirely founded on experience (see Reid's Inquiry into the Human Mind, p. 70. edit. 2.); and we pass from the sign to the thing signified by it immediately, or at least without any intermediate steps perceptible to ourselves. Hence it follows, that if a man, though in the same room with another, can by any peculiar modification of the organs of speech produce a sound, which in faintness, tone, body, and every other sensible quality, perfectly resembles a sound delivered from the roof of an opposite house, the ear will naturally, without examination, refer it to that situation and distance; the sound which the person hears being only a sign, which from infancy he has been accustomed, by experience, to associate with the idea of a person speaking from a house-top. A deception of this kind is practised with success on the organ, and other musical instruments; and there are many similar optical deceptions.

Rolandus, in his *Aglossostomographia*, mentions, that if the mediastinum, which is naturally a single membrane, be divided into two parts, the speech will seem to come out of the breast; so that the by-standers will fancy the person possessed.

For some facts and observations tending to explain the curious phenomena of ventriloquism by Mr. John Gough, we refer to the Manchester Memoirs, vol. v. part 2. p. 622. London, 1802, in which the ingenious author investigates the method whereby men judge by the ear of the position of sonorous bodies relative to their own persons. This author observes in general, that a sudden change of direction in sound, our knowledge of which, as he conceives, does not depend on the impulse in the ear, but on other facts, will be perceived, when the original communication is interrupted, provided there be a sensible echo. This circumstance will be acknowledged by any person who has had occasion to walk along a valley, intercepted with buildings, at the time that a peal of bells was ringing in it. For the sound of the bells, instead of arriving constantly at the ears of a person so situated, in its true direction, is frequently reflected in a short time from two or three different places. These deceptions are in many cases so much diversified by the successive interpositions of fresh objects, that the steeple appears, in the hearer's judgment, to perform the part of an expert ventriloquist on a theatre, the extent of which is adapted to its own powers, and not to those of the human voice.

voice. The similarity of effect which connects this phenomenon with ventriloquism convinced the author, whenever he heard it, that what we know to be the cause in one instance is also the cause in the other, *viz.* that the echo reaches the ear, while the original sound is intercepted by *accident* in the case of the bells, but by *art* in the case of the ventriloquist. In order that the cause which gives rise to the amusing tricks of this uncommon talent may be pointed out with the greater clearness, it will be proper to describe certain circumstances that take place in the act of speaking, because the skill of the ventriloquist seems to consist in a peculiar management of them. Articulation is the art of modifying the sound of the larynx, by the assistance of the cavity of the mouth, the tongue, teeth, and lips. The different vibrations, which are excited by the joint operation of the several organs in action, pass along the bones and cartilages, from the parts in motion to the external teguments of the head, face, neck, and chest; from which, a succession of similar vibrations is imparted to the contiguous air, thereby converting the superior moiety of the speaker's body into an extensive seat of sound, contrary to general opinion, which supposes the passage of the voice to be confined to the opening of the lips.

When an orator addresses an audience in a lofty and spacious room, his voice is reflected from every point of the apartment, of which all present are made sensible by the confused noise that fills up every pause in his discourse; nevertheless, every one knows the true place of the speaker, because his voice is the prevailing sound at the time. But were it possible to prevent his words from reaching any one of the audience directly, what would then follow? Undoubtedly a complete case of ventriloquism would be the consequence, and the person so circumstanced would transport the orator, in his own mind, to the place of the principal echo, which would perform the part of the prevailing sound at the instant. This he would be obliged to do, because the human judgment is bound, by the dictates of experience, to regard the person as inseparable from the voice; and the deception in question would be unavoidable, being produced by the same concurrence of causes which makes a peal of bells, situated in a valley, seem to change place in the opinion of a traveller. It is the business of a ventriloquist to amuse his admirers with tricks resembling the foregoing delusion; and it will be readily granted, that he has a subtle sense, highly corrected by experience, to manage, on which account the judgment must be cheated as well as the ear. This can only be accomplished by making the pulses, constituting his words, strike the heads of his hearers, not in the right lines that join their persons and his. He must, therefore, know how to disguise the true direction of his voice, because the artifice will give him an opportunity to substitute almost any echo he chuses in the place of it. But the superior part of the human body has been already proved to form an extensive seat of sound, from every point of which the pulses are repelled, as if they diverged from a common centre. This is the reason why people, who speak in the usual way, cannot conceal the direction of their voices, which in reality fly off towards all points at the same instant. The ventriloquist, therefore, by some means or other, acquires the difficult habit of contracting the field of sound within the compass of his lips, which enables him to confine the real path of his voice to narrow limits. For he, who is master of the art, has nothing to do but to place his mouth obliquely to the company; and to dart his words, if the expression may be used, against an opposing object, whence they will be reflected immediately, so as to strike the ears of the audience from an unexpected quarter, in consequence of which the reflector

will appear to be the speaker. Nature seems to fix no bounds to this kind of deception, only care must be taken not to let the path of the direct pulses pass too near the head of the person who is to be played upon; for, if a line, joining the exhibitor's mouth and the reflecting body, approach one of his ears too nearly, the divergency of the pulses will make him perceive the voice itself, instead of the reverberated sound.

The author has given the following narrative of a ventriloquist, whom he attended in the exercise of his art. His audience was arranged in two opposite lines, corresponding to the two sides of a long narrow room. The benches on which they were seated reached from one end of the place to the middle of it, the other part remaining unoccupied. The feats exhibited by him were the three following. First: he made his voice come from behind his audience, but it never seemed to proceed from any part of the wall, near the heads of the people present; on the contrary, it was always heard resembling the voice of a child, who seemed to be under the benches. He stood during the time of speaking in a stooping posture, having his mouth turned towards the place from which the sound issued; so that the line, joining his lips and the reflecting object, did not approach the ears of the company. Second: advancing into the vacant part of the room, and turning his back to the audience, he made a variety of noises, that seemed to proceed from an open cupboard which stood directly before him, at the distance of two or three yards. Third: he placed an inverted glass cup on the hands of his hearers, and then imitated the cries of a child confined in it. His method of doing it was this; the upper part of the hearer's arm laid close along his side; then the part below the elbow was kept in a horizontal position, with the hand turned downwards, which was done by the operator himself. After taking these preparatory steps, the man bent his body forwards in a situation which presented the profile of his face nearly to the front of his hearer, whilst his mouth pointed to the cup; in which posture he copied the voice of a confined child so completely, that three positions of the glass were easily distinguished by as many different tones, *viz.* when he pressed the mouth of the cup close against the palm, when one edge of it was elevated, and when the vessel was held near the hand, but did not touch it. The second and third instances of ventriloquism afford strong proofs, that this delusive talent is nothing more than the art of substituting an echo for the primary sound; for, besides the change perceivable in the direction of the voice, it was found to be blended with a variety of secondary sounds; such as we know by experience are produced, as often as a noise of any kind issues from a cavity.

The method of preventing the vibration of the vocal organs from reaching the external teguments is still wanting, as our author acknowledges, to complete his theory of ventriloquism; and this, he presumes, can only be supplied by an adept in the art.

VENTRY, in *Geography*, a small town of the county of Kerry, Ireland, situated on a harbour to which it gives name, on the Atlantic ocean. It is $4\frac{1}{2}$ miles W. of Dingle.

VENTURINE, or ADVENTURINE, is sometimes used for the finest and slenderest gold wire, used by embroiderers, &c.

When reduced into powder, as fine as it can be clipped, or filed, this powder may be strewed on the first layer of pure varnish, made use of in japaning, after the varnish is dry, in order to lay any colour over it.

VENUE, or VENUEW, in *Law*, a neighbouring or near place. *Locus quem vicini habitant.*

Thus we say, twelve of the affizes ought to be of the same venue where the demand is made.

In transitory actions, the courts will very often change the venue, or county, in which the cause is to be tried. The statute 6 Ric. II. cap. 2. having ordered all writs to be laid in their proper counties, this, as the judges conceived, empowered them to change the venue, if required, and not to insist rigidly on abating the writ, which practice began in the reign of James I.; and this power is discretionally exercised, so as not to cause, but prevent a defect of justice. Therefore the court will not change the venue to any of the four northern counties, previous to the spring circuit; because there the affizes are holden only once a year, at the time of the summer circuit. And it will sometimes remove the venue from the proper jurisdiction, (especially of the narrow and limited kind,) upon a suggestion, duly supported, that a fair and impartial trial cannot be had therein. Blackst. Comm. book iii.

VENUS, in *Astronomy*, one of the inferior planets; denoted by the character ♀.

Venus is easily distinguished by her brightness and whiteness, which exceeds that of all the other planets; and which is so considerable, that, in a dusky place, she projects a sensible shadow. Her place is between the earth and Mercury.

She constantly attends the sun, and never departs from him above $47^{\circ} 48'$ or $44^{\circ} 57'$. If S be the sun (*Plate XXI. Astronomy, fig. 8.*), E the earth, V Venus or Mercury, and EV a tangent to the orbit of the planet, then will the angle SEV be the greatest elongation of the planet from the sun; which angle, if the orbits were circles having the sun in their centre, would be found by saying, ES : SV :: rad. : fin. SEV. But the orbits are not circular, in consequence of which the angle EVS will not be a right angle, unless the greatest elongation happens when the planet is at one of its apsidæ. The angle SEV is also subject to an alteration from the variation of SE and SV. The greatest angle SEV happens, when the planet is in its aphelion, and the earth in its perigee; and the least angle SEV, when the planet is in its perihelion, and the earth in its apogee. M. de la Lande has calculated these greatest elongations, and finds them $47^{\circ} 48'$ and $44^{\circ} 57'$ for Venus, and $28^{\circ} 20'$ and $17^{\circ} 36'$ for Mercury. If we take the mean of the greatest elongations of Venus, which is $46^{\circ} 22'.5$, it gives the angle VSE = $43^{\circ} 37'.5$; and as the difference of the daily mean motions of Venus and the earth about the sun is $37'$, we have $37' : 43^{\circ} 37'.5 :: 1 \text{ day} : 70.7 \text{ days}$, the time that would elapse between the greatest elongations and the inferior conjunction, if the motions had been uniform, which will not vary much from the true time. See ELONGATION.

To find the position of a planet when stationary. Let S be the sun (*fig. 9.*), E the earth, P the contemporary position of the planet, Xy the sphere of the fixed stars, to which we refer the motions of the planets; let EF, PQ, be two indefinitely small arcs described in the same time, and let EP, FQ, produced, meet at L; then it is manifest, that whilst the earth moves from E to F, the planet appears stationary at L; and on account of the immense distance of the fixed stars, EPL, FQL may be considered as parallel. Draw SE, SFw, SvP, and SQ; then, as EP and FQ are parallel, the angle QFS - PES = PwS - PES = ESF, and SPw - SQF = SvF - SQF = PSQ; that is, the contemporary variations of the angles E and P are as ESF : PSQ, the contemporary variations of the angular velocities of the earth and planet, or, (because the angular velocities are inversely as the pe-

riodic times, or inversely in the sesquuplicate ratio of the distances) as $SP^{\frac{3}{2}} : SE^{\frac{3}{2}}$, or (if $SP : SE :: a : 1$) as $a^{\frac{3}{2}} : 1^{\frac{3}{2}}$. But fin. SEP : fin. SPE being as $SP : SE$, or $a : 1$, the contemporary variations of these angles will be as their tangents. Hence, if x and y be the sines of the angles SEP and SPE, we have $x : y :: a : 1$, and

$$\frac{x}{\sqrt{1-x^2}} : \frac{y}{\sqrt{1-y^2}} :: a^{\frac{3}{2}} : 1, \text{ whence } x^2 = \frac{a^3 - a^2}{a^3 - 1}$$

$$= \frac{a^2}{a^2 + a + 1}, \text{ and } x = \frac{a}{\sqrt{a^2 + a + 1}}, \text{ the sine of the}$$

planet's elongation from the sun, when stationary.

Ex. If P be the earth, and E Venus; and we take the distances of the earth and Venus to be 100000 and 72333, we find $x = 0.48264$ the sine of $28^{\circ} 51' 5''$, the elongation of Venus when stationary, upon the supposition of circular orbits.

For excentric orbits, the points will depend upon the position of the apsidæ and places of the bodies at the time. We may, however, get a very near approximation thus. Find the time when the planet would be stationary, if the orbits were circular, and compute for several days, about that time, the geocentric place of the planet, so that you get two days, on one of which the planet was direct, and on the other retrograde, in which interval it must have been stationary, and the point of time when this happened may be determined by interpolation.

To find the time when a planet is stationary, we must know the time of its opposition, or inferior conjunction. Let m and n be the daily angular velocities of the earth and planet about the sun, and v the angle PSE, when the planet is stationary; then $m - n$, or $n - m$, is the daily variation of the angle at the sun between the earth and planet, according as it is a superior or inferior planet;

hence, $m - n$, or $n - m$, : $v :: 1 \text{ day} : \frac{v}{m - n}$, or $\frac{v}{n - m}$, the time from opposition or conjunction to the sta-

tionary points both before and after. Hence, the planet must be stationary twice every synodic revolution.

Ex. Let P be the earth, E Venus; then the angle SPE = $20^{\circ} 51'.5$; therefore, PSE = 13° ; also, $n - m = 37'$; hence, $37' : 13^{\circ} :: 1 \text{ day} : 21 \text{ days}$, the time between the inferior conjunction and stationary positions.

If the elongation be observed when stationary, we may find the distance of the planet from the sun, compared with the earth's distance, supposed to be unity. For $x^2 =$

$$\frac{a^2}{a^2 + a + 1}; \text{ hence, } a^2 + \frac{x^2}{x^2 - 1} \times a = -\frac{x^2}{x^2 - 1}$$

$$= (\text{if } t = \text{the tangent of the angle whose sine is } x) a^2 - t^2$$

$$a = t^2; \text{ consequently, } a = \frac{1}{2} t^2 + t \sqrt{1 + \frac{t^2}{4}}, \text{ upon}$$

the supposition of circular orbits.

A superior planet is retrograde in opposition, and an inferior planet is retrograde in its inferior conjunction; for let E be the earth (*fig. 10.*), P a superior planet in opposition; then, as the velocities are as the inverse square roots of the radii of the orbits, the superior planet moves slowest; hence, if EF, PQ, be two indefinitely small contemporary arcs, PQ is less than EF, and on account of the immense distance of the sphere YZ of the fixed stars, FQ must cut EP in some point x between P and m , consequently the planet appears retrograde from m to n . If P be the earth, and E an inferior planet in inferior conjunction, it will appear

pear retrograde from v to w . These retrograde motions must necessarily continue till the planets become stationary. Hence, a superior planet appears retrograde from its stationary point before opposition to its stationary point after; and an inferior planet, from its stationary point before inferior conjunction to its stationary point after.

When Venus appears west of the sun, that is, from her inferior conjunction to her superior, she rises before him, and is called *Phosphorus*, or *Lucifer*, or the *Morning star*; and when she appears east of the sun, that is, from her superior conjunction to her inferior, she sets after him, or shines in the evening after he sets, and is called *Hesperus*, or *Vesper*, or the *Evening star*: being each in its turn for two hundred and ninety days.

To delineate the appearance of a planet at any time. Let S be the sun (fig. 11.), E the earth, V Venus, for example; aVb the plane of illumination perpendicular to SV , cVd the plane of vision perpendicular to EV , and draw av perpendicular to cd ; then ca is the breadth of the visible illuminated part, which is projected by the eye into cv , the versed sine of Cva , or SVZ , for SVc is the complement of each. Now the circle terminating the illuminated part of the planet, being seen obliquely, appears to be an ellipse; therefore, if $cmdn$ represent the projected hemisphere of Venus next to the earth, mn , cd , two diameters perpendicular to each other, and we take $cv =$ the versed sine of SVZ , and describe the ellipse mvn , then cv is the axis minor, and $mcnv$ will represent the visible enlightened part, as it appears at the earth; and from the property of the ellipse, this area varies as cv . Hence, the visible enlightened part : the whole disc :: the versed sine of SVZ : diameter.

Hence, Mercury and Venus will have the same phases from their inferior to their superior conjunction, as the moon has from the new to the full; and the same from the superior to the inferior conjunction, as the moon has from the full to the new. Mars will appear gibbous in quadratures, as the angle SVZ will then differ considerably from the two right angles, and consequently the versed sine will sensibly differ from the diameter. For Jupiter, Saturn, and the Georgian, the angle SVZ never differs enough from two right angles to make those planets appear gibbous, so that they always appear full-orbed.

Dr. Halley proposed the following problem: To find the position of Venus when brightest, supposing its orbit, and that of the earth, to be circles, having the sun in their centre. Draw Sr perpendicular to EVZ , and put $a = SE$, $b = SV$, $x = EV$; $y = Vr$; then $b - y$ is the versed sine of the angle SVZ , which versed sine varies as the illuminated part; and as the intensity of light varies inversely as the square of its distance, the quantity of light

received at the earth varies as $\frac{b-y}{x^2} = \frac{b}{x^2} - \frac{y}{x^2}$; but

$a^2 = b^2 + x^2 + 2xy$; hence, $y = \frac{a^2 - b^2 - x^2}{2x}$; substitute this for y , and we get the quantity of light to be as

$$\frac{b}{x^2} - \frac{a^2 - b^2 - x^2}{2x^3} = \frac{2bx - a^2 + b^2 + x^2}{2x^3} = \text{a maxi-}$$

mum; put the fluxion = 0, and we get $x = \sqrt{3a^2 + b^2} - 2b$. Now, if $a = 1$, $b = .72333$, as in Dr. Halley's tables, then $x = .43036$; hence, the angle $ESV = 22^\circ 21'$, but the angle ESV , at the time of the planet's greatest elongation, is $43^\circ 40'$; hence, Venus is brightest between its inferior conjunction and its greatest elongation; also, the angle $SEV = 39^\circ 44'$, the elongation of Venus from the

sun at the same time, and $\angle SVZ = VSE + VES = 62^\circ 5'$, the versed sine of which is 0.53, radius being unity; hence, the visible enlightened part : whole disc :: 0.53 : 2; Venus, therefore, appears a little more than one-fourth illuminated, and answers to the appearance of the moon when five days old. Her diameter here is about $30''$, and therefore the enlightened part is about $10''.25$. At this time, Venus is bright enough to cast a shadow at night. This situation happens about 36 days before and after its inferior conjunction; for, supposing Venus to be in conjunction with the sun, and when seen from the sun to depart from the earth at the rate of $37'$ in 1 day, we have $37' : 22^\circ 21' :: 1 \text{ day} : 36 \text{ days}$ nearly, the time from conjunction till Venus is brightest.

If we apply this to Mercury, $b = .3171$, and $x = 1.00058$; hence, the angle $ESV = 78^\circ 55'$; but the same angle, at the time of the planet's greatest elongation, is $67^\circ 13'$. Hence, Mercury is brightest between its greatest elongation and superior conjunction. Also, the angle $SEV = 22^\circ 18'$, the elongation of Mercury at that time.

When Venus is brightest, and at the same time is at its greatest north latitude, it can then be seen with the naked eye at any time of the day, when it is above the horizon; for when its north latitude is the greatest, it rises highest above the horizon, and therefore is more easily seen, the rays of light having to come through a less part of the atmosphere, the higher the body is. This happens once in about eight years, Venus and the earth returning to the same parts of their orbits after that interval of time. Vince's Elements of Astronomy.

The diameter of Venus is to that of the earth as $11\frac{7}{12}$ to 10 nearly, her apparent diameter equal to $59'$, and real diameter equal to 9330 miles; her apparent diameter, when reduced to the mean distance of the earth, is, according to Dr. Herschel, $18''.79$, and her real diameter a little larger than that of the earth (see PLANET); her horizontal parallax about $30'$; her distance from the sun is to that of the earth from the sun as 72333 to 100000, and her real distance is 68,891,486 miles; her eccentricity is $\frac{1}{1750}$ ths of her mean distance from the sun (see EXCENTRICITY); the inclination of her orbit to the plane of the ecliptic $3^\circ 23' 35''$; her periodical course round the sun is performed in two hundred and twenty-four days seventeen hours nearly; and her motion round her own axis in twenty-three hours, or, according to the observations of Bianchini, in twenty-four days eight hours: according to Dr. Herschel, uncertain, but not so slow as twenty-four days. See DIAMETER, DISTANCE, EXCENTRICITY, NODE, PARALLAX, and PERIOD. See also PLANETS, PLANETARIUM, and Solar SYSTEM.

Venus, when viewed through a telescope, is rarely seen to shine with a full face, but has phases just like those of the moon; being now gibbous, now horned, &c. and her illuminated part is constantly turned towards the sun, i. e. it looks towards the east, when *Phosphorus*; and towards the west, when *Hesperus*.

These different phases of Venus were first observed by Galileo, who thus fulfilled the prediction of Copernicus: for when this excellent astronomer revived the ancient Pythagorean system, asserting, that the earth and planets moved round the sun, it was objected that in such a case the phases of Venus should resemble those of the moon; to which Copernicus replied, that some time or other that resemblance would be found out. Galileo sent an account of the first discovery of these phases in a letter, written from Florence in 1611, to William de Medici, the duke of Tuscany's ambassador at Prague; desiring him to communicate it

it to Kepler. The letter is extant in the preface to Kepler's *Dioptrics*, and a translation of it may be seen in Smith's *Optics*, p. 416.

Having recited the observations which he had made, he adds, "we have hence the most certain, sensible decision and demonstration of two grand questions, which to this day have been doubtful and disputed among the greatest masters of reason in the world. One is, that the planets in their own nature are opaque bodies, attributing to Mercury what we have seen in Venus: and the other is, that Venus necessarily moves round the sun, as also Mercury, and the other planets; a thing well believed indeed by Pythagoras, Copernicus, Kepler, and myself, but never yet proved, as now, by ocular inspection upon Venus." He closes with explaining the cypher that had been sent, in the following words: "Hæc immatura à me frustra leguntur, o, y; i. e. Cynthiæ figuræ æmulatur mater amorum, or, Venus imitates the phases of the moon."

M. Maraldi made several observations on Venus in 1729, but could perceive no spot; and, therefore, those observed by Bianchini must either have disappeared, or the air at Paris was not so clear as at Rome.

Martin Folkes, esq. formerly president of the Royal Society, spoke of Bianchini with respect, as too accurate to make any mistakes in astronomical observations, and too honest to publish any thing that was not exactly agreeable to truth. See *Nature of the PLANETS*.

Sometimes Venus is seen in the disc of the sun, in form of a dark round spot. This happens when the earth is about her nodes at the time of her inferior conjunction. These appearances, called transits, happen but seldom. We have had two in the last century, viz. one in June 1761, and another in June 1769. The next will not occur before the year 1874. See PARALLAX.

The effect of the parallax being determined, for computing which Dr. Maskelyne proposed a new method in relation to the transit of Venus in 1769, the transit affords a very ready method of finding the difference of the longitudes of two places where the same observations are made. For compute the effect of parallax in time, and reduce the observations at each place to the time, if seen from the centre of the earth, and the difference of the times is the difference of the longitudes. From the mean of sixty-three results from the transits of Mercury, Mr. Short found the difference of the meridians of Greenwich and Paris to be $9' 15''$; and from the transit of Venus in 1761, to be $9' 10''$ in time.

Except such transits as these, Venus exhibits the same appearances to us regularly every eight years; her conjunctions, elongations, and times of rising and setting, being very nearly the same, on the same days, as before.

In 1672 and 1686, Cassini, with a telescope of 34 feet, thought he saw a satellite moving round this planet, and distant from it about three-fifths of Venus's diameter. It had the same phases as Venus, but without any well-defined form; and its diameter scarcely exceeded one-fourth of that of Venus. Dr. Gregory (*Alt. lib. vi. prop. 3.*) thinks it more than probable that this was a satellite; and supposes the reason why it is not usually seen, to be the unfitness of its surface to reflect the rays of the sun's light; as is the case of the spots in the moon: of which, if the whole disc of the moon were composed, he thinks, that planet could not be seen as far as to Venus.

Mr. Short, in 1740, with a reflecting telescope of $16\frac{1}{2}$ inches focus, perceived a small star near Venus; with another telescope of the same focus, magnifying fifty or sixty times, and fitted with a micrometer, he found its distance from Venus about 10° : with a magnifying power of

240, he observed the star assume the same phases with Venus; its diameter seemed to be about one-third, or somewhat less, of the diameter of Venus; its light not so bright and vivid, but exceeding sharp and well defined. He viewed it for the space of an hour, but never had the good fortune to see it after the first morning. *Phil. Transf. N^o 459. p. 646, or Martyn's Abr. vol. viii. p. 208.*

M. Montaigne, of Limoges in France, was told in the *Encyclopédie*, art. *Venus*, preparing for observing the transit of 1761, discovered in the preceding May a small star about the distance of $20'$ from Venus, and its diameter was about one-fourth of the planet. He made other observations for several days, which were communicated to M. Baudouin, who read two memoirs on the subject to the Royal Academy of Sciences, in which he endeavoured to state the elements of the orbit of this satellite; but it is to be considered, that Montaigne's telescope had no micrometer, and that his distances must be very vague and uncertain. If Venus has a satellite, it must, according to Dr. Herschel, be less in appearance than a star of the eighth or ninth magnitude. *Phil. Transf. for 1795.*

After all, it must be acknowledged, that Venus may have a satellite, though it is difficult for us to see it. Its enlightened side can never be fully turned towards us, but when Venus is beyond the sun; in which case, Venus appears little bigger than an ordinary star, and, therefore, her satellite may be too small to be perceived at such a distance. When she is between us and the sun, her full moon has her dark side turned towards us; and when Venus is at her greatest elongation, we have but one half of the enlightened side of her full moon towards us, and even then it may be too far distant to be seen by us. But it was presumed, that the two transits of 1761 and 1769, would afford opportunity for determining this point; and yet we find that, although many observers directed their attention to this object, no satellite was seen in the sun's disc; and, therefore, it is reasonable to conclude, that Venus has no satellite.

The phenomena of Venus evidently shew the falsity of the Ptolemaic system: for that system supposes, that Venus's orb, or heaven, incloses the earth, passing between the sun and Mercury. And yet all our observations agree, that Venus is sometimes on this side of the sun, and sometimes on the other; nor did ever any body see the earth between Venus and the sun; which yet must frequently happen, if Venus revolved round the earth in an heaven below the sun.

Dr. Desaguliers contrived a planetarium to represent the phenomena of Venus, according to the discoveries of Bianchini; as did also Mr. Ferguson an orrery for the same purpose. The principal properties of these machines are the following: that the angle of the axis of the globe representing Venus makes, with the ecliptic, an angle of 15° ; that the tropics are 75° from the equator; that the tropics are 15° from the equator; that the plane of a solar horizon for the longest day cuts the plane of the equator at an angle of 15° ; that the sun's greatest declination is 75° ; that there are but $9\frac{1}{4}$ days in every revolution round the sun; and that to bring the days to an even reckoning, every fourth year must be a leap year, which, taking in the four quarters of a revolution, will make the leap year in Venus consist of ten of her days, equal to $7\frac{1}{2}$ months of our time; and that the long day for the north pole will contain $4\frac{2}{3}$ apparent diurnal revolutions of the sun. For a detail and illustration of the phenomena resulting from these properties, see Desaguliers's *Exp. Phil. vol. ii. p. 552, &c.* *Phil. Transf. vol. xlv. p. 127, &c. &c.* *Ferguson's Astron. p. 8, &c.* For the history and account of various instruments of this kind, see ORRERY and PLANETARIUM.

TABLE I. — Epochs of the Mean Longitude of Venus.

Years.	Mean Long.				Aphelion.				Node.				
	S.	D.	M.	S.	S.	D.	M.	S.	S.	D.	M.	S.	
Nat. J. C.	0	5	28	29	10	9	14	8	12	1	29	22	9
100	0	17	42	10	9	15	39	12	2	0	13	49	
1400	2	27	31	10	10	3	12	12	2	11	25	29	
1500	9	16	44	10	10	4	33	12	2	12	17	9	
B. N. S.	1600	3	19	55	52	10	5	54	12	2	13	8	48
C.	1700	10	7	32	45	10	7	15	12	2	14	0	28
B.	1740	10	15	13	58	10	7	46	36	2	14	21	8
B.	1760	4	19	4	34	10	8	3	48	2	14	31	28
B.	1780	10	22	55	10	10	8	20	0	2	14	41	48
B.	1786	7	23	16	16	10	8	23	52	2	14	44	54
	1787	3	8	3	46	10	8	25	40	2	14	45	25
	1788	10	24	27	24	10	8	26	29	2	14	45	56
	1789	6	9	14	54	10	8	27	17	2	14	46	27
	1790	1	24	2	24	10	8	28	6	2	14	46	58
B.	1791	9	8	49	54	10	8	28	55	2	14	47	29
	1792	4	25	13	31	10	8	29	43	2	14	48	0
	1793	0	10	1	1	10	8	30	32	2	14	48	31
	1794	7	24	48	31	10	8	31	20	2	14	49	2
	1795	3	9	36	1	10	8	32	9	2	14	49	33
B.	1796	10	25	59	38	10	8	32	58	2	14	50	4
	1797	6	10	47	8	10	8	33	46	2	14	50	35
	1798	1	25	34	38	10	8	34	35	2	14	51	6
	1799	9	10	22	8	10	8	35	23	2	14	51	37
C.	1800	4	25	9	38	10	8	36	12	2	14	52	8
B.	1801	0	9	57	8	10	8	37	1	2	14	52	39
	1802	7	24	44	38	10	8	37	49	2	14	53	10
	1803	3	9	32	7	10	8	38	38	2	14	53	41
	1804	10	25	55	45	10	8	39	26	2	14	54	12
	1805	6	10	43	15	10	8	40	15	2	14	54	43
B.	1806	1	25	30	45	10	8	41	3	2	14	55	14
	1807	9	10	18	15	10	8	41	52	2	14	55	45
	1808	4	26	41	52	10	8	42	40	2	14	56	16
	1809	0	11	29	22	10	8	43	29	2	14	56	47
	1810	7	26	16	52	10	8	44	18	2	14	57	18
B.	1811	3	11	4	22	10	8	45	6	2	14	57	49
	1812	10	27	27	59	10	8	45	55	2	14	58	20
	1813	6	12	15	29	10	8	46	43	2	14	58	51
	1814	1	27	2	59	10	8	47	32	2	14	59	22
	1815	9	11	50	29	10	8	48	21	2	14	59	53
B.	1816	4	28	14	7	10	8	49	9	2	15	0	24
	1817	0	13	1	36	10	8	49	58	2	15	0	55
	1818	7	27	49	6	10	8	50	46	2	15	1	26
B.	1819	3	12	36	36	10	8	51	35	2	15	1	57
	1820	10	29	0	14	10	8	52	24	2	15	2	28

TABLE II. — Mean Motion of Venus for Years.

Years.	Mot. in Long.				Mot. Aph.			Mot. Node.			
	S.	D.	M.	S.	D.	M.	S.	D.	M.	S.	
B.	1	7	14	47	30	0	0	49	0	0	31
	2	2	29	35	0	0	1	37	0	1	2
	3	10	14	22	30	0	2	26	0	1	33
	4	6	0	46	7	0	3	14	0	2	4
B.	5	1	15	33	37	0	4	3	0	2	35
	6	9	0	21	7	0	4	52	0	3	6
	7	4	15	8	37	0	5	40	0	3	37
	8	0	1	32	14	0	6	29	0	4	8
B.	9	7	16	19	44	0	7	17	0	4	39
	10	3	1	7	14	0	8	6	0	5	10
	11	10	15	54	44	0	8	55	0	5	41
	12	6	2	18	22	0	9	43	0	6	12
	13	1	17	5	51	0	10	32	0	6	43
	14	9	1	53	21	0	11	20	0	7	14
B.	15	4	16	40	51	0	12	9	0	7	45
	16	0	3	4	29	0	12	58	0	8	16
	17	7	17	51	59	0	13	46	0	8	47
	18	3	2	39	28	0	14	35	0	9	18
	19	10	17	26	58	0	15	23	0	9	49
Biflexiles.	20	6	3	50	36	0	16	12	0	10	20
	40	0	7	41	12	0	32	24	0	20	40
	60	6	11	31	48	0	48	36	0	31	0
	80	0	15	22	24	1	4	48	0	41	20
	100	6	19	13	0	1	21	0	0	51	40
	200	1	8	26	0	2	42	0	1	43	20
	300	7	27	39	0	4	3	0	2	35	0
	400	2	16	52	0	5	24	0	3	26	40
	500	9	6	5	0	6	45	0	4	18	20
	600	3	25	18	0	8	6	0	5	10	0
Biflexiles.	700	10	14	31	0	9	27	0	6	1	40
	800	5	3	44	0	10	48	0	6	53	20
	900	11	22	57	0	12	9	0	7	45	0
	1000	6	12	10	0	13	30	0	8	36	40
	1100	1	1	23	0	14	51	0	9	28	20
Biflexiles.	1200	7	20	36	0	16	12	0	10	20	0
	1300	2	9	49	0	17	33	0	11	11	40
	1400	8	29	2	0	18	54	0	12	3	20
	1500	3	18	15	0	20	15	0	12	55	0
	2000	0	24	20	0	27	0	0	17	13	20

VENUS.

TABLE III. — Mean Motion of Venus for *Days*.

Days of Month.	JANUARY.				Days of Month.	FEBRUARY.				Days of Month.	MARCH.									
	Mot. Long.					Mot. Aph.	Mot. Node.	Mot. Long.				Mot. Aph.	Mot. Node.							
	S.	D.	M.	S.				SEC.	SEC.		S.			D.	M.	S.	SEC.	SEC.		
1	0	1	36	8	0	0	1	1	21	16	10	4	3	1	3	6	7	48	8	5
2	0	3	12	16	0	0	2	1	22	52	18	4	3	2	3	7	43	56	8	5
3	0	4	48	23	1	0	3	1	24	28	25	5	3	3	3	9	20	4	8	5
4	0	6	24	31	1	0	4	1	26	4	33	5	3	4	3	10	56	12	8	5
5	0	8	0	39	1	0	5	1	27	40	41	5	3	5	3	12	32	20	9	5
6	0	9	36	47	1	0	6	1	29	16	49	5	3	6	3	14	8	27	9	6
7	0	11	12	55	1	1	7	2	0	52	57	5	3	7	3	15	44	35	9	6
8	0	12	49	2	1	1	8	2	2	29	4	5	3	8	3	17	20	43	9	6
9	0	14	25	10	1	1	9	2	4	5	12	5	3	9	3	18	56	51	9	6
10	0	16	1	18	1	1	10	2	5	41	20	5	3	10	3	20	32	59	9	6
11	0	17	37	26	2	1	11	2	7	17	28	6	4	11	3	22	9	7	9	6
12	0	19	13	34	2	1	12	2	8	53	36	6	4	12	3	23	45	14	9	6
13	0	20	49	41	2	1	13	2	10	29	43	6	4	13	3	25	21	22	10	6
14	0	22	25	49	2	1	14	2	12	5	51	6	4	14	3	26	57	30	10	6
15	0	24	1	57	2	1	15	2	13	41	59	6	4	15	3	28	33	38	10	6
16	0	25	38	5	2	1	16	2	15	18	7	6	4	16	4	0	9	46	10	6
17	0	27	14	13	2	1	17	2	16	54	15	6	4	17	4	1	45	53	10	6
18	0	28	50	21	3	2	18	2	18	30	23	7	4	18	4	3	22	1	10	7
19	1	0	26	28	3	2	19	2	20	6	30	7	4	19	4	4	58	9	10	7
20	1	2	2	36	3	2	20	2	21	42	38	7	4	20	4	6	34	17	11	7
21	1	3	38	44	3	2	21	2	23	18	46	7	4	21	4	8	10	25	11	7
22	1	5	14	52	3	2	22	2	24	54	54	7	4	22	4	9	46	32	11	7
23	1	6	51	0	3	2	23	2	26	31	2	7	5	23	4	11	22	40	11	7
24	1	8	27	7	3	2	24	2	28	7	9	7	5	24	4	12	58	48	11	7
25	1	10	3	15	3	2	25	2	29	43	17	7	5	25	4	14	34	56	11	7
26	1	11	39	23	3	2	26	3	1	19	25	8	5	26	4	16	11	4	11	7
27	1	13	15	31	4	2	27	3	2	55	33	8	5	27	4	17	47	11	11	7
28	1	14	51	39	4	2	28	3	4	31	41	8	5	28	4	19	23	19	12	7
29	1	16	27	46	4	2								29	4	20	59	27	12	7
30	1	18	3	54	4	3								30	4	22	35	35	12	8
31	1	19	40	2	4	3								31	4	24	11	43	12	8

In the Months January and February of a Bifextile Year, subtract 1 from the given Day of the Month.

VENUS.

TABLE III. — continued.

Days of Month.	APRIL.				Days of Month.	MAY.				Days of Month.	JUNE.									
	Mot. Long.					Mot. Long.					Mot. Long.									
	S.	D.	M.	S.	SEC.	SEC.		S.	D.	M.	S.	SEC.	SEC.		S.	D.	M.	S.	SEC.	SEC.
1	4	25	47	50	12	8	1	6	13	51	45	16	10	1	8	3	31	47	20	13
2	4	27	23	58	12	8	2	6	15	27	52	16	10	2	8	5	7	54	20	13
3	4	29	0	6	12	8	3	6	17	4	0	16	10	3	8	6	44	2	20	13
4	5	0	36	14	13	8	4	6	18	40	8	16	11	4	8	8	20	10	21	13
5	5	2	12	22	13	8	5	6	20	16	16	17	11	5	8	9	56	18	21	13
6	5	3	48	30	13	8	6	6	21	52	24	17	11	6	8	11	32	26	21	13
7	5	5	24	37	13	8	7	6	23	28	31	17	11	7	8	13	8	33	21	13
8	5	7	0	45	13	8	8	6	25	4	39	17	11	8	8	14	44	41	21	13
9	5	8	36	53	13	8	9	6	26	40	47	17	11	9	8	16	20	49	21	14
10	5	10	13	1	13	8	10	6	28	16	55	17	11	10	8	17	56	57	21	14
11	5	11	49	9	13	9	11	6	29	53	3	17	11	11	8	19	33	5	22	14
12	5	13	25	16	14	9	12	7	1	29	10	18	11	12	8	21	9	12	22	14
13	5	15	1	24	14	9	13	7	3	5	18	18	11	13	8	22	45	20	22	14
14	5	16	37	32	14	9	14	7	4	41	26	18	11	14	8	24	21	28	22	14
15	5	18	13	40	14	9	15	7	6	17	34	18	11	15	8	25	57	35	22	14
16	5	19	49	48	14	9	16	7	7	53	42	18	12	16	8	27	33	44	22	14
17	5	21	25	55	14	9	17	7	9	29	50	18	12	17	8	29	9	51	22	14
18	5	23	2	3	14	9	18	7	11	5	57	18	12	18	9	0	45	59	22	14
19	5	24	38	11	14	9	19	7	12	42	5	18	12	19	9	2	22	7	23	14
20	5	26	14	19	15	9	20	7	14	18	13	19	12	20	9	3	58	15	23	15
21	5	27	50	27	15	9	21	7	15	54	21	19	12	21	9	5	34	23	23	15
22	5	29	26	34	15	10	22	7	17	30	29	19	12	22	9	7	10	30	23	15
23	6	1	2	42	15	10	23	7	19	6	36	19	12	23	9	8	46	38	23	15
24	6	2	38	50	15	10	24	7	20	42	44	19	12	24	9	10	22	46	23	15
25	6	4	14	58	15	10	25	7	22	18	52	19	12	25	9	11	58	54	23	15
26	6	5	51	6	15	10	26	7	23	55	0	19	12	26	9	13	35	2	24	15
27	6	7	27	13	16	10	27	7	25	31	8	20	12	27	9	15	11	10	24	15
28	6	9	3	21	16	10	28	7	27	7	15	20	13	28	9	16	47	17	24	15
29	6	10	39	29	16	10	29	7	28	43	23	20	13	29	9	18	23	25	24	15
30	6	12	15	37	16	10	30	8	0	19	31	20	13	30	9	19	59	33	24	15
							31	8	1	55	39	20	13							

VENUS.

TABLE III. — *continued.*

Days of Month.	JULY.				Days of Month.	AUGUST.				Days of Month.	SEPTEMBER.									
	Mot. Long.					Mot. Long.					Mot. Long.									
	S.	D.	M.	S.	SEC.	SEC.		S.	D.	M.	S.	SEC.	SEC.		S.	D.	M.	S.	SEC.	SEC.
1	9	21	35	41	24	15	1	11	11	15	43	28	18	1	1	0	55	45	32	21
2	9	23	11	49	24	16	2	11	12	51	51	28	18	2	1	2	31	53	33	21
3	9	24	47	56	24	16	3	11	14	27	59	29	18	3	1	4	8	0	33	21
4	9	26	24	4	25	16	4	11	16	4	6	29	18	4	1	5	44	8	33	21
5	9	28	0	12	25	16	5	11	17	40	14	29	18	5	1	7	20	16	33	21
6	9	29	36	20	25	16	6	11	19	16	22	29	19	6	1	8	56	24	33	21
7	10	1	12	28	25	16	7	11	20	52	30	29	19	7	1	10	32	32	33	21
8	10	2	48	35	25	16	8	11	22	28	38	29	19	8	1	12	8	40	33	21
9	10	4	24	43	25	16	9	11	24	4	45	29	19	9	1	13	44	47	34	21
10	10	6	0	51	25	16	10	11	25	40	53	30	19	10	1	15	20	55	34	21
11	10	7	36	59	26	16	11	11	27	17	1	30	19	11	1	16	57	3	34	22
12	10	9	13	7	26	16	12	11	28	53	9	30	19	12	1	18	33	11	34	22
13	10	10	49	14	26	16	13	0	0	29	17	30	19	13	1	20	9	19	34	22
14	10	12	25	22	26	17	14	0	2	5	24	30	19	14	1	21	45	26	34	22
15	10	14	1	30	26	17	15	0	3	41	32	30	19	15	1	23	21	34	34	22
16	10	15	37	38	26	17	16	0	5	17	40	30	19	16	1	24	57	42	34	22
17	10	17	13	46	26	17	17	0	6	53	48	30	19	17	1	26	33	50	35	22
18	10	18	49	53	26	17	18	0	8	29	56	31	20	18	1	28	9	58	35	22
19	10	20	26	1	27	17	19	0	10	6	3	31	20	19	1	29	46	5	35	22
20	10	22	2	9	27	17	20	0	11	42	11	31	20	20	2	1	22	13	35	22
21	10	23	38	17	27	17	21	0	13	18	19	31	20	21	2	2	58	21	35	22
22	10	25	14	25	27	17	22	0	14	54	27	31	20	22	2	4	34	29	35	22
23	10	26	50	33	27	17	23	0	16	30	35	31	20	23	2	6	10	37	35	23
24	10	28	26	40	27	17	24	0	18	6	42	31	20	24	2	7	46	44	36	23
25	11	0	2	48	27	17	25	0	19	42	50	32	20	25	2	9	22	52	36	23
26	11	1	38	56	28	18	26	0	21	18	58	32	20	26	2	10	59	0	36	23
27	11	3	15	4	28	18	27	0	22	55	6	32	20	27	2	12	35	8	36	23
28	11	4	51	12	28	18	28	0	24	31	14	32	20	28	2	14	11	16	36	23
29	11	6	27	19	28	18	29	0	26	7	21	32	20	29	2	15	47	23	36	23
30	11	8	3	27	28	18	30	0	27	43	29	32	21	30	2	17	23	31	36	23
31	11	9	39	35	28	18	31	0	29	19	37	32	21							

VENUS.

TABLE III. — *continued.*

Days of Month.	OCTOBER.				Days of Month.	NOVEMBER.				Days of Month.	DECEMBER.									
	Mot. Long.					Mot. Long.					Mot. Long.									
	S.	D.	M.	S.	SEC.	SEC.		S.	D.	M.	S.	SEC.	SEC.		S.	D.	M.	S.	SEC.	SEC.
1	2	18	58	39	36	23	1	4	8	39	41	41	26	1	5	26	43	35	45	28
2	2	20	35	47	37	23	2	4	10	15	49	41	26	2	5	28	19	43	45	29
3	2	22	11	55	37	23	3	4	11	51	57	41	26	3	5	29	55	51	45	29
4	2	23	48	2	37	24	4	4	13	28	5	41	26	4	6	1	31	59	45	29
5	2	25	24	10	37	24	5	4	15	4	12	41	26	5	6	3	8	7	45	29
6	2	27	0	18	37	24	6	4	16	40	20	41	26	6	6	4	44	14	45	29
7	2	28	36	26	37	24	7	4	18	16	28	41	26	7	6	6	20	22	45	29
8	3	0	12	34	37	24	8	4	19	52	36	41	26	8	6	7	56	30	45	29
9	3	1	48	41	38	24	9	4	21	28	44	42	27	9	6	9	32	38	46	29
10	3	3	24	49	38	24	10	4	23	4	51	42	27	10	6	11	8	46	46	29
11	3	5	0	57	38	24	11	4	24	40	59	42	27	11	6	12	44	53	46	29
12	3	6	37	5	38	24	12	4	26	17	7	42	27	12	6	14	21	1	46	29
13	3	8	13	13	38	24	13	4	27	53	15	42	27	13	6	15	57	9	46	29
14	3	9	49	21	38	24	14	4	29	29	22	42	27	14	6	17	33	17	46	30
15	3	11	25	28	38	24	15	5	1	5	30	42	27	15	6	19	9	25	46	30
16	3	13	1	36	38	25	16	5	2	41	38	43	27	16	6	20	45	32	47	30
17	3	14	37	44	39	25	17	5	4	17	46	43	27	17	6	22	21	40	47	30
18	3	16	13	52	39	25	18	5	5	53	54	43	27	18	6	23	57	48	47	30
19	3	17	50	0	39	25	19	5	7	30	2	43	27	19	6	25	33	56	47	30
20	3	19	26	7	39	25	20	5	9	6	10	43	28	20	6	27	10	4	47	30
21	3	21	2	15	39	25	21	5	10	42	17	43	28	21	6	28	46	12	47	30
22	3	22	38	23	39	25	22	5	12	18	25	43	28	22	7	0	22	19	47	30
23	3	24	14	31	39	25	23	5	13	54	33	43	28	23	7	1	58	27	47	30
24	3	25	50	39	40	25	24	5	15	30	41	44	28	24	7	3	34	35	47	30
25	3	27	26	47	40	25	25	5	17	6	49	44	28	25	7	5	10	43	48	30
26	3	29	2	54	40	25	26	5	18	42	56	44	28	26	7	6	46	51	48	31
27	4	0	39	2	40	25	27	5	20	19	4	44	28	27	7	8	22	58	48	31
28	4	2	15	10	40	26	28	5	21	55	12	44	28	28	7	9	59	6	48	31
29	4	3	51	18	40	26	29	5	23	31	20	44	28	29	7	11	35	14	48	31
30	4	5	27	26	40	26	30	5	25	7	28	44	28	30	7	13	11	22	48	31
31	4	7	3	33	40	26								31	7	14	47	30	49	31

VENUS.

TABLE V. — Equation of the Orbit of Venus for 1780.

Argument. Mean Anomaly of Venus.												
Sig. O. —		Sig. I. —		Sig. II. —		Sig. III. —		Sig. IV. —		Sig. V. —		
D.	M. S.	Diff.	M. S.	Diff.	M. S.	Diff.	M. S.	Diff.	M. S.	Diff.	M. S.	Diff.
1	0 0	49"	23 29	40 49	47 19	1"	41 10	25"	23 51	44"	30	
2	0 49	49	24 12	41 13	47 20	1	40 45	26	23 7	44	29	
3	1 38	49	24 54	41 37	47 19	2	40 19	26	22 23	44	28	
4	2 27	49	25 35	41 42	47 17	3	39 53	27	21 39	44	27	
5	3 16	49	26 16	42 23	47 14	2	39 26	28	20 55	44	26	
6	4 5	49	26 57	42 44	47 11	4	38 58	29	20 10	46	25	
7	4 54	49	27 37	43 5	47 7	5	38 0	29	19 24	46	24	
8	5 43	49	28 17	43 25	47 2	6	38 0	30	18 38	46	23	
9	6 32	48	28 56	43 45	46 56	7	37 30	31	17 52	46	22	
10	7 20	48	29 35	44 3	46 49	8	36 59	32	17 6	46	21	
11	8 9	49	30 13	44 21	46 41	9	36 27	32	16 19	47	20	
12	8 58	48	30 51	44 38	46 32	10	35 55	32	15 32	47	19	
13	9 46	47	31 28	44 54	46 22	10	35 23	32	14 45	48	18	
14	10 33	48	32 5	45 9	46 12	11	34 49	34	13 57	48	17	
15	11 21	48	32 41	45 23	46 1	12	34 15	35	13 9	48	16	
16	12 9	47	33 16	45 37	45 49	13	33 40	35	12 21	48	15	
17	12 56	48	33 51	45 50	45 36	13	33 5	36	11 33	49	14	
18	13 44	47	34 25	46 2	45 23	15	32 29	37	10 44	49	13	
19	14 31	46	34 58	46 13	45 8	15	31 52	37	9 55	49	12	
20	15 17	46	35 32	46 23	44 53	17	31 15	38	9 6	49	11	
21	16 3	46	36 4	46 32	44 36	17	30 37	38	8 17	49	10	
22	16 49	46	36 35	46 41	44 19	17	29 59	38	7 28	49	9	
23	17 35	46	37 6	46 49	44 2	19	29 20	39	6 39	49	8	
24	18 21	45	37 36	46 56	43 43	20	28 41	40	5 49	50	7	
25	19 6	45	38 6	47 2	43 23	20	28 1	40	4 59	50	6	
26	19 51	45	38 35	47 7	43 3	21	27 21	41	4 10	49	5	
27	20 35	44	39 3	47 11	42 42	22	26 40	41	3 20	50	4	
28	21 19	44	39 31	47 14	42 20	22	25 59	42	2 30	50	3	
29	22 3	44	39 57	47 17	41 58	22	25 17	42	1 40	50	2	
30	22 46	43	40 23	47 19	41 34	24	24 34	43	0 50	50	1	
31	23 29	43	40 49	47 19	41 10	24	23 51	43	0 0	50	0	
	Sig. XI. +	Sig. X. +	Sig. IX. +	Sig. VIII. +	Sig. VII. +	Sig. VI. +						

The greatest Equation diminishes 25" in 100 Years. The others are proportional at the Rate of 0".5 for a Minute.

TABLE IV. — Mean Motion of Venus for Hours, Minutes, and Seconds.

Hours.	Mot. Long.		Min.		SEC.		Mot. Long.		Min.		SEC.	
	D. M. S.	'' ''	'' ''	'' ''	'' ''	'' ''	'' ''	'' ''	'' ''	'' ''	'' ''	'' ''
1	0 4 0	1 0 4	31	2 4	31	2 4	31	2 4	31	2 4	31	2 4
2	0 8 1	2 0 8	32	2 8	32	2 8	32	2 8	32	2 8	32	2 8
3	0 12 1	3 0 12	33	2 12	33	2 12	33	2 12	33	2 12	33	2 12
4	0 16 1	4 0 16	34	2 16	34	2 16	34	2 16	34	2 16	34	2 16
5	0 20 2	5 0 20	35	2 20	35	2 20	35	2 20	35	2 20	35	2 20
6	0 24 2	6 0 24	36	2 24	36	2 24	36	2 24	36	2 24	36	2 24
7	0 28 2	7 0 28	37	2 28	37	2 28	37	2 28	37	2 28	37	2 28
8	0 32 3	8 0 32	38	2 32	38	2 32	38	2 32	38	2 32	38	2 32
9	0 36 3	9 0 36	39	2 36	39	2 36	39	2 36	39	2 36	39	2 36
10	0 40 3	10 0 40	40	2 40	40	2 40	40	2 40	40	2 40	40	2 40
11	0 44 4	11 0 44	41	2 44	41	2 44	41	2 44	41	2 44	41	2 44
12	0 48 4	12 0 48	42	2 48	42	2 48	42	2 48	42	2 48	42	2 48
13	0 52 4	13 0 52	43	2 52	43	2 52	43	2 52	43	2 52	43	2 52
14	0 56 5	14 0 56	44	2 56	44	2 56	44	2 56	44	2 56	44	2 56
15	1 0 5	1 0 5	45	3 0	45	3 0	45	3 0	45	3 0	45	3 0
16	1 4 5	1 4 5	46	3 4	46	3 4	46	3 4	46	3 4	46	3 4
17	1 8 6	1 8 6	47	3 8	47	3 8	47	3 8	47	3 8	47	3 8
18	1 12 6	1 12 6	48	3 12	48	3 12	48	3 12	48	3 12	48	3 12
19	1 16 6	1 16 6	49	3 16	49	3 16	49	3 16	49	3 16	49	3 16
20	1 20 6	1 20 6	50	3 20	50	3 20	50	3 20	50	3 20	50	3 20
21	1 24 7	1 24 7	51	3 24	51	3 24	51	3 24	51	3 24	51	3 24
22	1 28 7	1 28 7	52	3 28	52	3 28	52	3 28	52	3 28	52	3 28
23	1 32 7	1 32 7	53	3 32	53	3 32	53	3 32	53	3 32	53	3 32
24	1 36 8	1 36 8	54	3 36	54	3 36	54	3 36	54	3 36	54	3 36
25	1 40 8	1 40 8	55	3 40	55	3 40	55	3 40	55	3 40	55	3 40
26	1 44 8	1 44 8	56	3 44	56	3 44	56	3 44	56	3 44	56	3 44
27	1 48 8	1 48 8	57	3 48	57	3 48	57	3 48	57	3 48	57	3 48
28	1 52 8	1 52 8	58	3 52	58	3 52	58	3 52	58	3 52	58	3 52
29	1 56 8	1 56 8	59	3 56	59	3 56	59	3 56	59	3 56	59	3 56
30	2 0 8	2 0 8	60	4 0	60	4 0	60	4 0	60	4 0	60	4 0

VENUS.

TABLE VII. — Heliocentric Latitude of Venus, with the Reduction to the Ecliptic.

Argument. The Longitude of Venus — that of the Node.										
Sig.	O. lat. N. VI. lat. S.	O. VI.		I. lat. N. VII. lat. S.	I. VII.		II. lat. N. VIII. lat. S.	II. VIII.		
Deg.	Latitude.	Sub. Long.	Sub. from Log.	Latitude.	Sub. Long.	Sub. from Log.	Latitude.	Sub. Long.	Sub. from Log.	Deg.
	D. M. S.	M. S.		D. M. S.	M. S.		D. M. S.	M. S.		
0	0 0 0	0 0	0	1 41 45	2 37	190	2 56 17	2 37	571	30
1	0 3 33	0 6	0	1 44 48	2 40	202	2 58 2	2 33	583	29
2	0 7 6	0 13	1	1 47 50	2 43	214	2 59 44	2 30	594	28
3	0 10 39	0 19	2	1 50 50	2 45	226	3 1 22	2 26	605	27
4	0 14 12	0 25	4	1 53 48	2 47	238	3 2 57	2 23	615	26
5	0 17 44	0 31	6	1 56 44	2 50	250	3 4 29	2 19	626	25
6	0 21 16	0 38	8	1 59 37	2 52	263	3 5 58	2 15	636	24
7	0 24 48	0 44	11	2 2 28	2 54	276	3 7 23	2 10	645	23
8	0 28 19	0 50	15	2 5 17	2 55	288	3 8 45	2 6	655	22
9	0 31 50	0 56	19	2 8 4	2 57	301	3 10 3	2 1	664	21
10	0 35 20	1 2	23	2 10 49	2 58	314	3 11 18	1 56	673	20
11	0 38 49	1 8	28	2 13 31	2 59	328	3 12 29	1 51	681	19
12	0 42 18	1 13	33	2 16 11	3 0	341	3 13 37	1 46	689	18
13	0 45 46	1 19	38	2 18 48	3 1	354	3 14 41	1 41	697	17
14	0 49 13	1 25	44	2 21 23	3 1	367	3 15 41	1 36	704	16
15	0 52 40	1 30	51	2 23 55	3 1	380	3 16 38	1 30	711	15
16	0 56 5	1 36	58	2 26 24	3 1	394	3 17 32	1 25	717	14
17	0 59 29	1 41	65	2 28 51	3 1	407	3 18 22	1 19	723	13
18	1 2 53	1 46	73	2 31 15	3 0	420	3 19 7	1 13	729	12
19	1 6 15	1 51	80	2 33 36	2 59	434	3 19 50	1 8	734	11
20	1 9 35	1 56	89	2 35 55	2 58	447	3 20 29	1 2	739	10
21	1 12 54	2 1	98	2 38 11	2 57	460	3 21 4	0 56	743	9
22	1 16 13	2 6	107	2 40 23	2 55	473	3 21 36	0 50	747	8
23	1 19 31	2 10	116	2 42 33	2 54	486	3 22 4	0 44	751	7
24	1 22 46	2 15	126	2 44 40	2 52	498	3 22 28	0 38	754	6
25	1 26 0	2 19	136	2 46 44	2 50	511	3 22 48	0 31	756	5
26	1 29 12	2 23	146	2 48 45	2 47	523	3 23 5	0 25	758	4
27	1 32 23	2 26	157	2 50 42	2 45	536	3 23 18	0 19	760	3
28	1 35 32	2 30	168	2 52 37	2 43	548	3 23 27	0 13	761	2
29	1 38 39	2 33	179	2 54 29	2 40	560	3 23 33	0 6	762	1
30	1 41 45	2 37	190	2 56 17	2 37	571	3 23 35	0 0	762	0
	XI. lat. S. V. lat. N.	Add to Long.	Sub. Log.	X. lat. S. IV. lat. N.	Add to Long.	Sub. Log.	IX. lat. S. III. lat. N.	Add to Long.	Sub. Log.	
		XI. V.			X. IV.			IX. III.		

Explanation of the Tables.—Table I. contains the epochs of the mean longitude, of the aphelion and node. Table II. contains the mean motions of the same, for years. Table III. contains their mean motions for days. Table IV. contains their mean motions for hours, minutes, and seconds. Table V. contains the equation of the orbit for the year 1780; but this equation diminishes 25" in 100 years. Table VI. contains the logarithm of the distance of Venus from the sun, for the year 1780, with the corrections for 100 years, owing to a change of the excentricity. Table VII. contains the heliocentric latitude of Venus, the reduction in longitude to the ecliptic, and the reduction of the logarithm of the distance, in order to get the curtate distance from the sun.

The greatest equation (Table V.) of the orbit is 47' 20", and this diminishes at the rate of 25" in 100 years; that is, the diminution for every minute of the equation is very nearly 0".5; we shall, therefore, take the secular diminution at the rate of 0".5 for every minute of the equation: thus, if the equation be 16', the diminution is 4" for 100 years; and for any other number of years, the diminution is in proportion. For any time *before* 1780, this correction must be added to the equation.

In Table VI. there is a small table for the correction of the logarithms of the distance of Venus from the sun, for 100 years; entering it with the mean anomaly of Venus, and applying the correction according to the sign, for any time *after* 1780; but with a contrary sign, *before* 1780.

To find the heliocentric Latitude and Longitude of Venus, and the Logarithm of her Distance from the Sun.—From Table I. take out the epochs of the mean longitude, the aphelion and node, for the given year; and place them in a horizontal line. But if the given year be not found in that Table, take the nearest year preceding the given year, as an epoch, and take out as before; under which (Table II.) place the mean motion in longitude, of the aphelion and node, answering to the number of years elapsed since the epoch, to the given year.

Under these, write down (Table III.) the mean motions of the same, for the given day of the month.

Under these, write down (Table IV.) the mean motions of the same, for the given hours, minutes, and seconds.

Add together the numbers in the several columns, re-

jecting 12 S, or any multiple thereof, if they occur, and you get the mean longitude, places of the aphelion and node, for the given time.

Subtract the longitude of the aphelion from the mean longitude, and the remainder is the mean anomaly.

With the mean anomaly enter Table V., and take out the equation of the orbit with its proper sign, making proportion for the minutes and seconds, if there be any. But this requires a correction, at the rate of 0".5 for every minute of the equation for 100 years; and for any other time, the correction will be in proportion; to be subtracted *after* 1780, and added *before* that time.

Apply the equation with its proper sign to the mean longitude, and you get the longitude on the orbit, from the mean equinox.

From the longitude of Venus in her orbit, subtract the longitude of the node; and you have the argument, called the Argument of Latitude.

To the longitude on the orbit, apply the reduction (Table VII.) with its proper sign, and you have the longitude upon the ecliptic, from the mean equinox.

To the longitude thus found, apply the nutation with its proper sign, and you get the true longitude of Venus on the ecliptic, from the true equinox.

With the argument of latitude enter Table VII., and take out the latitude, making proportion for the minutes and seconds, if necessary; and this is the true heliocentric latitude of Venus.

With the mean anomaly of Venus enter Table VI., and take out the logarithm of her distance from the sun, making proportion for the minutes and seconds, if necessary. But this must be corrected by the small Table, to be entered with the mean anomaly, and you get the correction for 100 years; and for any other time, the correction will be in proportion, to be applied with a contrary sign, *before* 1780.

With the argument of latitude enter Table VII., and take out the reduction in the column under Sub. Log., making proportion for the minutes and seconds, if necessary; and subtract it from the logarithm of the distance last found, and you have the logarithm of the curtate distance.

Ex.—On June 23, 1690, new style, at 1^h 18' 11" mean time at Greenwich; to find the heliocentric latitude and longitude of Venus, and the logarithm of her distance from the sun.

	Longitude.	Aphelion.	Node.
Epoch for 1660 - -	^s 3 ^o 19 ['] 55 ["] 52	^s 10 ^c 5 ['] 54 ["] 12	^s 2 ^o 13 ['] 8 ["] 48
Mot. for 80 years - -	0 15 22 24	1 4 48	41 20
Mot. for 10 years - -	3 1 7 14	8 6	5 10
June 23 - - - - -	9 8 46 38	23	15
1 hour - - - - -	4 0		
18' - - - - -	1 12		
11" - - - - -	1		
Mean Long. - - - -	4 15 17 21	10 7 7 29	2 13 55 33
Equation - - - - -	+ 6 50	4 15 17 21	4 15 24 11
Long. on orbit - - -	4 15 24 11	6 8 9 52	2 1 28 38
Reduction - - - - -	- 2 32	Mean Anomaly.	Arg. of Latitude.
Long. from mean equ.	4 15 21 39	Log. dist. - 9.856347	Hel. lat. 2° 58' 51"
Nutation - - - - -	+ 2	Reduction - - 588	
True long. on ecl. -	4 15 21 41	Log. curt. dist. 9.855759	

VENUS.

VENUS, in *Chemistry*, is used for the metal *Copper*; which see. Its character is ♀; which, say the adepts, expresses it to be gold, only joined with some corrosive and arsenical menstruum; which, removed, copper would be gold.

Venus is universally allowed, by the chemists, &c. to be one of the most powerful medicines in nature: of this, is said to have been composed the famous Butler's stone, which cured most diseases by only licking it. Of this is composed that noble remedy of Van Helmont, viz. the sulphur of vitriol, or ens vitrioli, fixed by calcination and cohobation. Of the ens vitrioli of Venus is likewise composed Mr. Boyle's arcanum, the colcotlar vitrioli.

It is certain copper is a powerful emetic, and an antidote against poisons; for it is no sooner taken, than it exerts its force: whereas other vomitories lie a good while in the stomach: but one single grain of rust of Venus immediately vomits. Hence syrups, that have stood over night in copper vessels, create a vomiting.

However, pure copper, in its metallic state, or calcined by fire, appears to be indissoluble, and of no considerable effect, in the bodies of animals: but dissolved in the nitrous or marine acids, and crystallized or exsiccated by heat, it proves a strong caustic. Preparations of this kind, though formerly used, are now laid aside. Copper, combined with the vitriolic acid, or with vegetable acids, or corroded by the air, acts outwardly, as an efficacious detergent and a gentle escharotic, and internally as a virulent emetic and cathartic. Some have ventured on small doses, as quick emetics for expelling poisons; but the end may be obtained by less dangerous means.

It has been also reckoned an excellent medicine in chronic cases: hence a famous physician is recorded to have cured Charles V. of a dropsy by the use of copper.

A saturated solution of the metal in volatile spirits is recommended by Boerhaave in disorders proceeding from an acid, weak, cold, phlegmatic cause. He says, that if three drops be taken in the morning in a glass of mead, and the dose doubled every day, to twenty-four drops, it proves attenuating, warming, and diuretic; that by this medicine he once cured a confirmed ascites; though in other similar cases it failed; that it is the only preparation of copper which does not prove emetic; and that it may be tried with safety. Dr. Lewis, however, is of opinion, that in considerable doses it would exert the same virulent operation with the other soluble preparations or solutions of copper. A solid preparation of this kind, made by rubbing together in a glass mortar two parts of blue vitriol, and three of the volatile salt, procured from sal ammoniac, till all effervescence has ceased, and then gently drying the concrete, is ordered in the last Edinburgh Pharmacopeia, under the name of *cuprum ammoniacum*. It has frequently been given with success in epileptic and convulsive disorders. Lewis. See *SULPHATE of Copper*. See also *SAPPHIRINA Aqua*, and *AQUA Cupri Ammoniaci*.

Venus is dissoluble by all the salts known, both acid, alkaline, and nitrous; nay, even by water and air, considered as they contain salt.

It is from this common reception of all menstrua, that copper is called *Venus*, q. d. *meretrix publica*, a common prostitute: though others take the denomination to have been occasioned by its turning of a sea-green colour, when dissolved by acid. It must be given internally, with great caution.

VENUS, *Crystals of*. See *CRYSTAL*, *VERDEGREEN*, and *COPPER*.

VENUS, *Spirit of*. See *ACETIC Acid*.

VOL. XXXVI.

VENUS, in *Mythology*, the goddess of love, thus invoked by Lucretius:

“ Quæ quoniam rerum naturam sola gubernas,
Nec sine te quicquam dias in luminis oras
Exoritur, neque fit lætum, nec amabile quicquam.”

She is represented by the poets, painters, and statuary of antiquity, in a variety of alluring forms: with her hair sometimes waving over her naked shoulders, and sometimes negligently tied behind in golden tresses; with a mantle, exhibiting all the colours of the rainbow, and glittering with diamonds, sometimes flowing loosely, and at other times bound with a girdle or belt, called *cestus*, of which it is said that, “in eo deliramenta omnia inclusa erant; ibi inerat amor, inerat desiderium, inerat et amantium colloquium, itinerat et blanda loquentia quæ furtim mentem prudentium subripit:” accompanied by two Cupids, the three Graces, and followed by the beautiful Adonis, who held up her train; and riding in a chariot of ivory, finely carved, and beautifully painted and gilt, and drawn by swans, doves, or swallows. She is sometimes exhibited like a young virgin rising from the sea, and riding in a shell; at other times with a shell in her hand, and her head crowned with roses; sometimes with a mirror in her hand, and golden sandals and buckles on her feet; sometimes with poppy in one hand, and an apple in the other; and at Elis she was represented as treading on a tortoise; the tortoise being an emblem of reserve and modesty.

According to Cicero (*De Nat. Deorum*, lib. iii.) there were four principal deities under the denomination of Venus; one, the daughter of Cælum and Dies, called *Venus Urania*, who had a temple at Cythera, and also at Elis, with a statue of gold and ivory, executed by Phidias: the second, produced from the froth of the sea, called by the Greeks *Aphrodite* and *Anadomenè*, whose cradle was a shell, in which she was driven by Zephyrus upon the island Cyprus, and received by the Hours, or *Hora*, who educated her, and presented her to the gods, and who was at length, as some say, married to Vulcan: the third, born of Jupiter and Dione, and, as Cicero says, married to Vulcan: and the fourth, born of Syria and Tyrus, called *Astarte*, and said to have been married to Adonis. Plato, in his “*Banquet*,” allows only two; one, the daughter of Cælus, and the other, of Jupiter. Pausanias distinguishes three; one celestial, which presided over chaste loves; one terrestrial, or popular, who was the goddess of marriages; and a third, named *Apostrophia*, or the averting Venus, who banished infamous passions. Among the moderns, sir Isaac Newton, in his “*Chronology*,” seems to own no other Venus besides *Calycopis*, the mother of Eneas, and daughter of Otreus, king of Phrygia, whom Thoas (or Vulcan), furnished Cinyras, married, and erected temples to her at Paphos, at Amathus, in the island of Cyprus, and at Byblos in Syria; instituting priests to her honour, a sacred worship, and the scandalous feasts called the “*Orgies*,” for which reason she acquired the name of the Cyprian and Syrian goddess. This celebrated author relies on the authority of Tacitus (*Hist. l. ii. c. 3.*) who thus speaks of her: “We are told that Cinyras consecrated an ancient temple to Venus of Paphos, the landing-place of this goddess, who sprung from the foam of the sea.” His opinion may be easily reconciled to Lactantius's account, extracted from Euhemerus's sacred history, viz. that this was a woman of Cyprus, who by her behaviour encouraged gallantry, and gave rise to the fable of Venus.

Banier traces the origin of the fable of Venus to Phœnicia. He is of opinion that there never was another Venus worshipped among the Orientals but the *Venus*

Celestis, that is to say, the planet of that name; and Astarte, the wife of Adonis, whose worship was intermixed with that of the planet, or, which comes to the same, that Syrian Venus, the fourth in Cicero, so celebrated in antiquity. The Phœnicians, in conducting their colonies into the islands of the Mediterranean sea, and into Greece, introduced thither the worship of this goddess. They stopped first in the island of Cyprus, which lies next the coasts of Syria; and there the worship of this goddess was generally received. From thence they went to Cythera, an isle near the continent of Greece: there the Greeks began to traffic with them, and to get some knowledge of their religion; and this is the reason of their giving out, that it was near this island the goddess was seen for the first time, because it was there they came to hear of her first. A very convincing proof that the worship of Venus was established in that island, before it passed into the continent, is, that the temple of Cythera was accounted the most ancient of any that Venus had in Greece, as Pausanias remarks.

From Cythera the worship of this goddess passed into Greece; and as those who had brought it thither came by sea, the Greeks, who endeavoured to give every thing a marvellous dress, say she had sprung from the sea, and gave her the name of Aphroditè, a word which imports foam. This, no doubt, is the true explication of this fiction, and it is needless to search into it for any other mystery. The Greek poets embellished this fable according to their own fancy. Having heard of Astarte's passionate love of Adonis, they took care to apply this circumstance to their Venus: and, moreover, they considered Love as the son of this goddess, and gave her the three Graces for her daughters. In fine, they formed that love-system, of which the ideas have served, in after-ages, to embellish the works of their brother-poets. A young virgin rises out of the foam of the sea, and appears upon a shell-fish; she sits down on mount Cythera, where the flowers spring up under her feet; the Hours, charged with the care of her education, conduct her to heaven, where all the gods, charmed with her beauty, make love to her; she matches with Vulcan, the most deformed of all; she disgraces herself by her gallantries with Mars and Mercury; by the one she has Cupid, and by the other Anti-Cupid; Bacchus is her squire; in fine, she pre-fides over marriages and gallantry; and, therefore, has a mysterious girdle given her, called the *cellus* of Venus, which not only makes herself amiable, but has virtue to kindle the flame of an extinguished passion, &c.

This was not all, they foisted into the history of the goddess Venus, most of the celebrated pieces of gallantry. Some beauty being surpris'd in an intrigue, gave rise to the adultery of Mars with Venus, and to the stratagem of Vulcan.

Venus, whatever might be the dishonourable ideas entertained concerning her, was nevertheless regarded as one of the principal deities; and as she patronized scandalous passions, she was worshipped in a manner worthy of her. Her temples, open to prostitution, taught the corrupt world, that in order to pay due honour to the goddesses of love, they were to have no regard to the rules of modesty. The virgins prostituted themselves publicly in her temples, and there the married women shewed as little reserve. Amathus, Cythera, Gnidos, Paphos, Idalia, and the other places especially consecrated to this goddess, were distinguished by the most infamous abuses.

Farther, as there were several Venuses, her worship was not every where the same. In some places they only burned

incense upon her altars; elsewhere they made her an offering of sweet odours, one ingredient of which was the flesh of a sparrow; in other places they sacrificed to her a white goat. The women had also a custom of consecrating their hair to this goddess; and the tresses of Berenice, which she had vowed to Venus, were placed among the stars.

Among the flowers, the rose was particularly consecrated to this goddess, because this flower had been tinged with the blood of Adonis, whom one of its thorns had wounded, which changed it into red from white, which it was before this adventure. The myrtle, too, was dedicated to her, because it commonly grows upon the borders of the water where this goddess was born. The swans and sparrows were peculiarly consecrated to her, but above all the pigeons, from the fable which sets forth, that while this goddess was one day playing with Cupid, the little god would needs wager to gather more flowers than she, and a nymph named Pteris, having assisted the goddess, she won the wager, with which Cupid was so provoked, that he transformed the nymph into a pigeon. As there were several persons who bore the name of Venus, her worship was not every where the same.

Venus was known under several appellations and characters; derived either from the places where she was worshipped, or from some particular circumstances that had given rise to her worship. Accordingly we read of the Venus *Amathusia*, *Amica*, *Anaitis*, *Apaturia* or *Desidiosa*, *Aphrodita*, *Archytis*, *Argynnis*, *Armata*, *Aurea*, *Barbata*, *Basilis*, *Callypiga*, *Calva*, *Cluacina*, *Colias*, *Cypria*, *Cytherea*, *Elephantina*, *Elycopis*, *Erycina*, *Etaira*, *Genitrix*, *Hortensis*, *Improba*, *Libuina*, *Marina*, *Nephthe*, *Paphia*, *Praxis*, *Ridens*, *Verticordia*, *Vitrix*, *Zerynthia*, &c. &c.

Praxiteles executed two statues of Venus, one clothed, bought by the inhabitants of Cos, and another naked, which he sold to the Cnidians. See ANADUOMENÈ, and VENUS *de Medicis*.

The Venus of M. Maffei seems to have been formed in conformity to the well-known passage of Terence,

“Sine Cerere & Baccho friget Venus.”

The goddess in this statue is accompanied with two Cupids, and crowned with ears of corn, holding a thyrsus, wrapped about with leaves and clusters of grapes; and as she carries in her hand three arrows, she seems to teach us that her arrows fly more unerringly when Ceres and Bacchus concur. Pausanias informs us that he had seen in Elis a fine statue of Venus Urania or Celestial, whose feet rested upon the back of a tortoise; and another of terrestrial Venus, placing her feet upon a he-goat.

We have on medals the Venus Urania, or Celestis, with a star or sun, or celestial globe in her hand; and the Venus Paphia, almost naked, leaning on a column, with a helmet and the arms of Mars in her hands, bearing an inscription *Veneri Vitrici*, or *Veneri Genitrici*. She is sometimes seen armed, sometimes resting upon a dolphin, holding a pigeon in her lap, or with Adonis, accompanied by his dogs, or with Cupid and the three Graces; but more frequently rising from the sea, seated upon a shell borne by two Tritons, or upon a chariot drawn by two sea-horses, or by a female sea-goat, or rather he-goat; for, according to Pausanias, her statue, made by the famous statuary Scopas, was upon that animal, and in that case she is accompanied by Nereids and Cupids, mounted upon dolphins, one of the Nereids holding a lute in her hand, and mounted upon a sea-centaur; but more frequently her chariot is drawn by swans or pigeons, birds consecrated to her. Sometimes she

she appears herself supported by a Triton, having a buckler in her hand, on which is represented a head; sometimes mounted upon sea-horses, she seems to skim over the waves of the sea, her head being covered with a veil which swells in the wind, with Cupid swimming at her side. An oar at the foot of the goddess seems to represent the Venus Pelagia or Marine: and the figure which she holds in her hand, a cornucopia, expresses the blessings produced by maritime commerce. There is also a picture of the Venus Desidiofa in the Barberini palace at Rome, which is one of the finest-coloured pictures that is left us by the ancients; the hair of whose head may be compared with Guido's, and the colouring of the flesh reminds us of Titian. Part of this picture is lost, and part restored by Carlo Marat. Venus is described by Statius (lib. i. l. v. 56.) much in the same manner as she is represented in the Barberini picture.

We shall only add, that Venus is sometimes described by the poets of the third age under the character of the goddess of jealousy, rather than as the goddess of love; in which Valerius Flaccus (Argon. ii. v. 106.) and Statius (Theb. v. v. 69.) have drawn two very terrible pictures of her. Spence's Polymetis, p. 74.

VENUS *de Medicis*, in the history of *Ancient Sculpture*, a famous statue of white marble, about five feet high, brought from the Medicis palace at Rome to Florence, by order of duke Cosmo III., and now standing in the great duke's palace. The hips, legs, and arms, were broken off by the removal of this statue; but they have been rejoined with an art, that renders their former separation imperceptible. The inscription on the base intimates that this was the work of Cleomenes, an Athenian, the son of Apollodorus: the pedestal is modern; the statue seems to bear a little forwards; the right knee advances a little; the left-hand is placed before that part which distinguishes the sexes, and the right across her breasts; yet without touching the body. The head inclines a little to the left shoulder; so that her face seems to be turned away a little from the observer: and from this circumstance some have taken occasion to remark, that the hair of the head of this Venus expresses three different passions; as you first approach her, you perceive aversion or denial in her look; as you advance a step or two nearer, she shews compliance; and one step more to the right, it is said, turns into a little insidious and insulting smile: but Mr. Spence does not allow that this account is justified by the statue itself.

The attitude of the Venus de Medici is peculiarly graceful: that attitude may be described in two verses of Ovid, Art. Am. v. 614.

“ Ipse Venus pubem, quoties velamina ponit,
Protegitur læva semi-reductâ manu.”

The bloom of youth, the pleasing softness of her look, and her beauty and modesty, seem to rival each other in the charms of her countenance. Her person is somewhat plump, and the flesh is so admirably executed, that it seems so soft as if it would yield to the touch. Time has given to the white marble a yellowish hue, though still in the sun-shine it is almost transparent: her hair is brown, which may be no more than the faded gilding not unusual among the ancients. The head, which is said to be too small in proportion to the other parts, is suspected by some not to have been executed by the same artist who made the body: this will ever be the standard of female beauty and softness: the breasts are also the finest that can be conceived, small, distinct, and delicate, suggesting an idea of softness, which

no copies can imitate, and also of firmness: from the breasts, her shape begins to diminish gradually down to her waist; but with an exquisite fineness of shape, the Venus of Medici has what the Romans call *corpus solidum*, and the French the *enbonpoint*; and her waist in particular is not represented as flinted by art, but as exactly proportioned by nature to all the other parts of her body. There is also a tenderness and elegance in every other part of her form: her legs are neat and slender: the small of them is finely rounded, and her feet are little, white and pretty: so that she possesses all those lesser beauties which the poets have marked out in the female make; the *teretes suræ* (Hor. lib. ii. od. iv. ver. 21.), and the *pes candidus* (Id. lib. iv. od. i. v. 27.), and *exiguus* (Ovid. Am. lib. ii. el. iii. ver. 7.) And one may well say of this statue, what one of the persons in Plautus's Epidicus (act v. sc. 1.) says of a complete beauty:

“ Ab unguiculo ad capillum summum, est festivissima.”

Though the Venus of Medici has not escaped censure, with regard to the smallness of her head and hips, the largeness of the nose, the depth of the partition along the vertebrae of the back, the length of the fingers, which, excepting the little finger on the left-hand, are without joints; and though, in comparing the parts separate, as the head, nose, &c. of this statue, with those of others, the similar parts might be found even of superior workmanship; yet for such a combination of beauties, the delicacy of shape and attitude, and symmetry of the whole, it is universally allowed that the world doth not afford its equal. This incomparable statue stands between two others, which in any other place would be esteemed admirable pieces: that on the right of the Venus de Medici is twice as big, with the golden apple in her hand, and is called *Venus Viratrix*; the other, by Hercules Ferrata, is distinguished by the name of *Venus Urania*. Spence's Polymetis, p. 6, &c. Keyser's Travels, vol. i. p. 434.

VENUS, in *Heraldry*, is used for the colour vert.

VENUS, in the Linnæan system of *Natural History*, a genus of the Testacea order of worms. See CONCHOLOGY.

VENUS, *Mount of*, *Mons Veneris*, among *Anatomists*, is a little hairy protuberance in the middle of the pubes of women; occasioned by the collection of fat under the skin in that place.

Among chiromancers, the mount of Venus is a little eminence in the palm of the hand, at the root of one of the fingers.

VENUS's *Comb*, in *Botany*. See SCANDIX.

VENUS's *Fly-Trap*. See DIONÆA.

VENUS's *Looking-Glass*. See CAMPANULA and SPECULUM *Veneris*.

VENUS's *Navel-Work*. See COTYLEDON, n. 19, and CYNOGLOSSUM, n. 18.

VENUS, *Cape*, in *Geography*, a cape on the coast of Otaheite. N. lat. 17° 29'. W. long. 149° 36'.

VENUSIA, VENOSA, in *Ancient Geography*, a town of Italy, in Apulia, near mount Vultur, watered by a small river called Aufidus. It is said to have been denominated Aphrodisia. It became a Roman colony in 460 U.C. It was formerly a magnificent city, but its baths, theatres, and temples have been destroyed. It was the birth-place of Horace.

VENUSTI, MARCELLO, in *Biography*. This painter was born at Mantua in 1515, and was a pupil of Pierino del Vaga. He is however far better known as the painter of several designs of Michael Angelo, (to which he gave a colour unknown to that great composer,) than by any original

ginal works of his own. The cardinal Farnefe engaged him to copy the great work of the Last Judgment in the Capella Scitina, upon a small scale, which he accomplished very much to the satisfaction of M. Angelo, who in consequence engaged him to paint an altar-piece for the Capella de Cefi in the church of La Pace, from a design of his own, of the Annunciation. There are several pictures in England, which are called Michael Angelo's, that have every appearance of being painted by Venusti. Some works of his own are spoken of with respect, particularly the Martyrdom of St. Catherine, in the church of S. Agostino; and St. John in the Wilderness, in St. Catherine alli Funari. He died in 1576, aged sixty-one.

VENZONE, in *Geography*, a town of Italy, in the country of Friuli, on the Tajamento; 18 miles W.N.W. of Friuli.

VEPILLIUM, or VEPILLUM, in *Ancient Geography*, a town of Africa, S. of Carthage, situated two leagues S.E. of Almana, which has still some vestiges of the Romans.

VEPREULÆ, in *Botany*, the thirty-first natural order among the *Fragmenta* of Linnæus, named from *vepres*, a briar or bramble, because the plants which compose this order are pliant shrubs, of humble growth. The genera mentioned at the end of the *Genera Plantarum* are *Dais*, *Quisqualis*, *Dirca*, *Daphne*, *Gnidia*, *Lachnea*, *Passerina*, *Stellera* and *Thefum*; to which Linnæus has added in manuscript, *Strubiola*, *Santalum* (with a doubt whether it should not rather be referred to the *Bicornes*), and *Scleranthus*. No remark occurs, in Giseke's publication of the *Praelectiones* of Linnæus, on this order. As far as concerns the eight first named of the above genera, with *Strubiola*, it is precisely analogous to Jussieu's ΤΗΥΜΕΛÆÆ, see that article. *Thefum* and *Santalum* belong to Mr. Brown's SANTALACEÆ, an order extracted from the *Onagræ* and *Elæagni* of Jussieu, which the reader will find in its proper place. *Scleranthus* seems naturally one of the *Caryophyllei*, notwithstanding the insertion of its stamens into the *calyx*, which obliged Jussieu to range it with his *Portulacææ*. Perhaps this decision may partly be supported by the habit, and the aspect of the *flower*.

VEPRIS, Juss. 371, a name given by Commerçon to what is now called SCOPOLIA; see that article.

VER-PUERON, in *Natural History*, a name given to a kind of insects which are fond of eating the puceron, and destroy them in vast numbers.

They are thus called, as the ant-eater is, *fornica-leo*, from their destroying great numbers of them.

These ver-pucerons are a sort of worms produced from the eggs of flies, and are of two principal kinds; the one having legs, the other none.

When we observe the vast number of young produced by every puceron, and the quick progress they make in their multiplication, we are apt to wonder, that every plant and tree in the world are not covered with them; but on the contrary, when we observe the devastation these devourers make among them, we are apt to wonder how any of them escape at all, to perpetuate the species. These worms indeed seem created for no other purpose but to destroy them; and this they do in so violent a manner as is scarcely to be conceived. As the flies of many kinds lay their eggs on meat and other substances, which they know will afford food for the young ones, when hatched from them: so the parents of these worms lay their eggs on the branches and leaves of trees loaded with pucerons, on which they know they will feed. The worms produced from them are devourers from the very instant they are hatched, and find themselves placed in the midst of prey, being every way surrounded by a nation of creatures which are their proper

food, and which are furnished with no weapons, either offensive or defensive, and which never so much as attempt to fly from them, but seem wholly ignorant of their danger, till seized upon by the devourers. Reaumur's *Hist. of Insects*, vol. vi. p. 111.

The flies, which are produced from these worms, are all of the two-winged kind; but there are several different species of them; the generality of them resemble wasps, and have a very flat body. Goedart, who has described some of these flies, was surpris'd to see them very small when first produced from the chrysalis, yet growing very large in a quarter of an hour's time, and that without taking any nourishment; but this was only owing to their several parts having been squeezed while in the chrysalis, and expanding themselves when they were at liberty from the compression. These are the changes of this kind of leo-puceron; but the other devourer of these creatures, which has six legs, is of a different kind, and indeed is in itself reducible to several species, some of these six-legged worms becoming four-winged flies, and others a kind of beetles. These, from their near resemblance to the formica-leo, are by Reaumur distinctly called puceron-lions.

VER-Polype, a name given by Reaumur, and some other authors, to a species of water-worm, by no means to be confounded with the creature called simply the polype, and which is so famous for its reproduction of parts cut off, and for many other singular properties.

This ver-polype is a species of water-worm, produced from the egg of a tipula, and had this name given it from some remarkable productions, placed at the anterior and posterior parts of the body, which are supposed to have some analogy with the parts of the sea-fish called the *polypus*. These worms are found in muddy ditches, usually either crawling upon, or buried in the mud. Reaumur's *Hist. Insects*, vol. ix. p. 49.

VER du Gard, in *Geography*, a town of France, in the department of the Gard; 6 miles S.E. of Uzes.

VERA, in *Ancient Geography*, a town of Asia, in Media, on an eminence, and strong by its situation.—Also, the name of a river of Gaul.

VERA, in *Geography*, a town of Spain, in Navarre; 25 miles N. of Pamplona.—Also, a town of Spain, in the province of Grenada; 34 miles N.E. of Almeria. N. lat. 37° 8'. W. long. 2° 4'.—Also, a river of European Turkey, which runs into the gulf of Salonichi, near the mouth of the Vardar.

VERA Billa. See BILLA.

VERABADURGAM, in *Geography*, a town of Hindoostan, in Myfore; 8 miles W.S.W. of Caveripatam.

VERACINI, ANTONIO, in *Biography*, uncle and master to Francesco Maria Veracini, the celebrated performer on the violin, published at Florence, in 1692, ten sonatas, the usual number, till Corelli's time; and afterwards, "Sonate da Chiesa," two sets; but this author not being possessed of the knowledge, hand, or caprice of his nephew, his works are now not sufficiently interesting to merit further notice, particularly as there was nothing marked or original in his style; the harmony indeed was correct; but "much may be right, yet much be wanting."

VERACINI, FRANCESCO MARIA, a native of Florence, and contemporary with Tartini, who were regarded as the greatest masters of the violin that had ever appeared; nor were their abilities confined merely to the excellence of their performance, they extended to composition, in which they both manifested great genius and science. But whatever resemblance there may have been in the professional skill of these two masters, it was impossible for any two men to be more dissimilar

diffimilar in disposition: Tartini was so humble and timid, that he was never happy but in obscurity; while Veracini was so foolishly vain-glorious as frequently to boast that there was but *one God, and one Veracini*.

Being at Lucca at the time of La Festa della Croce, which is celebrated every year on the 14th of September, when it is customary for the principal professors of Italy, vocal and instrumental, to meet, Veracini entered his name for a solo concerto; but when he went into the choir, in order to take possession of the principal place, he found it already occupied by Padre Girolamo Laurenti, of Bologna; who not knowing him, as he had been some years in Poland, asked him where he was going? Veracini answered to the place of first violin. Laurenti then told him, that he had been always engaged to fill that post himself; but that if he wished to play a concerto, either at vespers, or during high mass, he should have a place assigned him. Veracini, with great contempt and indignation, turned his back on him, and went to the lowest place in the orchestra. In the act or part of the service in which Laurenti performed his concerto, Veracini did not play a note, but listened with great attention. And being called upon, would not play a concerto, but desired the hoary old father would let him play a solo at the bottom of the choir, desiring Lanzetti, the violoncellist of Turin, to accompany him; when he played in such a manner as to extort an *e viva!* in the public church. And whenever he was about to make a clofe, he turned to Laurenti, and called out: "Cosi si fuona per fare il primo violino:" "this is the way to play the first fiddle." Many silly stories of this kind are handed about Italy concerning the caprice and arrogance of this performer, who was usually qualified with the title of *Capo pazzo*.

Veracini would give lessons to no one except a nephew, who died young. The only matter he had himself in his youth, was his uncle, Antonio Veracini, of Florence; but by travelling all over Europe he formed a style of playing peculiar to himself. Besides being in the service of the king of Poland, he was a considerable time at different courts of Germany, and twice in England, where, during the time of Farinelli, he composed several operas: among which was "Adriano," in London, in the winter of 1735 and 1736, which had a run of twelve nights; and in 1744, "L'Errore di Salomone," in which Monticelli performed.

Veracini's first arrival in England was in the year 1714, when in the advertisements of the time for the opera of Dorinda, it is said that "Signor Veracini, lately arrived, will perform symphonies;" and the same year, with the operas of Crespo, Arminio, and Ernelinda, solos on the violin were frequently performed by Veracini.

We saw and heard him perform in the year 1745, at Hickford's room, where, though in years, he led the band at a benefit concert for Jozzi, the second finger, at the opera, in such a bold and masterly manner as we had never heard before. Soon after this, in returning to the continent, Veracini was shipwrecked, and lost his two famous Steiner violins, thought to have been the best in the world, and all his effects. He used to call one of his violins St. Peter, and the other St. Paul.

As a composer he had certainly a great share of whim and caprice, but he built his freaks on a good foundation, being an excellent contrapuntist. The peculiarities in his performance were his bow-hand, his shake, his learned arpeggios, and a tone so loud and clear, that it could be distinctly heard through the most numerous band of a church or theatre.

Veracini and Vivaldi had the honour of being thought mad for attempting in their works and performance what many a sober gentleman has since done uncensured; but

both these musicians, happening to be gifted with more fancy and more hand than their neighbours, were thought insane; as friar Bacon, for superior science, was thought a magician, and Galileo a heretic.

VERA-CRUZ, in *Geography*, a sea-port of Mexico, in the province of Tlascala, with a secure harbour, defended by a fort, upon a rock of a neighbouring island, called St. John d'Alva, in the gulf of Mexico. This is fortified with 300 pieces of cannon; and signals are made from a high tower. This is a place of very great extent, and perhaps one of the most considerable in Spanish America for trade, it being the natural centre of the American treasure, and the magazine of all the merchandize sent from New Spain, or of that transported hither from Europe. It receives a prodigious quantity of East India goods over land from Acapulco, brought from the Philippine isles. Upon the annual arrival of the flota here from Old Spain, a fair is opened, which lasts many weeks, when this place may be said to be immensely rich. Its situation is unhealthy, from the bogs round it, and the barrenness of the soil. It parts the sea in a semicircle, and is inclosed with a single wall or parapet, six feet high and three broad, surmounted by a wooden pallisade much decayed. The wall is flanked with six feeble bastions, on square towers twelve feet high. On the shore to the S.E. and N.W. are two redoubts, with some cannon to defend the port. The houses are well built with stone and lime, and have wooden balconies. The streets are wide, well paved with pebbles, and kept in excellent order. The churches are much decorated with silver; and in the dwelling-houses, the chief luxury consists of porcelain and other Chinese articles. The principal inhabitants are merchants; but European commerce is mostly carried on at Xalapa. The population is about 7000 or 8000: the inhabitants are generally proud, indolent, and devout; but commerce is well understood, and here are seven or eight houses, each worth a million of dollars. The women are rarely handsome, and live in retirement; the only amusements being a coffee-house and processions, or religious masquerades, the penitents whipping themselves with much bloodshed. A charity of 6000 dollars to marry four poor girls has, as is usual in such cases, reverted to the rich. The harbour of Vera-Cruz might offer anchorage to 40 or even 60 ships of war in four to ten fathoms; but the northerly winds are terrible, and often drive vessels on shore. In the rainy season the marshes on the south are haunted by caymans, or alligators, from seven to eight feet in length, but innocent. The sea-fowl are innumerable, and the mosquitoes very troublesome. The north winds are said to be so violent, that the ladies are excused from going to mass; and these gales sometimes load the walls with sand. In the rainy season the water regularly falls in the night. Earthquakes are frequent. Vera-Cruz having been taken and plundered several times by the Buccaneers, the Spaniards have built forts, and placed centinels along the coast: their ordinary garrison consisting only of 60 horse and two companies of foot; 180 miles E.S.E. of Mexico. N. lat. 19° 5'. W. long. 97° 26'.

VERA-CRUZ, a port in the bay of St. Philip and St. Jago, in Terra Australis del Espiritu Santo, discovered by Quiros in 1606, and, according to him, capable of containing 1000 ships, with clear soundings of black sand, and water from three feet to 40 fathoms.

VERA-CRUZ, *Old*, a sea-port of Mexico, in the province of Tlascala. This is the port where Cortez landed in 1518; 15 miles N. of Vera-Cruz. This is situated infalubriously; and the river is full of caymans, so strong as to draw an ox under water. They are fond of the flesh of dogs. N. lat. 19° 20'. W. long. 97° 40'.

VERACUNDALORE, a town of Hindoostan, in the Carnatic; 20 miles S.W. of Bomrauzepollam.

VERAGILA, a small island in the gulf of Venice. N. lat. $44^{\circ} 12'$. E. long. $15^{\circ} 32'$.

VERAGRI, in *Ancient Geography*, a people of the Alps, in the Pennine valley. Cæsar places them between the Nantuates and the Seduni.

VERAGUA, in *Geography*, a province of Mexico, bounded on the N. by the gulf of Mexico, on the E. by the province of Darien, on the S. by the Pacific ocean, and on the W. by Costa Rica. This coast was first discovered by Columbus, in the year 1503, to whom it was granted, with the title of duke. To the river now called Veragua, he gave the name of "Verdes-aguas," on account of the green colour of its water; or, according to others, because the Indians called it by that name in their language. But however that may be, it is from this river that the province derives its name. In 1538, the captains Gasper d'Espinoza and Diego de Alvarez, renewed the discovery by land; but, being repulsed by prince Urraca, were obliged to content themselves with a settlement in the neighbourhood; and even here the Spaniards were not able to maintain their ground against the frequent incursions of the Indians; so that finding the absolute necessity of a stronger settlement, they built the city Santa Fé, on the spot where it now stands. This province, though geographically belonging to North America, is included within the kingdom or territory of Terra Firma. The country is rugged and mountainous, but abounding with beautiful and excellent woods, and having vales that afford rich pastures. The monkeys found here are small but beautiful, being of a buff-colour, with a white crown; but too delicate to be removed from their native clime. It is said to rain here every day in the year; and the rain is attended with tremendous thunder and lightning, and produces torrents that descend with rapidity and violence from the mountains. Its gold-mines are rich, but little wrought, because every article must be carried on the shoulders of the Indians over steep mountains. The Doraces, and other savage tribes, live naked in the mountains, on roots and fruits; but several have been converted since the year 1760 by the Franciscans, who have founded some Indian villages. The capital of this province is called by the same name, and also *St. Jago de Veragua* (which see); it is situated in a warm and moist climate, abounding in maize, yucca, a root of which bread is made, plantains, and cattle, but principally in swine. The natives dye their cotton of a rich and permanent purple, with the juice of a sea-snail found on the coast of the Pacific, akin to the murex of the ancients; with which, and some gold from the mines, they carry on trade with Panama, and the provinces of the kingdom of Guatemala. Here is an elegant hospital; and fourteen villages are subject to the jurisdiction of this town, which is ruled by a governor.

VERAL, a river of Spain, which runs into the Aragon.

VERALA, in *Ancient Geography*, a town of Hispania Citerior, between Calaguris and Trifium.

VERAMALLY, in *Geography*, a town of Hindoostan, in the Carnatic; 18 miles S. of Tritelinopoly.

VERANO AVE, or *Ave de Verano*, in *Ornithology*, the name by which the Portuguese in the Brazils call a large bird of the thrush kind, approaching to the size of a small pigeon, remarkable for its loud noise; and more commonly known by its American name *guirapanga*.

VERANOCA, in *Ancient Geography*, a town of Asia, in Phœnicia.

VERAPATCHY, in *Geography*, a town of Hindoostan, in the Myfore; 20 miles W.N.W. of Dindigul.

VERA-PAZ, a province of Mexico, in the domain of

Guatemala, bounded on the N. by the province of Chiapa, on the E. by the bay and province of Honduras, on the S. by Guatemala, and on the W. by Soconusco; about 120 miles in length, and 74 in breadth. In one part of the country the air is healthy, in the other not. The country is subject to earthquakes, thunder, and nine months' rain. The soil is mountainous, yielding little corn, but abounding in forests of cedar, &c. in which are many wild beasts. The principal commodities are drugs, cocoa, cotton, wool, honey, &c.

VERA-PAZ, or COBAN, a town of Mexico, and capital of the province of Vera-Paz, situated on a river which runs to the bay of Honduras; 600 miles S.E. of Mexico. N. lat. $15^{\circ} 50'$. W. long. $91^{\circ} 14'$.

VERATO, a town of Naples, in the province of Otranto; 4 miles S. of Alessano.

VERATRUM, in *Botany*, which some derive from *verè atrum*, truly black, because the root is, externally at least, of that colour; may more safely be left among those ancient names whose origin is unknown. It occurs in Lucretius and Pliny, indicating some very active or poisonous plant; and is generally supposed synonymous with the ἰλλεβορος λυκο of Dioscorides, itself rather doubtful, and whose particular designation is a contradiction to the above etymology. Whatever difficulties may attend the determination of the ancient *Veratrum*, this name is now universally applied to the genus we are about to describe, one of whose original species having nearly white, and the other as nearly black, flowers, the English appellations, of White and Black Hellebore, suit them so well, as to efface all memory of old uncertainties.—Linn. Gen. 540. Schreb. 715. Willd. Sp. Pl. v. 4. 895. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 5. 425. Pursh 242. Juss. 47. Tournef. t. 145. Lamarck Illustr. t. 843. Gærtner. t. 18.—Class and order, *Polygamia Monoecia*, or more properly *Hexandria Trigynia*. Nat. Ord. *Coronariæ*, Linn. *Junci*, Juss. *Melanthaceæ*, Brown.

Gen. Ch. *Cal.* none, unless the corolla be taken for such. *Cor.* Petals six, elliptic-oblong, sessile, thinner at the margin towards the base, and finely serrated or fringed in that part, permanent. *Stam.* Filaments six, inserted into the base of the petals, awl-shaped, converging round the germens, spreading at the summit; anthers quadrangular, versatile, attached by the back. *Pist.* Germens three, superior, oblong, compressed, erect, combined, terminating in three very short styles, with simple spreading stigmas. *Peric.* Capsules three, oblong, erect, compressed, of one cell and one valve, bursting at their inner margins by which they are originally connected. *Seeds* several, obliquely imbricated, inserted into each margin of the capsule, oblong, compressed, winged at each end; the wing at the lower part rounded. Several flowers, on the same plant, have only slight rudiments of a pistil.

Ess. Ch. Calyx none. Petals six, permanent, sessile, equal, bearing the stamens. Styles permanent. Capsules three, bursting at the inner edge. Seeds numerous, compressed, imbricated, winged at each end. Some flowers male.

Obs. This genus has been thought too near MELANTHUM, see that article. The capsules of the latter are single, of three cells, and in some species the cells burst externally, but this is not the case with *M. sibiricum*, whose cells burst at the inner angle only. The subject wants revision. The habit of *Melanthium*, for the most part an African genus, is very unlike *Veratrum*, the leaves being slender, and *inflorescence* more simple. The corolla is more coloured, with elongated claws; and though permanent, has less of the coriaceous nature of a calyx. HELONIAS, (see that article,)

ticle,) which Mr. Ker would unite with *Veratrum*, has a roundish three-celled capsule, and a different habit.

1. *V. album*. White Veratrum, or Common White Hellebore. Linn. Sp. Pl. 1479. Willd. n. 1. Ait. n. 1. Jacq. Austr. t. 335. Fl. Dan. t. 1120. Mill. Ic. t. 271. Mill. Illustr. t. 98. Woodv. Med. Bot. t. 100. (Helleborus præcox; Ger. Em. 440. Elleborum album; Matth. Valgr. v. 2. 559.)—Panicle thrice compound. Petals ascending, elliptical.—Native of alpine meadows in most parts of Europe, from Norway to Greece; but not of Britain. It is, of course, a hardy perennial in our gardens, where it has been cultivated time out of mind, flowering from June to August. The root is tuberous, black on the outside, with long, simple, white, cylindrical fibres. Stem from two to four or five feet high, stout, erect, simple, leafy, terminating in a large, branching, downy panicle, of innumerable greenish-white flowers, with little or no scent, an inch broad, whose petals when in full perfection spread horizontally, but in fading return to their original ascending posture, becoming green, leafy, and coriaceous. The leaves are large, elliptical, entire, with many ribs, plaited, smooth, of a fine green; the uppermost becoming oblong or lanceolate bracteas. Each partial flower-stalk is also accompanied by an elliptic-lanceolate downy bractea, various in length. This stately plant, accompanied by *Gentiana lutea*, makes a magnificent appearance in rich pastures on the alps of Switzerland and Savoy, where they both grow more luxuriantly than in gardens.—Mr. Sieber of Prague has sent us from the alps of Austria, under the name of "*V. viride* Bernhardi," what seems a greener-flowered variety of the *album*, and different from the following; but it is extremely difficult to decide on this point, without seeing the plants alive.

2. *V. viride*. Green Veratrum. Ait. n. 2. Willd. n. 2. Pursh n. 1. Bigelow Bost. 246. [*V. album*; Michaux Boreal.-Amer. v. 2. 249. *Helonias viridis*; Curt. Mag. t. 1066.]—Spikes panicled, dense, cylindrical. Petals ascending, elliptical.—In swamps and on mountain bogs, from Canada to Carolina, flowering in July. A stately plant, from three to six feet high. Pursh. Dr. Bigelow, in his *Flora Bostonensis*, says this plant, not infrequent in meadows and swamps about Boston, is called Poke root, or Swamp Hellebore. It was cultivated in England by Peter Collinson, in 1742. The foliage and habit are like the preceding, but the panicle is larger and greener; its branches longer and more cylindrical, spiked, not racemose, each flower being nearly or quite sessile. The petals are broader; their margins thickened and mealy about the base.

3. *V. nigrum*. Dark Veratrum. Linn. Sp. Pl. 1479. Willd. n. 3. Ait. n. 4. Jacq. Austr. t. 336. Curt. Mag. t. 963. (Helleborus albus præcox; Ger. Em. 440. f. 2.)—Clusters panicled, dense, cylindrical. Petals obovate, widely spreading; at length reflexed.—Native of dry mountainous situations, in Siberia, Hungary, Austria and Greece, flowering in July. Perfectly hardy in our gardens, where it blossoms freely, and increases without any care, provided the soil be dry. It agrees with the first species in habit and leaves, but is rather taller, and is very remarkable for the dark purplish-brown, almost black, hue of its flowers, which exhale a faint cadaverous scent. They compose long, cylindrical, sessile clusters, assembled into a long panicle, accompanied by narrow strap-shaped bracteas in the lower part. Each flower is but half as broad as those of *V. album*, and the petals turn backward as they fade, becoming finally of a dull green.

4. *V. virginicum*. Virginian Veratrum. Ait. n. 3. (Melanthium virginicum; Linn. Sp. Pl. 483. Willd. Sp. Pl. v. 2. 266. Pursh 240. *Helonias virginica*; Curt. Mag. t. 985. *Aphodelo affinis floridana*, ramofo caule, floribus

ornithogali obfoletis; Pluk. Amalth. 40. t. 434. f. 8.)—Clusters panicled, loose. Petals elliptical, spreading, with two spots at the base; hairy at the back.—In low grounds, amongst luxuriant herbage, from New York to Carolina, flowering in June and July, perennial. Rather scarce in gardens, though tolerably hardy. The stem is from three to five feet high, downy. Leaves linear-lanceolate, folded, ribbed, pointed. Panicle pyramidal, of numerous, loosely racemose, many-flowered branches, whose partial stalks are about half as long again as the petals. Flowers green, with two brown spots on each petal. After being expanded for some time, they turn to a red-brown.

5. *V. parviflorum*. Small-flowered Veratrum. Michaux Boreal.-Amer. v. 2. 250. Willd. n. 4. Ait. n. 5. Pursh n. 2.—Clusters panicled, with slender branches. Petals oval-lanceolate, acute at each end. Leaves elliptical, flat, smooth.—On high mountains in Carolina, flowering in July. Flowers small, green. Root perennial. Pursh. The leaves are like those of a *Veratrum*, but not so much furrowed, or plaited. Petals without glands. Inflorescence that of a *Melanthium*. Michaux. We have seen no specimen nor figure, neither of this nor the following.

6. *V. angustifolium*. Narrow-leaved Veratrum. Pursh n. 3.—Dioecious. Panicle simple. Petals linear. Leaves very long, linear, keeled.—On high mountains of Virginia and Carolina. Perennial, flowering in June. Stem tall. Flowers greenish-yellow. Pursh.

7. *V. Sabadilla*. Caustic Veratrum, or Indian Caustic Barley. Retz. Obs. fasc. 1. 31. n. 107. Willd. n. 5. (Cevadilla; Dale Pharm. 286. *Hordeum causticum*; Bauh. Pin. 23. Theatr. 467, with a probably fictitious figure. Ytzevimpatti, seu Canis interfecto, vel Hordeolum; Hernand. Mex. 307, with an apparently authentic figure.)—Leaves linear-lanceolate, ribbed. Cluster simple, dense, solitary, terminal.—Native of the colder regions of Mexico. The leaves appear to be all nearly radical. Stem solitary, simple, erect, almost naked, three spans high. Cluster erect, cylindrical, a span long, nearly or quite simple. Flowers turned to one side, of a very dark purple. Petals ovate.—Retzius, who first introduced this plant into a scientific botanical work, found a specimen of the flowers, imported along with the seeds, in a druggist's shop. They answered to the character of a genuine *Veratrum*, as might be expected from the seeds and capsules, which we have occasionally met with, and whose qualities are analogous to those of *V. album*. But the learned professor never thought of tracing out the synonyms, or searching for any figures, of this little-known plant; which defect we have endeavoured to supply. For the medical properties of the seeds in question, see CEVADILLA.

For *V. luteum*, Linn. Sp. Pl. 1479. Willd. n. 6, see HELONIAS, n. 3.

VERATRUM, in Gardening, contains plants of the hardy, herbaceous, perennial kind, among which the species cultivated are, the white-flowered veratrum, or white hellebore (*V. album*); the dark-flowered veratrum (*V. nigrum*); and the yellow-flowered veratrum (*V. luteum*).

The first sort has the stems three or four feet high, and branching out on every side almost their whole length: the branches and principal stem being terminated by spikes of flowers set very close together, which are of a greenish-white or herbaceous colour, and appear in July.

The second sort has the stalks rising higher, but the flowers are of a dark-red colour, which appear almost a month sooner.

The third sort has a large tuberous root with a single stem, about a foot high, having the flowers produced at the top, in a single thick close spike, which are small, and of a yellowish-white colour, appearing in June.

Method of Culture.—All these plants may be increased by seed and parting the roots.

The seed should be sown in the autumn or early spring, upon a bed or border of light earth, or in a box filled with the same sort of mould. When the plants are come up in the spring, keep them clear from weeds, and refreshed with water occasionally when the season is hot and dry; and in the following autumn, when the leaves decay, take them up carefully without injuring the roots, and plant them out about half a foot square in a fresh bed of light mould; and when they have remained in it till fit for flowering, they should be removed into the borders, clumps, or other parts. This is, however, a tedious method, as they seldom flower in less than four years; therefore the root method is mostly had recourse to.

The roots may be divided in autumn, when the leaves decay, and be planted out in a light, fresh, rich mould where they are to grow; they should not be removed oftener than once in about four years. The roots should not be parted too small.

These plants have a fine effect in the middle of large borders, clumps, and other similar situations, in pleasure grounds and other places by the singularity of their large furrowed leaves, and their different modes of flowering.

The first sort is much cultivated as a medicinal plant for the use of its root, as well as the black sort occasionally; in which intention the plants should be set out in beds or borders in any common parts of the ground.

VERATRUM, in the *Materia Medica*. See HELLEBORE.

Mr. James Moore has suggested that a vinous infusion of the root of the *veratrum album*, or white hellebore, constitutes the active ingredient in the *eau médicinale d'Huffon*. Mr. Moore gives the following preparation: take of white hellebore-root, eight ounces; white wine, two pints and a half. The root is to be cut in thin slices, and infused for ten days, occasionally shaking the bottle. Let the infusion be then filtered through paper.

The dose of the mixture, in cases of gout, may be from one fluid-drachm to three fluid-drachms.

VERB, in *Grammar*, a word serving to express what we affirm of any subject, or attribute to it; or, it is that part of speech, by which one thing is attributed to another, as to its subject; as the words *is*, *understands*, *hears*, *believes*, &c. This is, in other words, the definition of a verb adopted by Dr. Priestley in his *Grammar*. But this definition seems to include not only verbs, but likewise all adjectives, and abstract nouns signifying qualities; for when we say "God is good," or "Goodness belongs to God," do not the words "good" and "goodness" express what is affirmed of or attributed to the Deity? But if in this definition it is merely asserted, that the essence of the verb consists in affirmation, it might have been expressed with greater precision, thus: "a verb is a word affirming something of, or attributing something to, a thing." It is, says Dr. Blair, the affirmation that seems to be that which chiefly distinguishes the verb from the other parts of speech, and gives it its most conspicuous power. Hence there can be no sentence, or complete proposition, without a verb either expressed or implied; for whenever we speak, we always mean to assert, that something is or is not; and the word which carries this assertion, or affirmation, is a verb. This ingenious writer, however, seems to have improperly included time as one of the three things implied in all verbs, adding this to the attribute of some substantive, and an affirmation concerning that attribute. The definition of Dr. Beattie seems to be more objectionable. He defines a verb to be "a word necessary in every sentence,

signifying the affirmation of some attribute, together with the designation of time, number, and person." According to this definition, neither infinitive moods, nor gerunds, nor supines, nor participles are verbs; for they neither contain an affirmation, nor signify time, nor are limited either to number or person. If affirmation, which we conceive to be the case, be essential to verbs, it is possible to form a tolerably copious language with only *one verb* in it; for infinitives, participles, adjectives, &c. may be so united to nouns by the copula, or verb *is*, *alone*, as to express almost any idea which we can have occasion to communicate. But if the circumstances of time, person, and number, be essential to verbs, it is more than probable that languages may subsist in the world, which have not a single verb in them. And in this case Dr. Beattie cannot consistently maintain, as he asserts, that a verb is "a word necessary in every sentence." In the Malayan language, *e. g.* which is held in high estimation, and which has wide extent in the East Indies, the verb admits of no modification whatever, on account either of person, tense, or voice; in all these respects, the personal pronouns only, with particles prefixed, determine the sense.

The verb is thus called of the Latin *verbum*, word, by way of eminence; as being the principal word of a sentence. Accordingly verbs, as Dr. Adam Smith observes, must have been coeval with the first attempts towards the formation of language. No affirmation can be expressed without the assistance of some verb. This writer suggests, that the radical verb, or the first form of it, in most languages, would be what we now call the *impersonal verb*: as "it rains," and the like: as this is the simplest form of the verb, and merely affirms the existence of an event, or of a state of things. By degrees, after pronouns were invented, such verbs became personal, and were branched out into all the varieties of tenses and moods. On this subject, see VERB, *Substantive, infra*.

The common definition given by grammarians is, that the verb is a word which betokens *being*, *doing*, or *suffering*. This is the definition of the learned bishop Lowth, and it includes nothing more than what is essential; so that it is equally applicable to the verb in all languages, in all its various forms, comprehending not only infinitives and participles, but likewise gerunds and supines. If it is in any respect defective, it is because it does not in all cases sufficiently distinguish verbs from verbal nouns. Infinitives and participles, gerunds and supines (see each in its place), not only signify actions, but govern the cases of nouns and pronouns in the same manner with the verbs, and therefore should be comprehended under the name of verbs. But those verbal nouns which do not govern accusative cases have not the same pretensions; for they have not the regimen of verbs, but of substantives, and consequently more properly belong to that class.

To conceive the origin and office of verbs, it may be observed, that the judgment we make of any thing, as when I say *the earth is round*, necessarily includes three terms. The first, called the *subject*, is the thing we affirm of, *e. g.* earth. The second, called the *attribute*, is the thing affirmed, *e. g.* round. The third, *is*, connects those two terms together, and expresses the action of the mind, *affirming* the attribute of the subject.

This last is what we properly call the verb; and which some of our later grammarians, particularly the Port Royalists, choose to call by a more significant word, *affirmation*. The reason is, that its principal use is to signify affirmation; that is, to shew the discourse in which that word is used, is the discourse of a man who does not only conceive things, but judges and affirms somewhat of them.

By this circumstance, a verb is distinguished from nouns, which also signify an affirmation, as *affirmans affirmatio*; those only signify affirmation, as that, by a reflection of the mind, is rendered an object of thought: so that they do not shew, that the person who uses them *affirms*, but only that he conceives an *affirmation*.

Though the principal use of verbs be to signify affirmation or assertion, they also serve to express the other motions of the soul; as to desire, pray, command, &c.; but this they only do, by changing the mood, or inflexion.

Here, we only consider the verb in its primary signification, which is that it has in the indicative mood. On this footing, the verb should have no other use, but to mark the connection which we make in the mind, between the two terms of a proposition; but the verb *esse, to be*, is the only one that has retained this simplicity: nor, in strictness, has this retained it, but in the third person, as *est, is*.

In effect, men being naturally inclined to shorten their expressions, to the affirmation they have almost always added other significations in the same word: thus, *e. g.* they add that of some attribute, so as that two words make a proposition; as in *Petrus vivit*, Peter lives: where *vivit* includes both the attribute and affirmation; it being the same thing to say *Peter lives*, as that *Peter is living*. And hence the great variety of verbs in every language.

For if people had been contented to give the verb its general signification, without any additional attribute, each language would only have needed one verb, *viz.* the verb substantive *est, is*.

Again, on some occasions, they also superadd the subject of the proposition, as *sum homo*, I am a man; or *vivo*, I live: and hence the diversity of persons in verbs.

Again, we also add to the verb, a relation to the time, with regard to which we affirm; so that one single word, as *cenâsti*, signifies that I attribute to the person I speak the action of supping, not for the present time, but for the past: and hence the great diversity of tenses in most verbs.

The diversity of these significations, or additions in the same word, has perplexed and deceived many of our best authors, in the nature of a verb; and has led them to consider it, not according to what is essential to it, which is to affirm; but according to some of these its accidental relations.

Thus, Aristotle, taking up with the third of those additional significations, defines verb to be *vox significans cum tempore*; a word signifying something with time.

Others, as Buxtorf, adding the second relation, define it, *vox flexilis cum tempore et persona*; a word admitting of divers inflexions, in respect of time and person.

Others, taking up with the first of the additional significations, which is that of the attribute, and considering that the attributes men ordinarily add to the affirmation, were actions and passions, have supposed the essence of a verb to consist in signifying *actions or passions*.

Lastly, Scaliger imagined he had made a great discovery in his book of the Principles of the Latin Tongue, in saying, that the distinction of things into *permanentes*, and *fluentes*, into what remain, and what pass away, is the proper source of the distinction between *nouns and verbs*; the first being to signify what remains, and the second what passes.

But from what we have said, it is easy to perceive, that these definitions are all false: and that the only true definition is *vox significans affirmationem*: this definition includes all that is essential to the verb: but if one would likewise include its principal accidents, one might define it, *vox significans affirmationem, cum designatione personæ, et temporis*; a

word which signifies an affirmation, with a designation of person, number, and tense; which is what properly agrees to the verb substantive *est*.

For as to other verbs, considered as becoming different by the union of certain attributes, one may define them thus: *vox significans affirmationem alicujus attributi, cum designatione personæ, numeri, et temporis*; a word which expresses the affirmation of some attribute, with a designation of person, number, and time.

Verbs, according to Mr. Harris, are those *attributives*, which have a complex power of denoting both an attribute and an assertion: those which take the attribute alone without the assertion are *participles*; and all other attributives are included under the general name of *adjectives*. And as some attributes have their essence in motion, *e. g.* *to walk, to live*, &c. others in the privation of motion, *e. g.* *to rest, to die*, &c. and others again in subjects, which have nothing to do with either motion or its privation, as *great and little, white and black*, &c. these last are adjectives, and those which denote motion or its privation are either verbs or participles. But motions and their privation, comprehended under the general term energy, imply time as their concomitant, and hence, he says, verbs which denote them, come to denote time also. See TENSE. See also MOOD.

Every energy has a reference, says this ingenious writer, to some energizing substance, and is conversant about some subject; and hence he derives the distinction between verbs *active and passive*: and as every energy respects an energizer, or a passive subject; hence appears the reason why every verb, whether active or passive, has in language a reference to some noun for its nominative case. When among the infinite subjects, to which the energy refers, that happens to occur, which is the energizer also, as *Brutus loved himself, slew himself*, &c. in such case the energy hath to the same being a double relation, both active and passive; and this gave rise among the Greeks to that species of verbs, called *verbs middle*; but in other languages, the verb still retains its active form, and the passive subject (*se or himself*) is expressed like other accusatives. Again, in some verbs, it happens that the energy always keeps within the energizer, and never passes out to any foreign subject, because the energizer and the passive subject are united in the same person; and then we obtain that species of verbs, called by grammarians *verbs neuter*, as if they were void both of action and passion, though they may rather be said to imply both. Of the above species of verbs, the middle cannot be called necessary, because most languages have done without it: those remaining are, therefore, the *active*, the *passive*, and the *neuter*, which seem essential to all languages whatever. Mr. Harris observes, that though the greater part of verbs denotes attributes of energy and motion; there are some which appear to denote nothing more than a mere simple adjective, joined to an assertion, as *ἰσχυρὸς* in Greek, *equalleth* in English, *albo* and *tumeo* in Latin; and there are also verbs, which are formed out of nouns, or in which the substantive is converted into an attributive. There are other supposed affections of verbs, besides moods and tenses, such as number and person. But these are, in fact, the properties not of attributes, but of substances. Hermes, chap. vi. viii. and ix.

Verbs are variously divided: with respect to the subject or signification, they are divided into *active, passive, neuter*, &c.; with respect to their construction, into *transitive and intransitive*; with respect to their formation or inflexions, into *regular and irregular, personal and impersonal; auxiliary, substantive*, &c. See LANGUAGE, GRAMMAR, and the subsequent articles.

VERB *Active*, is a verb which expresses an action that falls on another subject, or object. It is called also *transitive*, because the action passeth over to the object, or hath an effect upon some other thing. See ACTIVE.

VERB *Passive*, is that which expresses a passion; or which receives the action of some agent, and necessarily implies an object acted upon, and an agent by which it is acted upon: it is conjugated, in the modern tongues, with the auxiliary verb *I am, je suis, je sono, &c.*

Some do not allow of any verbs passive in the modern language; the reason is, what we call passive is nothing but the participle of the verb, joined with the auxiliary verb, *to be*; whereas the verbs passive of the Latin, &c. have their particular terminations. See PASSIVE.

VERB *Neuter*, is that which signifies an action that has no particular object on which to fall; but which, of itself, takes up the whole idea of the action: or a verb neuter expresses being, or a state or condition of being; when the agent and the object acted upon coincide: as, *I sleep, thou yawnest, he snores, we walk, you run, they stand.*

The Latins call them *neuters*, because they are neither active nor passive: though they have the force and signification of both; as, *I languish*, signifies as much as, *I am languishing*; *I obey*, as much as *I exercise obedience, &c.* only that they have no regimen to particularize this signification. The verb neuter is called *intransitive*; because the effect is confined within the agent, and doth not pass over to any object.

The distinction between verbs absolutely neuter, as, *to sleep*, and verbs active intransitive, as, *to walk*, though founded in nature and truth, is of little use in grammar; the construction of both is the same. Lowth's Gram. p. 62.

Of these verbs, there are some which form their tenses by the auxiliary verb *to have*; as, *I have slept, you have run.* These, grammarians call *neuter active*.

Others there are, which form their compound parts by the auxiliary *to be*; as, *to come, to arrive, &c.*; for we say, *I am come, not I have come, &c.* These are called *neuters passive*.

The neuter verb is varied like the active; but, having somewhat of the nature of the passive, admits in many instances of the passive form, retaining still the neuter signification; chiefly in such verbs as signify some sort of motion, or change of place or condition; as, *I am come, I was gone, &c.*

In English, many verbs are used both in an active and neuter signification, the construction only determining of which kind they are.

VERB *Substantive*, is that which expresses the being, or substance, which the mind forms to itself, or supposes in the object; whether it be there, or not: as, *I am, thou art.*

Existence, says Mr. Harris, may be considered as a universal genus, to which all things of all kinds are at all times to be referred. The verbs, therefore, which denote it, claim precedence of all others, as being essential to the very being of every proposition in which they may still be found, either express, or by implication; express, as when we say, *the sun is bright*; by implication, as when we say, *the sun rises*, which means, when resolved, *the sun is rising*. The verbs *is, groweth, becometh, est, sit, ὑπάρχει, ἐστίν, πέλει, γίγνεται*, are all used to express this general genus; and are called by the Latins *verbs substantive*, and by the Greeks ῥήματα ὑπαρκτικά, *verbs of existence*, a name more apt, as being of greater latitude, and comprehending equally as well attribute as substance. The principal of these verbs is the verb *ἐστίν, est, is*. All existence is either absolute, as when we say, *B is*; or qualified, as

when we say, *B is an animal, B is black, &c.* And with respect to this difference, the verb, *is*, can by itself express absolute existence, but never the qualified, without subjoining the particular form; consequently, when *is* only serves to subjoin some such form, it has little more force than that of a *mere assertion*. Under the same character, it becomes a latent part in every other verb, by expressing that assertion, which is one of their essentials: *e. g. riseth* means *is rising, &c.* Moreover, as to existence in general, it is either mutable, as in the objects of sensation; or immutable, as in the objects of intellect and science. All mutable objects exist in time, and admit the several distinctions of present, past, and future: but immutable objects know no such distinction, but rather stand opposed to all things temporary. And hence result two different significations of the substantive verb *is*, as it denotes mutable or immutable being: *e. g.* if we say, *this orange is ripe*, *is* meaneth that it existeth so now at this present, in opposition to past time, when it was green, and to future time, when it will be rotten: but if we say, *the diameter of the square is incommensurable with its side*, we do not intend by *is* that it is incommensurable *now*, having been formerly commensurable, or being to become so hereafter: on the contrary, we intend that perfection of existence, to which time and its distinctions are utterly unknown. Under the same meaning, we employ this verb, when we say, *truth is, or God is*: the opposition is not of time present to other times, but of necessary existence to all temporary existence whatever. Hermes, p. 88, &c.

In every language, says Dr. Adam Smith, in his "Formation of Languages," annexed to his "Theory of Moral Sentiments," there is a verb, known by the name of the substantive verb, in Latin, *sum*, in English, *I am*. This verb, he says, denotes not the existence of any particular event, but existence in general. On this account it is the most abstract and metaphysical of all verbs, and consequently could by no means be a word of early invention. Nevertheless he allows, that it is in every language; and therefore in languages which are in their earliest infancy. Others are of opinion, not without reason, that the verb substantive, or copula, *is*, is not only the most necessary, but the most simple of all verbs, for it contains nothing more than an assertion, or affirmation, that a thing exists. The idea conveyed by this simple proposition is coeval with thought itself: for what can we think about, unless we think that something is, or exists? This copula, or verb of existence, *is*, must appear to be coeval with language itself. But we cannot reasonably infer from hence, that this was the case with respect to any other finite verb. It is probable, that people, in their first attempts to express their ideas by words, would be some time before they invented any other word containing in itself an assertion or affirmation: for they would not, at a very early period, think of contriving words so complex in their nature as to include in them both the name of an action and an assertion.

An ingenious writer on the subject of verbs (see Pickbourn's Dissertation on the English Verb) conjectures that the first mode of expressing actions or passions would be by *participles* or *verbal nouns*; *i. e.* words signifying the names of the actions or passions they wanted to describe: and these words, connected with their subject by the copula *is* (a word coeval with speech itself), might, in these rude beginnings of language, tolerably well supply the place of verbs; *e. g.* from observing the operations of nature, such words as *rain* or *raining, thunder* or *thundering*, would soon be invented; and, by adding the copula *is*, they would say, *thundering, or thunder, is, or is not; raining, or rain, is*; which, by the rapidity of pronunciation, might in time

time form the verbs *rains, thunders, &c.* The observation of their own *actions*, or the *actions* of the animals around them, would soon increase their stock of ideas, and put them upon contriving suitable expressions for them. Hence might arise such words as these: *sleep, or sleeping; stand, or standing; run, or running; bite, or biting; hurt, or hurting*: and by joining these to substantives, by means of the copula *is*, they might form such sentences as these, *Lion is sleeping, or perhaps Lion sleep is, stand is, &c.*; which would soon be contracted into *Lion sleeps, stands, runs, bites, hurts, &c.* Thus our little insulated family might become possessed of verbs including an *attribute* and an *affirmation* in one word. The next step would probably be a distinction between actions in their *progressive* and in their *finished* state; *i. e.* actions *going on* in their presence, and perceived by their *senses*; and such as were *ended*, and consequently only known to them by *memory*, by *report*, or by their *effects*: and they might perhaps apply such words as *raining, thundering, sleeping, &c.* to the former kind of actions; and such as *rained, thundered, slept, &c.* to the latter. And by joining the copula *is* to these words signifying perfect actions, in the same manner in which they had joined it before to the words signifying imperfect ones, and afterwards contracting them into single words, they might soon acquire a verb expressing a finished action and an affirmation in one word. This improvement would probably suggest to them the idea of making such further alterations in, or additions to, their verbs, as would make them significant of all the grand divisions of time.

But still their verbs would have neither *person* nor *number*, and would probably remain in that state till the invention of pronouns. But this, requiring some degree of abstraction, would probably not happen very early; for, in their first efforts to express themselves, they would be more likely to say, "*Thomas loves William and Henry,*" than "*I love thee and him.*" However, in process of time, pronouns would no doubt be introduced: and they might perhaps make such alterations in their verbs, as to accommodate them to their numbers and persons, though such an accommodation does not seem absolutely necessary. Languages may therefore exist which do not vary their verbs to express either number or person. And, further, it is *possible* that there may be languages so constructed as not to admit any variation in their verbs, even to express *time*; for if the verb only contains, in itself, an assertion and an attribute, the time of it may be fixed by adverbs and other adjuncts. This author concludes that a definition applicable to the verb in all languages, and in all its forms, cannot comprehend in it any thing more than what bishop Lowth has expressed by saying, "A verb is a word signifying *to be, to do, or to suffer.*"

The copula, or substantive verb, *is*, according to this author, is, as we have already stated, the simplest of all verbs; and must necessarily have been contemporary with the first efforts of mankind to express their ideas by words. Without this we cannot unite an adjective to a substantive, or affirm that any thing is good or bad, or possess any quality whatever, or even exist. But this is the only verb, containing an affirmation, which is so perfectly simple in its nature as not to comprehend, at least, two ideas, which may be easily separated, nay which must necessarily be separated, in the operations of the mind, whenever it endeavours to express them. *Pluit, it rains, or is raining*, comprehends the idea which the mind forms of that operation of nature which we call rain or raining, and likewise an affirmation of the judgment which the mind forms concerning its present existence; and therefore cannot be expressed more simply and

naturally than by *is raining, or rain is*, which is easily contracted into, *rains*.

VERBS, *Auxiliary*, or *Helping*, are those which serve in conjugating active and passive verbs; such are, *I am, I have &c.*

The auxiliary verbs are like prepositions, words of a very general and abstract nature. They imply the different modifications of simple existence, considered alone, and without reference to any particular thing. In the early state of speech, the import of them would be incorporated with every particular verb in its tenses and moods, long before words were invented for denoting such abstract conceptions of existence, alone and by themselves. But after these auxiliary verbs, in the progress of language, came to be invented and known, and to have tenses and moods annexed to them, like other verbs; it was found, that as they carried in their nature the force of that affirmation which distinguishes the verb, they might, by being joined with the participle which gives the meaning of the verb, supply the place of most of the moods and tenses.

The abbot de Dangeau distinguishes all verbs into two general kinds; auxiliary verbs, and verbs which make use of auxiliaries.

This distinction some may tax as not very just: in regard auxiliary verbs sometimes make use of auxiliaries themselves: but this does not destroy the division; it only shews, that the auxiliary verb has two formalities, or two different qualities, under which it is to be considered; in virtue whereof, it constitutes, as it were, two sorts of verbs.

The verbs which make use of auxiliaries, he divides into *active, neuter, and pronominal*. *Verbs neuter*, he farther distinguishes into *neuters active and neuters passive*. *Pronominals* he distinguishes into *identical, reciprocal, neuterized, and passived*. But several of these are peculiar to the French language. See *AUXILIARY Verbs*:

When an auxiliary is joined to the verb, the auxiliary goes through all the variations of person and number; and the verb itself continues invariably the same. When there are two or more auxiliaries joined to the verb, the first of them only is varied according to person and number. The auxiliary *must* admits of no variation.

VERBS, *Regular*, are those which are conjugated after some one manner, rule, or analogy.

VERBS, *Irregular, or Anomalous*, are those which have something singular in the terminations or formations of their tenses. See *ANOMALOUS Verbs*.

The formation of verbs in English, both regular and irregular, is derived from the Saxon. The irregular verbs in English are all monosyllables, unless compounded; and they are for the most part the same words which are irregular verbs in the Saxon. The first class of irregulars comprehends those that are become so from some kind of contraction: thus, some verbs ending in *d* or *t* have the present, the past time, and the participle perfect and passive, all alike without any variation; as, *beat, burst, cost, &c.* which are contractions from *beated, bursted, costed, &c.* because of the disagreeable sound of the syllable *ed* after *d* or *t*. Others in the past time and participle perfect and passive, vary a little from the present, by shortening the diphthong, or changing the *d* into *t*; as, *lead, led; meet, met; bend, bent, &c.* Others not ending in *d* or *t* are formed by contraction; as, *have, had, for haved; flee, fled, for flee-ed, &c.* The following, beside the contraction, change also the vowel: *sell, sold; tell, told; clothe, clad*. The second class of irregulars are those that end in *ght*, both in the past time and participle, and change the vowel or diphthong into *au* or *ou*: they are taken from the Saxon, in which the termination is *hte*: as, *bring, brought; buy, bought; seek,*

seek, sought, &c. The third class of irregulars form the past time by changing the vowel or diphthong of the present; and the participle perfect and passive, by adding the termination *en*: these also derive their formation from the Saxon: such are, *fall, fell, fallen*; *shake, shook, shaken*; *draw, drew, drawn*; *slay, slew, slain, &c. &c.* When *en* follows a vowel or liquid, the *e* is dropped. Some verbs, which change *i* short into *a* or *u*, and *i* long into *ou*, have dropped the termination *en* in the participle; as, *begin, began, begun*; *sing, sang, or sung*; &c. To this third class belong the defective verbs, *be, been*; *go, gone, i. e. gone*.

The whole number of verbs in the English language, regular and irregular, simple and compounded, taken together, is about four thousand three hundred. See in Dr. Ward's Essays on the English Language the catalogue of English verbs. The whole number of irregular verbs, including the defective, is about one hundred and seventy-seven. Lowth's Gram. p. 85. See CONJUGATION.

VERBS, *Defective*, are those which are not only for the most part irregular, but are also wanting in some of their parts. Such are the auxiliary verbs, most of which are of this number. They are in use only in some of their tenses and moods; and some of them are a composition of tenses of several defective verbs having the same signification.

VERBS *Inchoative*. See INCHOATIVE.

VERBS *Impersonal*. See IMPERSONAL.

There are also *reduplicative* verbs; as, *resound, recall, &c.*; and *frequentative* verbs, &c.

VERBS, *Transitive*. See TRANSITIVE, and VERB *Activa*, supra.

For the observations of an ingenious and learned coadjutor on the origin, nature, distribution, and properties of verbs, we must content ourselves with referring to the article GRAMMAR. It will be found that his sentiments differ in a variety of respects from those of much approved and popular writers, above stated: and we therefore prefer submitting them in the language of the author to the judgment of the philological reader, without any abridgment, and without any recapitulation, which would encroach too much on the limits to which we are confined. On this subject, see LANGUAGE.

VERBAL, something that belongs to verbs, or even to words spoken with the mouth.

Verbal nouns, are those formed from verbs. See INFINITIVE.

A verbal contract, is that made merely by word of mouth, in opposition to that made in writing.

VERBAL *Accident*. See ACCIDENT.

VERBANO, in *Geography*, a department of Italy, constituted of part of the duchy of Milan, situated on the side of lake Major, anciently called Verbanus Lacus, and the bailiwicks ceded by the Swifs. It contains 166,842 inhabitants, who elect twelve deputies. Varese is the capital.

VERBANUS, in *Ancient Geography*, a lake of Gallia Transpadana: its northern part was in Rhætia, and its southern part in Gaul.

VERBAS, in *Geography*, a river of Bosnia, which runs into the Save; 25 miles N.N.E. of Banjaluka.

VERBASCULUM, in *Botany*, the diminutive of *Verbascum*, perhaps from some similarity of colour and aspect, which may be traced in the Primrose and Cowslip. Bauh. Pin. 241. This is precisely synonymous with PRIMULA; see that article.

VERBASCUM, a plant frequently mentioned by Pliny, which, from all that he says about it, evidently belongs to the present genus, being the $\phi\lambda\omega\mu\omicron\varsigma$ of the

ancient, as well as of the modern Greeks. The above name is supposed to be corrupted from *Barbascum*, which originated in *barba*, alluding to the shaggy hairiness of the plant. (See PHLOMIS.) We do not however find any good authority for this supposition.—Linn. Gen. 97. Schreb. 132. Willd. Sp. Pl. v. 1. 1001. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 1. 383. Sm. Fl. Brit. 249. Prodr. Fl. Græc. Sibth. v. 1. 149. Pursh 142. Schrad. Monogr. 5. Juss. 124. Tourn. t. 61. Lamarck Illustr. t. 117. Gært. t. 55.—Class and order, *Pentandria Monogynia*. Nat. Ord. *Luride*, Linn. *Solanea*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, small, permanent, in five deep, erect, acute, nearly equal, segments. *Cor.* of one petal, wheel-shaped, unequal; tube very short; limb spreading, in five deep rounded segments. *Stam.* Filaments five, awl-shaped, unequal, distant, declining, woolly, shorter than the corolla, inserted into its base; anthers compressed, erect, more or less kidney-shaped, bursting lengthwise, imperfectly two-celled. *Pist.* Germen superior, roundish; style thread-shaped, slightly swelling upwards, declining, rather longer than the stamens; stigma obtuse. *Peric.* Capsule roundish-ovate, or ovate-oblong, slightly compressed, of two cells and two valves, bursting in the upper part, the valves sometimes splitting half way down; partition double, from the inflexed parallel margins of the valves, but often incomplete. *Recept.* ovate or globular, central, connected at each side, in an early state at least, with the valves. *Seeds* numerous, minute, angular, dotted, inserted into the receptacle.

Eff. Ch. Corolla wheel-shaped, irregular. Stamens distant, declining, bearded. Capsule superior, of two cells, with inflexed valves, and many seeds. Stigma simple.

Obs. There is so great a space between the inner edges of the inflexed valves and the central receptacle, in *V. pulverulentum* and some other species, that the ripe capsule is literally of but one common cell, though originally of two. Hence arose an error in Engl. Bot. p. 58, 59, which is corrected at p. 487 of the same work. CELSIA (see that article) differs from this genus in having four stamens only, two long and two short. Professor Schrader, in the first part of an excellent monograph on *Verbascum*, published at Gottingen in 1813, p. 14, asserts that this difference is very constant and invariable, and therefore he is not disposed to concur with those botanists who combine these two genera. We heartily assent to this determination. With regard to the new genus of *Ranondia*, founded, if we mistake not, on *V. Myconi*, and distinguished by having a capsule of one cell, with two lateral linear receptacles; we must suspend our judgment till we can examine into that character, but the habit of the plant, and its oblong heart-shaped two-celled anthers, indicate a very distinct genus.

The species of *Verbascum* are among the most uncertain of any well-known genus. They are more than commonly variable in the colour and size of their flowers, and appear to be very subject to cross impregnation. Hence we are led to mistrust some reputed species, described even by the ablest writers. The production of several mule ones has been traced and recorded, and we have observed others. Professor Schrader indeed has long cultivated and studied what he has described, and his accuracy is indisputable. We shall give his new species, on his own authority, and we shall profit by his remarks in the general characters here prefixed to the particular descriptions.

The root is generally biennial, rarely perennial, its form tapering. Stem generally solitary, from a foot and a half to four or eight feet in height, erect, sometimes peculiarly stiff and straight, rarely a little zigzag, leafy, in several instances

VERBASCUM.

stems alternately branched, many-flowered, panicled, with racemose stalks; in *V. Myconi* only altogether wanting. *Leaves* all radical the first year, subsequently all cauline: stalked, sessile, or decurrent; always alternate, simple, oblong; undivided, lobed or pinnatifid; simply or doubly crenate or toothed, rarely entire; generally covered with dense, white, shaggy or starry, or mealy and deciduous, woolliness; sometimes nearly smooth. *Flowers* racemose, generally aggregate, crowded, and very numerous; mostly yellow, rarely yellowish-white, or purple, or brownish. *Bracteas* mostly ovate, or lanceolate, pointed, of two orders, external and internal. The whole genus is nearly, if not entirely, European, the species found in America, except perhaps *V. Claytoni* of Pursh and Michaux, having been apparently introduced from this quarter of the world. The Levant produces many fine ones, not well known to Linnæus.

SECT. 1. *Leaves decurrent.*

1. *V. Thapsus*. Great Mullein; or High Taper. Linn. Sp. Pl. 252. Willd. n. 1. Schrad. n. 1. Pursh n. 1. Fl. Brit. n. 1. Engl. Bot. t. 549. Fl. Dan. t. 631. (*Thapsus barbatus*; Ger. Em. 773. *φλωμος λευκη αερην*; Diof. book 4. chap. 104.)—*Leaves* decurrent, crenate, woolly on both sides. Stem simple. Cluster dense. Flowers almost sessile.—Frequent throughout Europe, on banks and waste ground, flowering in July and August; very common in Greece. Mr. Pursh observes that, though common in America, this plant was probably introduced from Europe; nevertheless it springs up abundantly in the most remote parts of the country, in fields newly cleared and burnt. The root is biennial. Stem from three to five feet high, erect like a staff, woolly, winged with decurrent acute leaves, which are clothed with white entangled starry wool, like cloth or flannel. *Flowers* very numerous, large, of a bright golden-yellow, with orange-coloured hairy *filaments*, and roundish red *anthers*. Mr. Robson of Darlington communicated to Dr. Withering a mule plant, produced under his own eyes, from this species impregnated by *V. nigrum*. Mr. D. Turner found a corresponding specimen, now before us, at Barton, near Swaffham, Norfolk. The leaves are but slightly decurrent. *Spike* elongated and slender.—The leaves of *V. Thapsus*, about a handful boiled in a pint of milk, sweetened with sugar, strained, and the milk taken at bed-time, are useful in coughs, and more especially serviceable in allaying the irritation of the piles. *V. pulverulentum* has the same qualities.—*V. thapsiforme*, Schrad. n. 2. seems scarcely more than a variety with a larger corolla, and two of the *anthers* oblong, instead of their being all round.

2. *V. crassifolium*. Thick-leaved Mullein. Schrad. n. 3. "Hoffmannegg and Link Lusit. v. 1. 213. t. 26."—*Leaves* decurrent, obscurely crenate, densely woolly; the upper ones rather acute. Cluster dense. Flowers almost sessile. Filaments smooth. Two of the *anthers* oblong.—Found in sandy ground in Portugal. The smooth filaments afford the chief distinction between this plant and the last, at least its variety called *thapsiforme*. Experience must shew, by cultivation, whether this be permanent.

3. *V. cuspidatum*. Pointed-leaved Mullein. Schrad. n. 4. t. 1. f. 1. (*V. Thapsus*; Ehrh. Pl. Off. n. 111.)—*Leaves* decurrent, crenate, woolly on both sides; the upper ones pointed. Cluster somewhat interrupted. Two of the *anthers* oblong.—Found in mountainous woods near Vienna. Schott. Near Upsal. Ehrhart. This Dr. Schrader mentions as the *V. Thapsus* of the Vienna botanists, agreeing in habit with the two foregoing, but the stem is of more humble stature, and more slender. *Leaves* smaller, less densely woolly; the upper ones taper-pointed. *Inflorescence* and *flowers* more like *V. phlomisoides*, the cluster being interrupted,

the flowers more stalked, and aggregate in little tufts. *Corolla* large. Two longer *filaments* having oblong *anthers*; and in our specimen from Ehrhart smooth filaments, though the rest are hairy.

4. *V. niveum*. Snow-white Mullein. Tenore Hort. Neap. 109. Schrad. n. 5.—*Leaves* half-decurrent, crenate; woolly and very white beneath; more slightly so above. Cluster dense. Flowers nearly sessile. *Anthers* uniform.—Found near Naples. Stem two or three feet high, round; at length smooth and brownish. *Leaves* thickish, soft; their upper surface becoming green and slightly downy, though the under is snow-white. *Flowers* yellow, in tufts, almost sessile, about the size of *V. Thapsus*. *Filaments* clothed with white wool. Schrader. This appears to be really a very distinct species.

5. *V. densiflorum*. Dense-flowered Mullein. "Bertol. Pl. Rar. Ital. v. 3. 52." Schrad. n. 4.—*Leaves* downy; the radical ones lanceolate, elongated, crenate, deeply serrated at the base; upper stem-leaves pointed, toothed, half-decurrent. Cluster dense. Flowers aggregate, nearly sessile.—Found on the summit of mount Bruciana, between Carrara and Massa. Stem four or five feet high, angular, clothed with tawny woolliness, especially the upper part. Radical leaves more than eighteen inches long, two or three broad in the middle; green above; most hairy beneath; those of the stem gradually shorter upward, ovate, pointed, sessile, with a small decurrent wing on each side, more downy all over, especially the uppermost. Cluster very dense, above a foot long. *Flowers* large, yellow, in tufts on extremely short stalks. Pubescence of the whole plant yellowish or tawny, composed of branched entangled hairs, and much the most dense in the upper part. Bertolini.

6. *V. thapsoides*. Long-spiked Mullein. Schrad. n. 7. t. 5. f. 2. "Hoffmannf. et Link Lusit. v. 1. 214, excluding the synonyms."—*Leaves* finely crenate, downy; radical ones oblong-lanceolate; the rest oblong, acute, half-decurrent. Flowers on short stalks, aggregate, rather crowded. *Anthers* nearly equal.—Native of Portugal. Perennial. Stem three or four feet high, or more, generally branching at the top into several long, rather slender, tolerably dense clusters of yellow flowers, smaller than *V. Thapsus*. Schrader. We conceive this to be no other than the Linnæan *V. Thapsus*; see *V. Lychnitis*.

7. *V. macranthum*. Great-flowered Mullein. Schrad. n. 8. "Hoffmannf. et Link Lusit. v. 1. 215. t. 27."—*Leaves* finely crenate, downy; radical ones elliptic-oblong, tapering at the base; the rest oblong, acute, half-decurrent. Cluster interrupted, with distant tufts of flowers. Two of the *anthers* oblong.—Found by way sides, in the northern part of Portugal. Root supposed to be biennial. Stem two or three feet high, erect, simple, at length smooth and of a purplish-brown. *Leaves* thick, reticulated with veins beneath; their upper side becoming green and almost naked by age: radical ones stalked, three or four inches long, and half as broad. *Flowers* large, handsome, yellow. Hair of the *filaments* orange-coloured. Capsule small. Schrader.

8. *V. phlomisoides*. Southern Woolly Mullein. Linn. Sp. Pl. 253. Willd. n. 5. Ait. n. 6. Schrad. n. 10. Sm. Fl. Græc. Sibth. t. 224, unpubl. (*V. foliis radicalibus ovatis petiolatis, &c.*; Mill. Ic. 182. t. 273. *V. rugulosum*; Willd. Enum. 224. *V. thapsoides*; Villars Dauph. v. 2. 490, according to a specimen from the author. Schrad.)

β. *V. australe*; Schrad. n. 9. t. 2.

Leaves ovate, finely crenate, downy on both sides; lower ones stalked; upper pointed, clasping the stem, slightly decurrent. Cluster interrupted.—Native of barren waste ground

ground in the fourth of Europe, and east of Asia. We gathered it on the ramparts of Pavia; and Dr. Sibthorp at Constantinople. A large biennial species, hoary all over, with dense, starry, entangled, woolly hairs. *Stem* solitary, erect, simple, round, leafy, ending in a long, interrupted, many-flowered, fasciculated *cluster*, sometimes accompanied at the base with one or more much shorter ones. *Radical leaves*, as well as those on the lower part of the stem, four inches or more in length, stalked, broadly ovate, bluntish, obscurely crenate, thick, rugged, reticulated with copious veins, each tapering at the base into a winged *footstalk*: the upper ones gradually smaller, pointed, sessile; heart-shaped at the base, clasping the stem, and somewhat decurrent; diminishing into taper-pointed *bractæas*, which project further than their respective tufts of flowers. *Flowers* large and handsome, of a golden-yellow, about five in each tuft, accompanied by small, lanceolate, partial *bractæas*. *Partial stalks* shorter than the *calyx*, which is smooth internally. *Stamens* purple, either all densely hairy, with yellow, nearly uniform, *anthers*, or two of them bear more or less oblong and imperfect *anthers*; in which case the respective filaments are less hairy, or quite naked. *Germs* clothed with very dense wool, which comes off as the *capsule* ripens.

We scarcely discover any difference between the *V. australe* of our learned friend, and the *phlomoides*, of which his description answers exactly to our specimens. The *radical leaves* of the *australe* perhaps are larger and more lanceolate, but this can hardly indicate more than a variety. The *anthers* and *filaments* are acknowledged to vary in both, and we have found them to do so in *phlomoides*.

9. *V. condensatum*. Dense-flowered Round-leaved Mullein. Schrad. n. 11. t. 3.—“Leaves downy; radical ones elliptic, oblong, tapering at the base, doubly and unequally crenate; those of the stem oblong, acute, simply crenate; uppermost roundish-ovate, pointed, slightly decurrent. Clusters dense. Two of the anthers oblong.”—Observed by Mr. Schott in Austria, on a barren soil. Biennial. We cannot but suspect this to be a variety of the last, with a more dense *inflorescence*; larger, more strongly crenate, *radical leaves*, and broader upper ones. The two species are, at least, very nearly akin.

10. *V. nemorosum*. Grove Mullein. Schrad. n. 12. t. 1. f. 2.—“Leaves acute, crenate, downy; radical ones oblong, tapering at each end; lower stem-leaves lanceolate, contracted at the base; middle ones oblong-lanceolate; upper oblong, slightly decurrent. All the tufts of flowers a little remote. Two anthers oblong.”—Found by Mr. Schott in groves in Austria. Biennial. Akin to *V. phlomoides*, but distinguished by its straight, wand-like stem, four feet high, with a solitary lax *cluster*, and the narrow elliptic-lanceolate shape of all its *leaves*, which are of a yellowish green, the radical ones becoming finally rather naked on the upper surface.

11. *V. montanum*. Mountain Mullein. Schrad. n. 13. “Hort. Gotting. fasc. 2. 18. t. 12.”—“Leaves downy; radical ones oblong-elliptical, crenate, stalked; those of the stem oblong, rather acute, slightly crenate; uppermost acute, rather decurrent. Flowers nearly sessile, in rather crowded tufts. Anthers almost equal.”—Native of the Pyrenees, as well as of the alps of Switzerland and Germany. Biennial. Stem eighteen inches or two feet high, erect, simple, clothed, like the rest of the herbage, with yellowish rusty pubescence. *Leaves* somewhat wrinkled, reticulated beneath; the radical ones three to four and a half inches long, two to two and a half broad, obtuse, losing part of their thick downiness by age: lower stem-leaves tapering into a *footstalk*; the rest acute, sessile, or, about

the top of the stem, slightly decurrent. *Cluster* from about three to six inches long. *Flowers* nearly sessile, in tufts more or less crowded; some solitary. *Bractæas* ovato-lanceolate, pointed, scarcely exceeding the flowers, except the lowermost. *Calyx* as in *V. phlomoides*. *Corolla* most like *V. Thapsus*. Two of the *filaments* more slightly hairy than the rest, sometimes naked; their *anthers* perfect, but rather larger and more oval than the three others. If cultivated in shady situations, the *stem* sometimes reaches the height of six feet, and becomes branched in the flowering part; the *leaves* also grow much larger, of a dirty green, a little polished on the upper side; the *clusters* above a foot long, thicker, and more compact. Schrad.

12. *V. collinum*. Hill Mullein. Schrad. n. 14. t. 5. f. 1.—“Leaves crenate, downy; lower ones elliptic-oblong, stalked: those about the middle of the stem oblong-lanceolate, rather acute, tapering at the base; uppermost oblong, acute, slightly decurrent. Tufts of flowers distant. Anthers equal.”—Native of hillocks, and dry grassy ground, in some parts of the north of Germany. Perennial. *Stem* two or three feet high, erect, simple, slightly angular in the upper part; reddish below. *Leaves* soft, wrinkled, downy on both sides; pale green above; hoary and reticulated beneath; radical ones four or four and a half inches long, and half as broad; the rest gradually smaller upwards, the top ones being about an inch and a half in length. *Cluster* twelve or eighteen inches long, rarely having a branch at the base. *Flowers* yellow, sweet-scented, resembling *V. nigrum*, with purple-bearded *filaments*, and composing numerous little tufts, often near an inch from each other. Schrad. We should suspect this might be a male progeny of *V. nigrum*, impregnated by some of the foregoing species; having found near Norwich what has every appearance of being a similar offspring of *nigrum*, from the pollen of *V. pulverulentum*.

13. *V. veriflorum*. Various-flowered Mullein. Schrad. n. 15.—“Leaves crenate, downy; lowermost elliptic-oblong, stalked; those of the stem oblong, acute, slightly decurrent; uppermost pointed. Clusters paniced. Tufts distant, of few flowers. Anthers equal.”—Found in sandy ground near Prague, but rarely. The herbage is clothed with dense down, of a dirty yellowish-green hue. *Stem* two or three feet, or more, in height, branched in the flowering part, rarely simple. *Leaves* rather thick and rugged; radical ones from three and a half to six inches long, one and a half to two and a half broad, most evidently and acutely crenate at the base; those about the middle of the stem only sessile. *Clusters* paniced, a foot long, or more. *Flowers* generally the size of *V. phanicum*, slightly fragrant, in rather distant tufts. *Partial stalks* half as long again as the *calyx*. *Bractæas* ovato-lanceolate, with long points; the inner ones linear, much smaller. *Corolla* of a rusty red, but variable, the base of its smaller segments bearded with the same kind of yellow wool that clothes the three smaller *filaments*. Two larger *filaments* covered entirely with purple wool, some of which also is seen about the middle of the three others. *Anthers* kidney-shaped; those of the two longer filaments rather larger, and finally more oval. *Pollen* whitish. Sometimes the *corolla* is found twice its usual size, and the partial *flower-stalks* are occasionally more long and slender than above described. Professor Schrad. received this from Mr. Taufsch, a Bohemian botanist, as *V. rubiginosum* of Waldstein and Kitaibel; a species unknown to us, but which he says is widely different.

14. *V. ramigerum*. Branched Decurrent Mullein. Schrad. n. 16. t. 4.—“Leaves finely downy; radical ones oblong-lanceolate; those of the stem oblong, acute, doubly crenate;”

VERBASCUM.

nate, half-decurrent; uppermost pointed. Clusters panicled. Tufts distant, many-flowered. Anthers equal."—Native of the duchy of Mecklenberg-Swerin. *Link.* The habit of this species resembles *V. Lychnitis*. *Root* biennial. *Stem* from four to six feet high, erect, thick; rather angular, brown, and much branched in the upper part; the branches spreading, angular, and, like the rest of the stem, slightly downy. Upper side of the leaves covered with very thin pubescence; under more hoary, and more thickly clothed; the radical, and lower stem-leaves, often a foot or more in length, four or five inches wide, tapering down into the footstalk. *Flowers* yellow, from fifteen to twenty in each tuft of the principal cluster, on stalks twice the length of the calyx; fewer in the lateral clusters; the lower tufts many of them very distant from each other. *Braçteas* ovato-lanceolate. *Calyx* and *corolla* larger than in *V. Lychnitis*. *Stamens* like those of that species. *Schrader*.

15. *V. mucronatum*. Pointed-leaved Mullein. *Lamarck* Dict. v. 4. 218. *Schrad.* n. 17; excluding perhaps *Tournefort's* synonym.—“Leaves crenate, clothed with dense hoary down; radical ones oblong-lanceolate; those of the stem oblong, acute, half-decurrent; uppermost ovate, long-pointed. Spikes panicled. Flowers in nearly sessile heads.” Found in Crete by *M. Labillardiere*. *Root* biennial. Whole herbage covered with hoary down. *Stem*, in the cultivated plant at least, from six to eight feet high, straight, thick, branched upwards. Lower leaves one and a half, or two feet long, on short stalks, acute; the rest more pointed, and unequally decurrent. Spikes panicled, various in length, their points somewhat incurved. *Flowers* yellow, rather large, in distant, many-flowered, sessile heads, hoary with deciduous woolliness. *Braçteas* lanceolate. *Filaments* all clothed with whitish wool. *Schrader*.

16. *V. sinuatum*. Scalloped-leaved Mullein. *Linn. Sp. Pl.* 254. *Willd.* n. 12. *Ait.* n. 14. *Schrad.* n. 18. *Sm. Fl. Græc.* Sibth. t. 227, unpubl. (*V. crispum et sinuatum*; *Bauh. Hist.* v. 3. 860. *V. aliud*; *Camer. Epit.* 882. *Matth. Valgr.* v. 2. 492. *V. laciniatum* *Matthioli*; *Dalech. Hist.* 1302. *Φλομος μέλας*; *Diosc.* book 4. chap. 104.)—Leaves serrated, powdery; radical ones pinnatifid and wavy; the rest undivided, decurrent. *Stem* panicled, many-flowered.—Native of dry barren exposed situations, in the south of Europe, and north of Africa; a hardy biennial, long known in our botanical gardens, but seldom long preserved. *Dr. Sibthorp* observed this to be the most common Mullein throughout Greece and all the circumjacent islands. The root is brown, and rather woody. *Herb* of a dark green, besprinkled with loose tufts of powdery, hoary, starry pubescence, but far less woolly, or uniformly hoary, than any of the preceding species. The leaves also differ widely from all the foregoing, in being pinnatifid half way to the midrib, with jagged and plaited lobes; the radical ones a span long, on shortish stalks; the rest smaller, sessile, decurrent; the upper ones very small, ovato-lanceolate, undivided, more decurrent, reflexed; all of them reticulated with veins, rugose; most hoary beneath. The stem is erect, one and a half or two feet high, zigzag, alternately branched from top to bottom, panicled, often tinged with dark purple. *Panicle* spreading, with copious, hoary, somewhat winged branches. *Flowers* generally tufted, stalked, yellow, with purple hairy filaments. *Capsule* small, roundish. The figure of *Matthioli*, copied by *Dalechamp* and *Tabernæmontanus*, is more like the cultivated variety of the following species, but differs in its branching panicled stem.

Set. 2. *Leaves not decurrent.*

17. *V. plicatum*. Plaited-leaved Mullein. *Prodr. Fl.*

Græc. n. 524. *Fl. Græc.* t. 226, unpubl. (*V. sinuatum* β; *Linn. Sp. Pl.* 255. *V. pinnatifidum*; *Ait.* n. 15, but not of *Vahl* nor *Willdenow*. *V. græcum fruticosum, folio sinuato candidissimo*; *Tourn. Cor.* 8. *Voyage*, v. 1. 128, with a figure. *Φλομος λευκη θηλη*; *Diosc.* book 4. chap. 104.)—Leaves lyrate-sinuuated, crisped, somewhat crenate, downy on both sides. *Spike* simple, interrupted, leafy.—Native of the isle of Hydra, and very plentiful about Athens. *Root* tapering, possibly perennial. *Stem* ascending, simple, leafy, clothed, like the foliage and calyx, with dense, starry, rigid, yellowish woolliness. *Leaves* obovate-oblong, thick; plaited or crisped at the margin; their upper surface even, and almost without sign of veins; under reticulated; radical ones stalked, near a span long; the rest sessile, clasping the stem, and gradually smaller upward; floral ones very small and pointed. *Spike* solitary, erect, a foot long, leafy or bracteated. *Flowers* three or four sessile together in the bosom of each bractea, yellow, almost an inch broad. *Filaments* yellow, bearded from the middle to the summit. *Anthers* all nearly alike. *Capsule* ovate, acute, hard, smooth when ripe. The leaves vary in acuteness; and in the garden plant, raised from *Dr. Sibthorp's* seeds, become more dilated, flattened, and less crisped, resembling the figure of *Matthioli*, cited under our preceding species, but the pubescence still remains totally different.

18. *V. auriculatum*. Auricled Mullein. *Prodr. Fl. Græc.* n. 523. *Fl. Græc.* t. 225, unpubl. (*V. orientale maximum candidissimum, ramis candelabrum æmulantibus*; *Tourn. Cor.* 8.)—Leaves elliptic-oblong, downy on both sides, auricled at the base. Clusters panicled, zigzag.—Native of the island of Samos. Biennial. The whole herb is clothed with dense snow-white down. *Stem* two feet high, stout, leafy; branched and becoming smooth in the upper part. *Leaves* crowded, sessile, two or three inches long, bluntly pointed, accompanied by axillary tufts of smaller ones; their upper surface covered with a dense and even coat of wool, hardly marked by rib or veins; the under reticulated, scarcely less densely clothed with a starry cobweb-like pubescence: their base contracted, but augmented with a rounded lobe at each side, embracing the stem. *Flowers* yellow, stalked, tufted and bracteated, as in *V. phlomoides*, but only half as large. *Calyx* with smooth points. *Beard of the filaments* yellowish-white. *Anthers* orange-coloured, nearly uniform. We think *Tournefort's* synonym is here rightly applied, though cited by *Lamarck* and *Schrader* for *mucronatum*, n. 15, which must be a different plant from the present, unless it be inaccurately described.

19. *V. pinnatifidum*. Pinnatifid Mullein. *Vahl Symb.* v. 2. 39. *Willd.* n. 13, excluding the synonym of *Tournefort*, which belongs to our n. 17.—Leaves flat, pinnatifid, cut, powdery; nearly naked on the upper side; radical ones stalked. *Stem* panicled, many-flowered.—Gathered by *Dr. Sibthorp*, on the sandy sea-shore near Yalva, in Bithynia. *Root* perennial, blackish, divided at the summit. *Stem* one to two feet high, erect, very much branched in all directions, leafy, round, dark-purple, sprinkled with downy mealiness. *Radical leaves* three inches long, on long stalks, flat, deeply pinnatifid, cut, wrinkled and veiny; dark green and almost naked above; paler, and powdery with starry hairs, beneath; the younger ones very densely woolly; those of the stem not half so large, sessile, not decurrent, less divided; floral ones aggregate, spreading, extending for the most part beyond the flowers, which are sessile, crowded, yellow, hoary externally, with orange-coloured stamens. *Capsule* nearly globose.

20. *V. Boerhaavii*. Boerhaavian Mullein. *Linn. Mant.* 45, excluding the reference to *Miller*; see n. 8. *Willd.* n. 3. (*V. blat-*

(*V. blattariæ* foliis nigrum, amplioribus floribus luteis, apicibus purpurascens; Boerh. Lugd.-Bat. v. 1. 228.)—Leaves obovate, somewhat lyrate, doubly crenate, veiny, slightly downy. Spike interrupted. Flowers in nearly sessile tufts. Bractæas all linear.—Said to be a native of the south of Europe. The Linnæan specimen grew in the Upsal garden. This species is very little known, perhaps from Linnæus having cited a plate of Miller's, which is as little like his specimen as almost any *Verbascum* can be, and belongs to *V. phlomidoides*. Hence *V. Boerhaavii* is admitted, without sufficient grounds, into the catalogue of our garden plants. We have, at least, never seen any thing answering to it. The leaves are a foot long, and almost four inches broad, membranous, copiously reticulated with veins; pinnatifid, in a lyrate manner, at the base; nearly smooth on the upper surface; the under partly clothed with light, deciduous, starry wool, resembling mouldiness. Spikes (whether solitary or numerous, does not appear from the specimen) a foot long, slightly and loosely woolly, of numerous scattered tufts of large yellow flowers with purple stamens.

21. *V. hæmorrhoidale*. Madeira Mullein. Ait. n. 5. Willd. n. 4.—“Leaves ovate-oblong, downy, slightly and minutely crenate; tapering at the base. Clusters elongated. Flowers in sessile tufts, without bractæas.”—Native of Madeira, from whence it was brought to Kew by Mr. Maffon, in 1777. This is marked as a biennial greenhouse plant, flowering from June to August.

22. *V. Lychnitidis*. White Mullein. Linn. Sp. Pl. 253. Willd. n. 6, β . Fl. Brit. n. 2. Engl. Bot. t. 58. Fl. Dan. t. 586. Villars Dauph. v. 2. 490. Math. Valgr. v. 2. 491. Ger. Em. 775. (*V. flore albo parvo*; Bauh. Hist. v. 3. 857. Raii Syn. 287.)

β . *V. Thapsi*; Linn. Sp. Pl. 1669. (*V. Thapsoides*; Willd. n. 2. Ait. n. 3. Hudf. 90. Schrad. n. 7. “Hoffmannf. et Link Lusit. v. 1. 214.” *V. angustifolium* ramosum, flore aureo, folio crassiore; Bauh. Hist. v. 3. 860.)

Leaves wedgeshaped-oblong; stripped of down on their upper side. Stem angular, paniced.—Native of pastures, road-sides, and waste ground, in various parts of Europe, flowering in July and August. In England it rarely occurs, except on chalky ground in Kent, where it abounds. The root is biennial, scarcely perennial. Stem a yard high, straight and upright, finely downy; copiously paniced at the top. Leaves elliptic-oblong, tapering at the base, crenate, reticulated with veins; white and woolly beneath; dark green and slightly downy, or quite naked, above; those at the root, and lower part of the stem, stalked; the rest sessile, not decurrent, all narrow at the base. Branches of the panicle racemose, with many woolly tufts of stalked, rather small, flowers, whose corolla is cream-coloured, tinged with yellow. Filaments yellowish, hairy. Anthers orange-coloured, uniform.

The variety β , a very celebrated and much disputed plant, is not preserved in the Linnæan herbarium. It is described as the mule offspring of *V. Lychnitidis*, from the pollen of *V. Thapsus*. We have specimens, artificially produced in this manner, by Mr. Griffith, of Garn, Denbighshire. These agree with the Portuguese plant, sent by professor Link, as his *V. Thapsoides*. So that we conceive the real *V. Thapsi*, or *Thapsoides*, is before us. Yet there are parts of the Linnæan description, *Sp. Pl.* 1670, that puzzle us; such as the purple beard attributed to the filaments of *V. Lychnitidis* and of this variety. Our specimens are intermediate, in every respect, between *Lychnitidis* and *Thapsus*. Their corolla is yellow. Beard of the filaments white. Upper leaves somewhat decurrent. As the real

species of this genus evidently vary before our eyes, there can be little doubt that their mule progenies are still more uncertainly defined.

23. *V. pulverulentum*. Yellow Hoary Mullein. Norfolk Mullein. Fl. Brit. n. 3. Engl. Bot. t. 487. Ait. n. 8. Villars Dauph. v. 2. 490. (*V. Lychnitidis*; Willd. n. 6, α . *V. pulverulentum*, flore luteo parvo; Bauh. Hist. 860. Raii Syn. 287. V. n. 583, α ; Hall. Hist. v. 1. 257.)

β . *V. nigro-pulverulentum*; Fl. Brit. *ibid*.

Leaves ovate-oblong, obscurely ferrated, covered on both sides with powdery deciduous wool. Stem round, paniced, much branched.—Native of banks, and the borders of fields, on a gravelly or chalky soil, in England, Austria, and Switzerland, flowering in July. This beautiful and stately plant is frequent about Norwich, and most parts of Norfolk; also near Bury, Suffolk; and, according to Ray, at Wollerton, near Nottingham. No species can be more distinct from the last, with which it has been confounded, even by Linnæus. The root is biennial. Stem three or four feet high, branched from top to bottom in a conical form, covered with innumerable golden flowers, larger than the last, whose filaments are clothed with white hairs, and their anthers are vermilion. The whole herbage is invested with white mealy down, easily rubbed off. Leaves all sessile, thick and woolly; the radical ones numerous, a foot long; upper ones ovate, pointed, clasping the stem, not decurrent. Mr. Sieber has sent an Austrian specimen of this species, named *V. floccosum*; but we know not of its having been published under that denomination.

Our variety β is found near Helleston, and in other parts of Norfolk. The leaves are like *pulverulentum*, flowers, and purple woolly stamens, like *nigrum*; so that, according to the opinion of Linnæus, the latter was the mother of this apparently mule production. We believe it moreover to be perennial.

V. pulverulentum displays a remarkable degree of irritability, if the stem be smartly struck, twice or thrice, with a small stick. In the space of a few minutes, the flowers close, and begin to drop off, all in their turn falling to the ground in the space of a quarter of an hour, if the weather be warm and still; if otherwise, this quality is less perceptible. We were first informed of it by the very ingenious Mr. Correa de Serra.

24. *V. gallicum*. Dauphiny Mullein. Willd. n. 11. (*V. Chaixi*; Villars Dauph. v. 2. 491. t. 13; synonyms all very doubtful.)—Leaves ovate-oblong, crenate, downy beneath; radical ones stalked; heart-shaped and pinnatifid at the base. Stem angular, paniced at the top.—Native of several parts of Dauphiny, in rocky situations. The habit of this plant, its panicle, and the soft durable pubescence of the backs of its leaves, as well as the shape of such as grow on the stem, most resemble *V. Lychnitidis*; the yellow flowers, purple hairy stamens, as well as the size, form, and long footstalks of the radical leaves, which are doubly crenate, rather accord with *V. nigrum*. But these radical leaves are remarkable for a few deep parallel segments at their base. We have a specimen from the author himself, or his bad figure would little avail us.

The late Mr. Donn favoured us with a specimen, above twenty years ago, from the Cambridge garden, of a tall Mullein, agreeing with this in most respects: but the lower leaves are taper at the base, and scarcely pinnatifid. This came from Poland, and is doubtless *V. polandicum* of his Hort. Cantab. ed. 5. 45; but unfortunately a name does not make a species, any more than *floccosum* of the same useful work, see our n. 23. This Polish plant seems a mule

VERBASCUM.

between *nigrum* and *Lychnitis*; or it may be a variety of *gallicum*.

25. *V. nigrum*. Dark, or Black, Mullein. Linn. Sp. Pl. 253. Willd. n. 8. Fl. Brit. n. 4. Engl. Bot. t. 59. Ger. Em. 775. Fl. Dan. t. 1088. (*V. tertium*; Matth. Valgr. v. 2. 489.)—Leaves oblong-heartshaped, stalked, waved and crenate, slightly downy. Cluster solitary, spiked, many-flowered.—Native of banks, and road-sides, in most parts of Europe. With us it occurs chiefly on a chalky or gravelly soil, in shady lanes, or on grassy hillocks, flowering in July and August. The root is perennial. Stem erect, simple, angular, leafy, brown or purplish, two or three feet high, rarely branched. Leaves of a fine deep green, not hoary, though somewhat downy; all stalked, except the very small upper ones. Cluster very long, slender, compact, though here and there interrupted, composed of innumerable tufted golden flowers, with bearded violet filaments, and orange anthers. This is altogether a very elegant species.

We received, many years since, from the late Mr. Davall, specimens and seeds of a variety of this species, having white flowers. These dried specimens differ little from our wild plant, except a slight degree of luxuriance, owing to culture, nor can it be doubted that they are the white-flowered variety, mentioned by Caspar Bauhin, and others. But the far more luxuriant progeny from their seeds, in lady Amelia Hume's garden, bore large copper-coloured flowers, almost like *V. cupreum*, Curt. Mag. t. 1226, which, but for its solitary flower-stalks, we should believe to be our plant. Such is the Proteus-like nature of this whimsical genus!

26. *V. ferrugineum*. Rusty Mullein. Ait. n. 9, excluding the reference to Andrews. Willd. n. 7.—“Leaves somewhat villous, wrinkled; those on the stem nearly sessile, equally crenate; radical ones oblong-heartshaped, doubly crenate.”—Native of the south of Europe; said to have been cultivated, at Edinburgh, by Mr. Sutherland, in 1683, and marked by Mr. Aiton as a hardy perennial, flowering from May to August. We have no specimen, but we remember to have examined an authentic one in Sir Joseph Banks's herbarium, which proved totally unlike the Greek plant of Dr. Sibthorp, figured as *ferrugineum* by Mr. Andrews, which is our *V. trifide*, hereafter described. Such errors are excusable in such a tribe. We have a notion that the specimen betrayed some affinity to *V. Boerhaavii*, n. 20, but we dare not assert it.

27. *V. trifide*. Brown-flowered Mullein. Prodr. Fl. Græc. n. 529. (*V. ferrugineum*; Andr. Repof. t. 162.)—Leaves elliptical, wavy and partly toothed, nearly smooth; radical ones stalked. Cluster solitary, simple. Stem leafy.—Gathered by Dr. Sibthorp on mount Athos. By his means the plant has been introduced into the gardens of England, where it proves a hardy perennial, flowering most part of the summer, and propagating itself copiously by seed, without requiring any care. This species differs from all the foregoing, in its very long simple cluster terminating the stem, at first drooping, but gradually becoming erect, and, as it flowers, extending itself to the height of five feet, being composed of innumerable, scattered, solitary, spreading, almost capillary partial stalks, each three or four times as long as its accompanying lanceolate bractea, and bearing a solitary inodorous flower, an inch broad, of a peculiarly dull greenish or yellowish brown, whose filaments are densely bearded with purple. Sometimes, from luxuriance, two of these stalks grow together, but each has always its own bractea. The whole cluster, bracteas, and obtuse calyx, are clothed with glandular viscid hairs. The radical leaves

are numerous, on longish stalks, wrinkled, slightly downy, a little viscid, green, reticulated with veins; their margin variously waved, or bluntly toothed: those on the stem are nearly sessile, ovate or heart-shaped, more or less acute. We cannot perceive any alteration in this plant after cultivating it for fifteen years, and yet there is scarcely a permanent specific character, to distinguish it from the following. Can Tournefort's *Blattaria orientalis*, *bugule folio*, &c. Voy. v. 2. 83, with a plate, acknowledged to be a variable plant, possibly belong to our *trifide*?

28. *V. phaniceum*. Purple-flowered Mullein. Linn. Sp. Pl. 254. Willd. n. 9. Ait. n. 11. Jacq. Austr. t. 125. Curt. Mag. t. 885. (*Blattaria flore purpureo*; Ger. Em. 776.)—Leaves ovate, crenate, smooth, chiefly radical and sessile. Cluster solitary, simple. Stem nearly leafless.—Native of Austria, and the south of Europe. A hardy perennial, cultivated in England ever since Gerard's time. It is of more humble growth than the last. Leaves chiefly radical, and nearly sessile, scarcely at all downy; their margin simply or doubly crenate. Inflorescence like the preceding, but the flowers are of a dark violet hue, and the stamens less hairy. Sometimes the stem becomes leafy, as in Jacquin's figure, and perhaps, as he represents it, branched; but we have never seen an instance of the latter.

29. *V. ovalifolium*. Oval-leaved Mullein. Donn. Cant. ed. 5. 45. Sims in Curt. Mag. t. 1037. Ait. n. 2.—“Leaves oval, sessile, acutely crenate; smoothish on the upper side. Stem erect, simple. Flowers spiked.”—Native of mount Caucasus. Introduced into England by Mr. Loddiges, in 1804. A hardy biennial, flowering from July to September. This has the aspect of several species in our first section, the flowers being as large as any of those, yellow, with orange-coloured, partly hairy, stamens; and nearly sessile, in a long dense spike. But the leaves are not decurrent, nor, though downy, at all hoary or woolly. We have seen no specimen.

Dr. Sims has exhibited in Curt. Mag. t. 1226, by the name of *V. cupreum*, a Mullein, whose stalked leaves, and racemose flowers, variegated with tawny-buff and purple, each on a partial stalk of considerable length, all appear so different from *V. ovalifolium*, the bracteas, and calyx likewise, being altogether unlike the figure of this species, that, but for our confidence in its excellent cultivator Mr. Loddiges, we could scarcely believe it came up from seeds of the *ovalifolium*. Perhaps, as Dr. Sims suggests, the parent may have been impregnated by *V. phaniceum*, or we would rather say our *trifide*. When the plant blooms within-doors, the corolla is pale yellow, with a purple eye. The inspection of this plant is enough to daunt the most ardent student of species of *Verbascum*, and to cause a general mistrust of them all.

30. *V. virgatum*. Large-flowered Primrose-leaved Mullein. With. Bot. Arr. 250. Fl. Brit. n. 5. Engl. Bot. t. 550. Ait. n. 12. (*Blattaria flore amplo*; Ger. Em. 778. B. magno flore; Bauh. Hist. v. 3. 859. Lob. Ic. 564.)—Leaves ovato-lanceolate, toothed, sessile; heart-shaped at the base; radical ones downy, and somewhat lyrate. Stem branched. Flowers axillary, on short stalks, partly aggregate.—Native of Worcesterhire. Biennial, flowering in July and August. Stem five or six feet high. Whole plant green, not hoary, though more or less covered with short, prominent, often forked, glandular hairs. The radical leaves, which resemble those of a primrose, are always so clothed. Those of the stem are very numerous, acute, toothed or sharply crenate, broad and rounded at the base, gradually diminishing upwards. Flowers from the bosoms of many of the upper leaves, large, yellow,

some of the lowermost four, five, or six together, the rest solitary, as are all those of the weaker branches. *Flower-stalks* hairy and viscid, seldom so long as the *calyx*, whose segments are lanceolate, acute, and glandular. *Filaments* bearded with purple. *Anthers* uniform.

31. *V. Blattaria*. Moth Mullein. Linn. Sp. Pl. 254. Willd. n. 10. Fl. Brit. n. 6. Engl. Bot. t. 393. (*Blattaria flore luteo*; Ger. Em. 778.)—Leaves oblong-lanceolate, acute, smooth, serrated; lower ones bluntish, tapering at the base, or stalked. Stem branched, racemose. Flower-stalks much longer than the bractæas.—Native chiefly of the southern parts of Europe, rare in England, flowering in July. *Root* tapering, annual. *Stem* three or four feet high, leafy. *Leaves* much narrower, and more deeply serrated or notched than in the last, the upper ones becoming gradually more pointed, and smaller, to the bottom of the long simple *clusters*, where they are replaced by a small, solitary, lanceolate *bractea* under each *flower-stalk*, as in *V. trifida* and *phœniceum*. The *corolla* is smaller than the last, bright yellow, more or less streaked with purple. *Filaments* clothed with purple hairs: sometimes the *corolla* seems to become purplish all over.

A supposed variety, with large white *flowers*, marked partially with purplish-brown at the back, is common in gardens; coming up from seed, and remaining unaltered, through many successive years. This is *Blattaria alba*, *Bauh. Pin.* 241, but we can discover no specific difference between it and the wild or cultivated yellow-flowered kind.

32. *V. spinosum*. Thorny Mullein. Linn. Sp. Pl. 254. Amoen. Acad. v. 4. 307. Willd. n. 16. Vahl Symb. v. 2. 39. Sm. Fl. Græc. Sibth. t. 229. (*Leucoium spinosum creticum*; Cluf. Hist. 299. Ger. Em. 459. *L. spinosum cruciatum*; Alpin. Exot. 37. t. 36. *Galastivida prima di Candia*; Pon. Bald. 114.)—Stem leafy, shrubby, much branched, spinous. Leaves all stalked, hoary.—Native of the higher mountains of Crete; a stranger in our gardens, even by name. This differs widely from all the rest, in its hardy, shrubby, bushy *stem*, a foot high, whose very compound *branches* harden at their points into smooth rigid thorns. *Leaves* crowded, an inch or inch and half long, oblong, obtuse, deeply toothed, downy and white on both sides: contracted at the base into the *footstalks*. *Flowers* scattered, stalked, lateral and terminal, yellow, hardly above half an inch broad. *Stamens* orange-coloured. *Calyx* obtuse. *Capsule* small, villous.

Two other species, mentioned by Linnæus, remain to be noticed; *V. Osbeckii*, and *V. Myconi*, Linn. Sp. Pl. 255. The former we have shewn to be the *TRIGUERA* of Cavanilles (see that article); nor does it answer to the characters of a *Verbascum*. The latter, figured in Curt. Mag. t. 236, an elegant, herbaceous, stemless plant, long known in our gardens, appears to be the *Ramondia* of Schrader and others, as we have mentioned in our remarks subjoined to the generic character of the present genus, from which this species must, doubtless, be excluded.—Willdenow has a *V. Barmadesii*, adopted from Vahl's Symb. v. 2. 39, and compared with *V. Osbeckii*. With this we are quite unacquainted.

From the present view of *Verbascum*, more complete than any that has hitherto been given, and yet so far from perfect, the reader may chiefly learn that no certain limits have as yet been found for many of the species of this genus, while others, apparently much alike, remain permanent and distinct. To fix them all, a long course of experiment, by cross impregnation, would be necessary.

VERBASCUM, in *Gardening*, furnishes plants of the hardy, annual, biennial, and perennial kinds, among which the species cultivated are, the annual mullein (*V. boerhaavii*);

the moth mullein (*V. blattaria*); the great mullein (*V. thapsus*); the woolly mullein (*V. phlomoides*); the white mullein (*V. lychnitis*); the scollop-leaved mullein (*V. sinuatum*); the rusty mullein (*V. ferrugineum*); the purple mullein (*V. phœniceum*); and the borage-leaved mullein (*V. myconi*).

In the first sort the flowers have an agreeable scent at a little distance; but if smelt too long, or too near, it becomes less pleasant.

The second sort has yellow flowers, which are streaked more or less with purple, and is very ornamental, flowering from July to November, or even later in mild weather.

It varies with white flowers.

The third sort has a biennial root, and the flowers are of a bright yellow colour, and sometimes, but rarely, white.

The fifth sort is remarkable for its straight wand-like angular stem, and cream-coloured flowers, which are produced in great numbers in a compound clustered terminating raceme. Sometimes the colour of the flowers is yellow.

The ninth sort has the flowers large in proportion to the size of the plant, of a blueish-purple colour, and highly ornamental, somewhat like the auricula, appearing in May, and continue successively in blossom for several months. It is a desirable plant to cultivate, especially for decorating rock-work.

Method of Culture.—These plants may all be increased by seeds, and offsets taken from the roots.

The well-ripened seeds should be sown in the autumn, or early spring, in a bed of light mould, or in the borders or other parts where they are to remain, covering them lightly in. When the plants are up a few inches in height, in the bed method, they should be removed into nursery rows till the autumn, when they must be removed to where they are to remain.

The annual sort is, however, best sown at once where the plants are to grow, which is best done in patches.

The offsets of all the perennial sorts should be taken off in the autumn, or very early in the spring, and be planted out where they are to grow. This is better than afterwards transplanting them.

They are all hardy plants, that succeed in almost any common soil and exposure, in borders, &c.

They afford a good effect in their different foliage, modes of flowering, and sweet scent of their flowers, in the large borders, clumps, and other parts of pleasure-grounds; the larger sorts being placed backwards in them.

VERBELIËT, in *Geography*, a town of Hungary; 6 miles S.W. of Erlau.

VERBENA, in *Botany*, among the Romans, was the name of some evergreen aromatic shrub, esteemed sacred, and employed in various solemn ceremonies. Hence it was called *Hierobotane*, and *Herba sacra*. Some derive *Verbena* from *verro*, to sweep, or cleanse; because the plant might be used for cleaning the altars or temples: others from *Herbena*, corrupted from *herba bona*, or good herb. But these rather prove that no good Latin etymology was to be found. De Theis gives a much better, and indeed a direct, derivation of the word, from Bullet's *Dictionnaire Celtique*, where the Celtic name of the plant is said to be *Ferfaen*, whence comes, still less changed, its English appellation, *Vervain*. The Roman shrub, above alluded to, is sometimes thought to have been our *Rosemary*, which could hardly be the Celtic plant; and we must rely on tradition, which has handed down our Common *Vervain*, the Linnæan *Verbena*, with much superstitious celebrity, even to the present day, as the *Ferfaen* of our barbarous ancestors. It still, from time to time, makes the fortune of quacks and village

VERBENA.

village doctresses, whether they aim at notoriety or lucre; and a person named Morley once wrote a pamphlet, recommending the root, to be worn as a charm, in scrophulous disorders, but, as Mr. Curtis remarks, he accompanied it with powerful medicines.—Linn. Gen. 14. Schreb. 20. Willd. Sp. Pl. v. 1. 115. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 4. 38. Brown Prodr. Nov. Holl. v. 1. 514. Sm. Fl. Brit. 608. Prodr. Fl. Græc. Sibth. v. 1. 401. Pursh 415. Juss. 109. Tourn. t. 94. Lamarck Illustr. t. 17. Gært. t. 66. (Blairia; Gært. t. 56. Zappania; Scop. Infubr. v. 1. 34. Brown Prodr. Nov. Holl. v. 1. 514. Pursh 417. Lam. Illustr. t. 17.)—Class and order, *Didynamia Gymnospermia*. (D. Angiospermia; Brown in Ait. Hort. Kew.) Nat. Ord. *Personatae*, Linn. *Vitices*, Juss. Gen. *Verbenaceae*, Juss. in Ann. du Mus. v. 7. 63. Brown.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, angular, tubular, linear, with five teeth, one of which is smaller than the rest, permanent. *Cor.* of one petal, unequal; tube cylindrical, straight, the length of the calyx, soon dilated and incurved; limb spreading, cloven half way down into five, more or less unequal, rounded segments. *Stam.* Filaments four, setaceous, very short, inserted into the tube of the corolla, and concealing within it, two of them shorter than the rest; anthers oblong, incurved. *Pistl.* Germen superior, quadrangular; style simple, thread-shaped, shorter than the tube; stigma obtuse. *Peric.* scarcely any, except an evanescent membranous tunic, the calyx containing the seeds, which are either four, or only two, oblong, parallel, erect, straight at the inner edge, gibbous at the outer.

Eff. Ch. Corolla funnel-shaped, rather unequal, curved. Calyx with five teeth. Seeds two or four, with a membranous evanescent tunic.

Obf. We have concurred with many other botanists, in separating from this genus the diandrous species; which moreover have only four teeth to their calyx, and never more than two seeds. (See *STACHYDARPHETA*.) But it does not seem necessary to retain also *Zappania*, distinguished by its two seeds, and more dense inflorescence, which is as truly spicate as in acknowledged *Verbena*.

1. *V. mexicana*. Mexican Vervain. Linn. Sp. Pl. 28. Willd. n. 6. Ait. n. 1. (*V. mexicana*, trachelii folio, fructu aparines; Dill. Elth. 407. t. 302.)—Leaves ovate, acute, harsh. Spikes lax. Calyx of the fruit reflexed, hispid, of two round lobes. Seeds two.—Native of Mexico. Cultivated in Sherard's garden in 1726. A stove plant, flowering in summer. *Stem* herbaceous, two or three feet high, square, leafy, rough and furrowed, branched in the upper part. *Leaves* opposite, on short stalks, strongly serrated like those of a common nettle, rough with minute rigid bristles. *Spikes* terminal, stalked, erect, long and slender; lax and interrupted in the lower part. *Flowers* very numerous, small, pale purple. The *calyx* when in fruit becomes stalked, recurved, tumid, and is at all times hoary with bristly hairs. We are not certain that this species has always four perfect *stamens*. Two of the *anthers* are most visible in the mouth of the tube.

2. *V. stachadifolia*. Oval-spiked Vervain. Linn. Sp. Pl. 27. Willd. n. 7. Ait. n. 2. (*V. n. 4*; Browne Jam. 116. t. 3. f. 1. *Lavandula frutescens, foliis latioribus crenatis*; Plum. Ic. 154. t. 162. f. 1.)—Spikes dense, imbricated, ovato-cylindrical. Leaves lanceolate, wavy, toothed, clothed with depressed hairs; hoary beneath. *Stem* shrubby.—Native of the West Indies. *Stem* spreading five or six feet, woody, but not lasting above two or three years. The *leaves* are stalked, two or two and a half inches long, acute, reticulated with veins, flat, not plaited,

as the erroneous engraving, after Plumier's drawing, is made to express, but wavy at the margin, with small acute teeth; the upper surface is covered with rigid depressed bristles; the under with softer hairs. *Spikes* hairy, an inch long, about thrice the length of their stalks. Of the *stamens, seeds, or colour of the flowers*, we are ignorant.

3. *V. globiflora*. Round-headed Vervain. L'Herit. Stirp. 23. t. 12. Willd. n. 8. (*Nepeta maxima, flore albo, spicâ habitiori*; Sloane Jam. v. 1. 173. t. 108. f. 1.)—Spikes dense, imbricated, roundish-ovate. Leaves ovate, crenate, rugose, downy. *Stem* shrubby, erect.—Native of South America; perhaps, as L'Heritier thought, of Buenos Ayres. We have from thence a specimen somewhat like it, but smaller in every part, possibly because it is a wild one. L'Heritier's plant was cultivated at Paris, being a *shrub* of humble growth, of a strong disagreeable odour. The *leaves* are shorter and more ovate than in the last, differing also from that species in being finely and closely crenate, not wavy or toothed. The *spikes* also are much shorter, nearly globose. *Flowers* white. *Stamens* four, all perfect. *Seeds* two.

4. *V. javanica*. Java Vervain. Burm. Ind. 12. t. 6. f. 2. Willd. n. 9. (*Zappania javanica*; Poiret in Lam. Dict. v. 8. 840.)—Spikes dense, imbricated, cylindrical. Leaves elliptic-lanceolate, crenate, finely downy.—Native of Java. *Stem* ascending, roundish, clothed, like the rest of the plant, with fine, short, close hairs. *Leaves* an inch and a half long, acute at each end. *Flowers* in short cylindrical spikes, on axillary, often opposite, stalks, the length of the leaves. Linnæus suspected this not to be different from *V. stachadifolia*, but they are very unlike in the margin of their *leaves*, as well as in general appearance.

5. *V. nodiflora*. Knot-flowered Vervain. Linn. Sp. Pl. 28. Willd. n. 10. Ait. n. 3. Bauh. Prodr. 125. Burm. Ind. 12. t. 6. f. 1. Sm. Fl. Græc. Sibth. t. 553, unpublished. (*Zappania nodiflora*; Brown Prodr. Nov. Holl. v. 1. 514. Pursh 417. Poiret in Lam. Dict. v. 8. 839.)—Spikes dense, imbricated, ovate. Leaves wedge-shaped, toothed. *Stem* creeping.—Native of the south of Europe, Levant, East and West Indies, and North America, in watery situations, flowering at various seasons. The *root* is fibrous, perennial. *Stems* herbaceous, trailing and creeping to a great extent. *Leaves* an inch or inch and half long, somewhat spatulate, smooth; entire at the base. *Flowers* light purple, with dark-red *bractæas*. *Calyx* somewhat two-lipped. *Seeds* two.

6. *V. bonariensis*. Cluster-flowered Vervain. Linn. Sp. Pl. 28. Willd. n. 11. Ait. n. 5. Poiret in Lam. n. 13. (*V. bonariensis altissima, lavandulæ canariensis spicâ multiplici*; Dill. Elth. 406. t. 300.)—Spikes aggregate, tufted, level-topped. Leaves lanceolate, sessile, clasping the stem.—Native of Buenos Ayres, from whence it came into Sherard's garden; and is still seen in some curious collections, being a hardy biennial plant, flowering throughout autumn. The *stem* is often six feet high, square, rough, clothed with long, harsh, coarsely serrated *leaves*, and terminating in copious tufts of blue *flowers*, made up of short spikes, on very long, opposite, panicked stalks. *Seeds* four, linear, striated, curiously rough on the inner side.

7. *V. rugosa*. Rugose Vervain. Willd. Enum. 633. Pursh n. 8. (*V. angustifolia*; Michaux Boreal-Amer. v. 2. 14. Ait. n. 7. Poiret in Lam. n. 11.)—Spikes thread-shaped, solitary, terminal or axillary. Leaves lanceolate, sparingly serrated, furrowed with veins; tapering at the base.—In dry soil, by road-sides, particularly on limestone, from Pennsylvania to Tennessee, flowering from June

to August. Perennial. Not above a foot high. *Flowers* fine blue. *Pursh*.

8. *V. clavata*. Whorled Vervain. "Fl. Peruv. v. 1. 21. t. 33. f. B." Poiret in Lam. n. 15.—Flowers in umbellate heads. Uppermost anthers club-shaped at the back. Leaves whorled, wedge-shaped, undivided or lobed.—Native of Peru, in sandy situations, flowering in August and September. The stems are numerous, erect, much branched, hoary; naked below. Leaves five or six in each whorl; some entire, linear-lanceolate, revolute; others divided or three-cleft, hardly an inch long, moderately downy, a little fringed. Flowers terminal, sessile, collected into a head in the form of an umbel, each with one or two linear, oblong, downy, fringed bractees. Corolla purplish-red. Stamens four. Anthers heart-shaped, surmounted by a small club-shaped appendage. Seeds four. *Poiret*.

9. *V. hispida*. Bristly Vervain. "Fl. Peruv. v. 1. 22. t. 34. f. A." Poiret in Lam. n. 16.—"Spikes ternate, cylindrical. Leaves ovate or oblong, undivided or somewhat three-cleft, deeply serrated, half-embracing the stem."—Native of Peru, in dry chalky ground, flowering in March and April. The stems are numerous, herbaceous, spreading, hispid, a foot high, branched, quadrangular. Leaves opposite, sometimes ternate, sessile, contracted, and in a manner decurrent, at the base, wrinkled, strongly veined, hispid, with deep, tooth-like, often unequal, serratures; their length two or three inches, breadth one inch. Flowers much crowded, in terminal, stalked spikes, generally three upon each branch, thick, cylindrical, two or three inches long, the lateral ones much shorter. Bractees solitary to each flower, half-lanceolate, fringed. Calyx purplish. Tube of the corolla purple; limb pale blue. Stamens four. Seeds four. *Poiret*.

10. *V. hastata*. Halberd-leaved Vervain. Linn. Sp. Pl. 29. Willd. n. 12. Ait. n. 6. Pursh n. 4. (*V. altissima americana*, spicâ multiplici, urticæ foliis angustis, floribus cæruleis; Herm. Parad. 242, with a plate.)—Spikes panicled, linear, acute. Leaves lanceolate, pointed, deeply and doubly serrated; lower ones hastate, or pinnatifid.—By road-sides in wet situations, and on the banks of rivers, from Canada to Carolina, perennial, flowering in July and August. From two to five feet high. Flowers purple, sometimes white. *Pursh*. The leaves are three inches, or more, in length, rough to the touch, like a fine file. Spikes two inches long, becoming longer, and lax, after flowering.

11. *V. triphylla*. Lemon-scented Vervain. L'Herit. Stirp. 21. t. 11. Willd. n. 13. Ait. n. 4. Curt. Mag. t. 367. (*Zappania citrodora*; Poiret in Lam. Dict. v. 8. 845.)—Spikes panicled. Leaves lanceolate, minutely and distantly toothed, three in a whorl. Stem shrubby.—Native of Chili, where it was found by the unfortunate DOMBEY, (see that article,) and introduced into the gardens of Europe. In Italy, Spain, and the south of France, this valuable shrub is quite naturalized, and its delightfully scented leaves, having the flavour of lemon, are useful in fevers, and other inflammatory disorders, being taken as tea, like balm, hyssop, &c. With us it is a hardy greenhouse plant, flowering in summer. The leaves are of a light bright green, roughish, two inches long, apparently entire to a slight observer, soon drying, and fragrant for a long time afterwards if rubbed. Flowers small, pale lilac, in aggregate, panicled, loose, terminal spikes. The specific name of this plant is not well chosen, so many Peruvian and Chili shrubs having three leaves in a whorl. Ortega, who thought it a new genus, called it *Aloysia citrodora*, and the French retain the latter appellation, as if *citreæ* would not

far more elegantly express their meaning. But who shall weed the rank wilderness of recent botanic names? in which the venerable fabric raised by Linnæus is almost hidden, like the temples at Pæstum, before they were cleared.

12. *V. virgata*. Wand-like Verbena. "Fl. Peruv. v. 1. 20. t. 32. f. B." (*Zappania virgata*; Poiret in Lam. Dict. v. 8. 845.)—"Spikes axillary, ternate, slender. Flowers whorled. Leaves ovate, acute, crenate."—Native of the extensive forests of Peru, flowering in August and September. A branching shrub, ten or twelve feet high, with a very agreeable scent. Leaves stalked, opposite, spreading, three or four inches long, an inch and a half broad; rough on the upper side; veiny, wrinkled and downy beneath. Spikes generally three from the bosom of each leaf, composing a spreading panicle. Calyx downy. Corolla white. Seeds two. *Poiret*.

13. *V. lappulacea*. Bur Vervain. Linn. Sp. Pl. 28. Willd. n. 14. Swartz Obs. 16. Jacq. Obs. fasc. 1. 37. t. 24. (*Scorodonia floribus spicatis purpurascens pentapetaloides, femine unico majori echinato*; Sloane Jam. v. 1. 174. t. 110. f. 1.)—Clusters solitary, lax, simple. Calyx of the fruit inflated, roundish. Seeds oblong, tuberculated. Leaves ovate, acute, sharply serrated.—Native of waste ground and stony places, in the West Indies. The stems are herbaceous, two or three feet high, branched, leafy, square, smooth, hollow. Leaves stalked, two inches long, slightly bristly. Clusters from the forks of the stem, long, weak, and slender, of numerous, distant, little, pale-blue flowers, on short partial stalks. Calyx downy; as the fruit ripens becoming globose, inclosing the four hard seeds, which are closely combined, beset externally with four thick spines. Dr. Swartz, in his *Flora Ind. Occ.* 1090, points out the affinity of this species to his own genus GHINIA, (see that article,) founded on *Verbena curassavica* of Linnæus. The fruit of *Ghinia*, however, is a drupa, with a nut of four cells.

14. *V. Forskalei*. Arabian Vervain. Vahl Symb. v. 3. 6. Willd. n. 15. (*Phryma*; Forsk. Fl. Arab. Fel. n. 372.)—Clusters terminal, simple. Calyx of the fruit roundish, beaked, reflexed. Seeds rounded, corrugated. Leaves ovate-oblong, acute, bluntly serrated.—Found by Forskall in Arabia Felix. Very nearly akin to the last, but more robust and erect, with rougher, more deeply serrated, leaves. Seeds not oblong and spinous, but roundish and toothed, inflexed at the points. *Vahl*.

15. *V. caroliniana*. Carolina Vervain. Linn. Sp. Pl. 29. Willd. n. 16. Ait. n. 8. Pursh n. 9. (*V. carolinensis, melissæ folio, aspero*; Dill. Elth. 407. t. 301.)—Spikes aggregate, lax and slender. Leaves elliptic-lanceolate, acute at each end, serrated, nearly sessile; rough above; somewhat downy beneath.—In dry sandy fields, from Carolina to Georgia, perennial, flowering in June and July. *Pursh*. Herb erect, branched, somewhat hairy. Leaves harsh, with minute bristly tubercles, on the upper side, an inch and a half or two inches long, unequally, not deeply, serrated. Flowers pale red, very small. Calyx bristly, twice the length of the minute, ovate, pointed bractees. Seeds four, oblong.

16. *V. urticifolia*. Nettle-leaved Vervain. Linn. Sp. Pl. 29. Willd. n. 17. Ait. n. 9. Pursh n. 6. (*V. folio urticæ angustiore*; Rivin. Monop. Irr. t. 57. *V. recta canadensis*; Morif. sect. 11. t. 25. f. 3. *V. peregrina, foliis urticæ*; Dodart Mem. 627. t. 35.)—Spikes aggregate, lax and slender. Leaves ovate, acute, serrated, stalked, hairy on both sides.—About road-sides and cultivated grounds, from New England to Carolina, perennial, flowering from June to September. Flowers very small, white.

VERBENA.

white. *Pursh.* Akin to the last, but taller, and clearly distinguished by its stalked, coarsely serrated, nettle-like leaves. *Braçteas* ovate, slightly pointed, shorter than the calyx.

17. *V. stricta.* Stout Upright Vervain. Venten. Hort. Cels. t. 53. Ait. n. 10. Willd. Enum. 633. Pursh n. 10. Donn Cant. ed. 5. n. 10. (*V. rigens*; Michaux Boreal.-Amer. v. 2. 14. *V. paniculata*; Donn Cant. ed. 5. n. 8.)—Spikes aggregate, corymbose, straight, dense, obtuse. *Braçteas* taper-pointed, as long as the calyx. Leaves ovate, on short stalks, unequally serrated, downy and hoary on both sides.—Native of Carolina, and the Illinois country, perennial, flowering in July and August. *Pursh.* A tall, stout, hoary plant, whose stiff round stem is clothed with numerous, coriaceous, veiny leaves, an inch and a half to two inches long, acute, coarsely serrated; most downy beneath. *Spikes* from two to four inches long, in strong plants numerous, crowded at the top of the stem, in a corymbose manner, hoary, imbricated. *Braçteas* ovate, with taper points, generally exceeding the calyx, whose teeth are also long and slender. *Corolla* large, of a violet blue.

18. *V. diffusa.* Spreading Vervain. Poiret in Lam. n. 14. Pursh n. 7.—Spikes very long, lax, panicled, widely spreading. *Braçteas* acute, about as long as the calyx. Stem erect, much branched. Leaves ovato-lanceolate, serrated, somewhat downy.—Native of North America; cultivated at Paris, according to Poiret, on whose authority Mr. Pursh gave this species a place in his Flora. He speaks of it as having a near resemblance to *V. urticifolia*, with very small, somewhat purple, flowers. We have seen no specimen.

19. *V. paniculata.* Compound-panicled Vervain.—Lamarck Illustr. v. 1. 57. Dict. n. 8. Pursh n. 5.—Spikes compound, in a corymbose panicle. Leaves lanceolate, deeply serrated and jagged; tapering at the base; harsh on both sides, slightly downy.—In the natural meadows of the high mountains of Virginia and Carolina, perennial, flowering in July and August.—From four to six feet high. *Flowers* very numerous, purple. We have from the Paris garden a specimen marked *V. paniculata* of Jussieu, which answers well to the description by Poiret in Lamarck's Dictionary, and is doubtless what they all intended. Our specimen indeed is but eighteen inches high, and the leaves are about two inches, not four or five, in length. They taper down into short stalks, and are not much pointed. Both surfaces are rough like a file, as is likewise the square stem, which terminates in a corymbose panicle, of compound or branched spikes. The *braçteas* are ovate, with a fine point, shorter than the calyx. *Corolla* rather small.—What we received from the late Mr. Donn of Cambridge, as his *V. paniculata*, is not this, but our *stricta*, n. 17.

20. *V. corymbosa.* Corymbose Chili Vervain. "Fl. Peruv. v. 1. 22. t. 33. f. A." Poiret in Lam. n. 16.—Spikes aggregate, corymbose. Leaves sessile, triangular-heart-shaped, wrinkled, harsh, deeply serrated, pointed.—Native of Chili, in waste ground amongst rubbish, flowering in November and December. The stems are erect, herbaceous, square, a foot high, with opposite branches. Leaves about an inch and a half in length, distant, strongly veined, almost triangular. *Flower-stalks* at the summits of the stem and branches, opposite, three-cleft, the lowermost axillary, all forming a corymb of oblong spikes, of violet-coloured flowers. *Braçteas* lanceolate, taper-pointed. *Seeds* four. *Poiret.*

21. *V. officinalis.* Common Vervain. Linn. Sp. Pl. 29.

Willd. n. 20. Fl. Brit. n. 1. Engl. Bot. t. 767. Curt. Lond. fasc. 1. t. 41. Woodv. Suppl. t. 218. Fl. Dan. t. 628. Brown n. 1. (*V. communis*; Ger. Em. 718. Verbena; Rivin. Monop. Irr. t. 56. Verbenaca; Matth. Valgr. v. 2. 399. Camer. Epit. 797.)—Spikes slender, panicled. *Braçteas* ovate. Leaves deeply cut. Stems mostly solitary, somewhat prickly. Native of waste ground, and road-sides, in most parts of Europe, common in England, flowering in July. We received it among the first specimens, sent from New South Wales, in 1792, by Dr. John White. Mr. Brown also saw it there, and in the tropical part of New Holland. The root is perennial, woody, branching, sending up, from each of its summits, a solitary stem, about a foot high, curved at the base, acutely quadrangular, smooth, except a greater or less proportion of minute hooked prickles. Leaves variously jagged, somewhat hairy, tapering at the base into a broad footstalk. Flowers small, pale lilac, in acute spikes, at first dense, but becoming long and lax as the seeds ripen. *Braçteas* ovate, half the length of the calyx. Seeds while young enfolded in one common skin, or tunic, almost obliterated as they ripen, when each appears marked at the summit with excavated dots. This is the plant used by Mr. Morley to cure the king's evil, by hanging its root round the neck. Curtis has very justly exposed his pretensions, and his affected disinterestedness. Ray long ago remarked that the sensible qualities of the Vervain were too slight to make its many boasted virtues credible. Nevertheless it is still used, and we believe will do no harm; unless the patient be deluded by this means to neglect what might be more serviceable. Dioscorides, whose *ισσα βολων*, or Holy Herb, this is, first published its powerful use in incantations, and yet he has been believed for its other qualities.

22. *V. spuria.* Jagged-leaved Vervain. Linn. Sp. Pl. 29. Willd. n. 9. Ait. n. 12. Pursh n. 3.—"Spikes thread-shaped. *Braçteas* longer than the calyx. Stem decumbent, much branched and divaricated. Leaves in many jagged segments."—On slate hills and lime-stone rocks, in the Illinois country, Virginia and Kentucky, biennial, flowering in July and August. Flowers very small, blue. *Pursh.* We have never seen this plant, nor had Linnæus a specimen.

23. *V. supina.* Trailing Spanish Vervain. Linn. Sp. Pl. 29. Willd. n. 21. Ait. n. 14. Sm. Fl. Græc. Sibth. t. 554, unpubl. Cluf. Hist. v. 2. 46. (*V. sacra*; Ger. Em. 718.)—Spikes thread-shaped, solitary. *Braçteas* shorter than the calyx. Stems decumbent, branched. Leaves doubly pinnatifid. Native of Spain and the Levant, in spots overflowed in winter, flowering in July. Root annual. Herb somewhat downy, spreading every way, a little glaucous, with square stems a foot long. Leaves in many, narrow, wedge-shaped, notched segments. Spikes from the ends, as well as the forks of the branches. Flowers small, light purple, becoming distant as the seeds ripen. *Braçteas* ovate, bristly like the calyx, and about half its length. *Seeds* oblong, smooth.

24. *V. prostrata.* Prostrate Vervain. Ait. n. 15.—"Spikes thread-shaped, solitary. Calyx twice as long as the seeds. Leaves deeply serrated or cut."—Found by Mr. Menzies, on the north-west coast of America; and introduced in 1794 into Kew garden. It is perennial and hardy, flowering in June and July.

25. *V. cuneiformis.* Wedge-leaved Vervain. "Fl. Peruv. v. 1. 22. t. 32. f. A." Poiret in Lam. n. 3.—Spikes ternate, oblong. *Braçteas* lanceolate, acute, fringed. Leaves three-cleft, cut. Stem erect.—Native of sandy ground

ground in Peru, flowering from March to May. The whole plant is bristly, two feet high, branched. Leaves sessile, half clasping the stem; contracted at the base; divided almost half way down into three large, oblong, serrated lobes, rough and hispid on both sides, two or three inches long, and about as broad. Spikes short, ternate. Flowers blue. *Poiret*.

26. *V. bracteosa*. Bracteated Vervain. Michaux Boreal-Amer. v. 2. 13. Willd. Enum. 634. Pursh n. 2. (Zapana bracteosa; *Poiret* in Lam. v. 8. 843.)—Spikes solitary, with lanceolate spreading bractees, longer than the flowers. Stem decumbent. Leaves lacinated, very hairy.—Native of Illinois and Kentucky, perennial, flowering in July. Flowers light purple. *Pursh*. A small very hairy plant, said to have some resemblance to *V. supina*, n. 23, but the long wide-spreading bractees are peculiar. The stems are from six to nine inches in length. Spikes from the ends, as well as the forks, of the branches, two or three inches long. Seeds only two.

27. *V. Aubletia*. Rose-coloured Vervain. Jacq. Hort. Vind. v. 2. 82. t. 176. Linn. Suppl. 86. Willd. n. 18. Ait. n. 11. Pursh n. 1. Curt. Mag. t. 308. (Buchnera canadensis; Linn. Mant. 88. Obletia; Journ. de Rozier, v. 1. 367. t. 2. *Erinus laciniatus*; Linn. Sp. Pl. 879. *Lychnidea verbenæ tenuifoliæ folio*; Feuill. Peruv. v. 3. 35. t. 25.)—Spikes capitate, solitary; cylindrical after flowering. Bractees awl-shaped, as long as the taper-pointed calyx. Leaves three-lobed, cut. Stem erect.—Native of Carolina and Georgia, flowering in June and July. The seeds appear to have been brought to Europe by M. Richard, senior, and were sent by him to Kew garden, in 1774. The plant is biennial in our climate, requiring the shelter of a frame in winter. The herbage is green, roughish to the touch. Stem a foot high, or more, square, leafy, branched from the bottom. Leaves stalked, broadish, variously cut. Flowers larger than most of the genus, of a fine pink or crimson, numerous, in stalked heads, which afterwards become thick, close, cylindrical spikes. The bractees are very narrow, permanent, downy as well as the calyx, whose teeth are also very long and slender. Seeds four, oblong; furrowed in the lower, reticulated in the upper, part. This is undoubtedly a genuine and most obvious *Verbena*, nor can we account for the error of Linnæus, who, with the ripe naked seeds on his original specimen, and the long-pointed calyx, referred it to *Buchnera*. It was called *Obletia*, either by its discoverer, or by La Tourrette, who sent a specimen and figure to Linnæus, by which the latter corrected his mistake. Their intention was to honour Aublet, whose name was sometimes written Oblet. With respect to the other Linnæan synonym, hitherto neglected by most of those who have noticed this *Verbena*, it depends entirely on Feuillée's plate and description, which led Linnæus to refer this, as well as the following species, to *Erinus*, without seeing a specimen of either. Lamarck, *Poiret*, and Willdenow, apply these latter synonyms to their *V. crinoides*, Willd. Enum. 634, which is *V. multifida*, Fl. Peruv. v. 1. 21. t. 33. f. C.

28. *V. veronicifolia*. Speedwell-leaved Vervain. (*Erinus peruvianus*; Linn. Sp. Pl. 879. *Lychnidea veronicæ folio*, flore coccineo; Feuill. Peruv. v. 3. 36. t. 25.)—Spikes capitate, solitary, cylindrical after flowering. Bractees awl-shaped, as long as the taper-pointed calyx. Leaves ovate, serrated, acute at each end. Stem erect.—Found by Feuillée in fields on the north side of the river de la Plata, in Paraguay. This seems to agree with the last in the flowers and inflorescence, differing only in the simple undivided form of the leaves; but whether that

difference be constant and specific, can be determined by future comparison of the two plants. The other synonym of Feuillée having been misunderstood, and, as we presume, distinguished without reason from *V. Aubletia*, we have here recorded this for the consideration of those who may hereafter meet with materials for solving our doubts.

VERBENA, in *Gardening*, contains plants of the hardy, herbaceous, and tender exotic kinds, among which the species cultivated are, the Indian vervain (*V. indica*); the trailing vervain (*V. supina*); the betony-leaved vervain (*V. orbicula*); the Jamaica vervain (*V. jamaicensis*); the Mexican vervain (*V. mexicana*); the globe-flowered vervain (*V. globiflora*); the cluster-flowered vervain (*V. bonariensis*); the halbert-leaved vervain (*V. hastata*); and the three-leaved vervain (*V. triphylla*).

And there are many other species that may be cultivated for variety.

The first sort is an annual plant with a purplish flower. In the second sort the flowers are of a light blue colour, and large. The third arises with a shrubby stalk, and the flowers grow in thick terminating spikes about a foot in length; are large, and of a fine blue colour. The fourth sort is three or four feet high in the stem, and much branched, the flowers blowing in succession, beginning at the bottom, but very few together, violet-coloured, with the throat and long slender incurved tube of a white colour. The seventh has four-cornered stalks, which rise to the height of five or six feet, the flowers of which are blue, appearing late in summer. The eighth has many four-cornered furrowed stalks, which are terminated by spikes of blue flowers, in clusters, which appear in August. The ninth is a very sweet-smelling under shrub, and very pleasant, like that of the lemon.

Method of Culture.—These plants are not raised without difficulty or attention. They may be increased by seeds, which should be sown in pots, or on a hot-bed, in the early spring, plunging the pots in the bed. When they are in a state of growth to remove, they should be planted in separate pots, and replunged in a fresh hot-bed, shade being given till they have taken new root, when they must have the management of tender plants of the exotic kind. The annual sorts should be kept in the stove, or a glass case, where there is a bark-bed to plunge them in, when too large to be continued under the frames; and the perennial sorts may be placed simply in such cases, air being admitted in a cautious manner.

Of these kinds, such as do not afford good seeds in this climate, may be increased by planting cuttings in the summer months in pots of good mould, placing them in the bark-bed of the stove, where they may be preserved many years. The eighth sort may be raised from seeds by sowing them in the autumn, and by parting the roots and planting them out at the same time. They succeed best on a soft loamy soil, and are so hardy as to thrive in the open air. The ninth sort may be readily increased, by planting cuttings in the spring or autumn in pots of good mould. It should have the protection of the greenhouse or a glass case. They afford variety among other potted plants in the greenhouse and stove, and some of the hardy sorts occasionally in the open ground.

VERBENACA, in *Botany*, with the earlier botanists among the moderns, and even with Pliny himself, seems to be synonymous with VERBENA, see that article. Linnæus indeed uses this word as the specific name of a common English species of *Salvia*, not supposed by any body, that we can find, to have been the so much honoured *Verbenaca* of the Romans, see Pliny, book 25. chap. 9. He was led

to this adoption of the name by Triumphetti, who compares the division of the leaves of this plant to those of *Verbenaca*, or Vervain. The application, therefore, is faulty, and causes a confusion of ideas. See *SALVIA*.

VERBENICO, in *Geography*, a town of the island of Veglia, with a small harbour, containing about 1200 inhabitants.

VERBERATION, formed from *verbero*, I smite, in *Physics*, a term used to express the cause of sound, which arises from a verberation of the air, when struck, in divers manners, by the several parts of the sonorous body first put into a vibratory motion.

VERBERIE, in *Geography*, a town of France, in the department of the Oise: near it is a medicinal spring; 9 miles S. of Compeigne.

VERBESINA, in *Botany*, according to Ambrosinus, who is followed by Linnæus, *Phil. Bot.* 175, originated in *Forbesina*; which latter arose from the leaves being divided like a pair of forceps. Professor Martyn, however, derives *Forbesina* from *Coq'sn*, food, or fodder; the chief objection to which is, that the plants of this genus do not appear to be serviceable, or to have been recommended, for any such purpose. De Theis considers the above name as synonymous with *Verbena*, because, as he says, the undulated obtuse leaves of *Verbesina alata* resemble that plant; but this explanation is unauthorized.—Linn. Gen. 437. Schreb. 570. Willd. Sp. Pl. v. 3. 2221. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 5. 120. Pursh 564. Juss. 188. Lamarck Illustr. t. 684. Gært. t. 171. (*Synedrella*: *ibid.* t. 171.)—Class and order, *Syngenesia Polygamia-superflua*. Nat. Ord. *Compositæ oppositifolia*, Linn. *Corymbifera*, Juss.

Gen. Ch. *Common Calyx* concave, of several oblong, channelled-concave, erect, mostly equal leaves, in a double row. *Cor.* compound, radiated; that of the numerous perfect florets in the disk funnel-shaped, five-toothed, erect; of the few (about five) female florets of the radius ligulate, either broad and three-cleft, or very narrow and undivided. *Stam.* in the perfect florets, Filaments five, capillary, very short; anthers united into a cylindrical tube. *Pist.* in the same florets, Germen rather oblong; style thread-shaped, the length of the stamens; stigmas two, reflexed; in the female ones, the same. *Peric.* none, except the unchanged calyx. *Seeds* in all the florets alike, solitary, thickish, angular, crowned with a chaffy crown of two, or more, acute teeth. *Recept.* covered with deciduous chaffy scales.

Ess. Ch. Receptacle chaffy. Seed-down bristle-pointed. Calyx of two rows of scales. Florets of the radius about five.

Obs. We have shewn, under the article *PHAETHUSA*, that the genus established by Gærtner, with that name, is a real *Verbesina*, though a *Siegesbeckia* of Linnæus. The bristly-pointed crown of the seed in the genus before us being wanting in *V. Lavania*, *alba* and *prostrata* of Linnæus, the two latter are removed to *ECLIPTA*, and the first to *LAUVANIA*; see those articles. The number of radiant florets is uncertain in many species.

Sect. 1. *Leaves alternate.*

1. *V. alata*. Wing-stalked *Verbesina*. Linn. Sp. Pl. 1270. Willd. n. 1. Ait. n. 1. Curt. Mag. t. 1716. (*Cannabina indica*, foliis integris, alato caule; Magn. Hort. 40. t. 8. *Chrysanthemum americanum*, caule alato flore aphylo globoso aurantio, foliis baccharidis; Commel. Hort. v. 1. 5. t. 3. *C. corassavicum*, alato caule, floribus aurantiis; Herm. Parad. 125, with a plate.)—Leaves alternate, decurrent, undulated, bluntish. Bristles of the seed two, very unequal.—Native of South America and the

West Indies. Cultivated ever since the beginning of the last century in our stoves, where it flowers most part of the summer, and being not uncommon, has been figured in more publications than we have thought necessary to quote, but which are cited by those mentioned above. The plant is perennial, hoary when young, erect, branched, three or four feet high, readily known by its winged stem. Leaves three or four inches long, veiny, wavy and toothed. Flowers of a very rich orange-colour, almost globular, three quarters of an inch broad, on long naked, alternate, often purplish, stalks, at the ends of the branches. Florets of the radius, in our gardens at least, numerous. Seeds bordered with a membrane; their terminal awns awl-shaped, rigid, one much longer than the other, incurved and hooked. Linnæus has hinted that this species differs so much in habit and structure from the rest, as almost to constitute a distinct genus. Gærtner makes it the type of *Verbesina*, and yet asserts that this genus is only *Spilanthus* with a radius. Indeed these two genera do run very much into each other, and the radius occasionally appears or vanishes in several species of each, nor are the bristles of the seed perhaps strictly constant even in the same species. We scarcely think the difficulty would be much lessened by removing *V. alata* to *SPILANTHUS*, see that article; though such a measure might be sanctioned by the habit of the plant. The remaining species, very various in habit, have not been sufficiently examined or compared to allow of a clear decision respecting them, and we must take them in general as we find them.

2. *V. chinensis*. Chinese *Verbesina*. Linn. Sp. Pl. 1270. Willd. n. 2.—Leaves alternate, stalked, ovato-lanceolate, obtuse. Seed-down with four bristly points.—Brought by Osbeck from China. Stem shrubby, with round, leafy, downy branches. Leaves an inch and a half long, bluntly serrated, finely downy. Flowers the size of the preceding, yellow, with numerous short rays, growing about the ends of the branches, on longish, slightly leafy, nearly simple, stalks. Seeds slender, quadrangular, each crowned with a jagged membrane, and four small, erect, straight bristles.

3. *V. virginica*. Virginian *Verbesina*. Linn. Sp. Pl. 1270. Willd. n. 3. Pursh n. 1. Michaux Boreal.-Amer. v. 2. 134.—Leaves alternate, stalked, lanceolate, nearly entire. Stem slightly winged. Corymb compound. Calyx oblong, downy.—In shady woods on the mountains, from Pennsylvania to Carolina, perennial, flowering from July to September. Rays three or four, white. Pursh.

4. *V. virgata*. Wand-stalked *Verbesina*. Cavan. Ic. v. 3. 38. t. 275. Willd. n. 4.—Leaves alternate, lanceolate, serrated, tapering at each end. Flowers corymbose.—Native of Mexico. Perennial, flowering in the garden at Madrid in December. Stem four feet high, erect, wand-like, leafy. Leaves a span long, tapering down into the footstalks. Flowers yellow, an inch broad, with about twelve elliptical radiant florets. Seeds black, elliptical, bordered with a whitish wing, and crowned with two small, erect, often deciduous bristles.

5. *V. mutica*. Parsley-leaved *Verbesina*. Linn. Sp. Pl. 1273. Willd. n. 5. Ait. n. 2. Swartz Obf. 314. t. 8. f. 1. (*Bidens apiifolia*; Linn. Am. Acad. v. 5. 405. *Chrysanthemum palustre minimum repens*, apii folio; Sloane Jam. v. 1. 263. t. 155. f. 3. *C. humile*, ranunculi folio; Plum. Ic. 75. t. 86. f. 2.)—Leaves alternate, deeply three-cleft, toothed; radical ones obovate, serrated. Stems procumbent. Seeds without awns.—Found in rather moist pastures, and by way-sides, in the West Indies. Swartz. Miller cultivated it in 1768, from seeds sent by Houftoun, from whom Gronovius received specimens in 1732. This species,

species, having no bristly crown to the seed, belongs rather, as Dr. Swartz observes, to *Anthemis*; but the habit is somewhat adverse. The stems, a span long, spread every way on the ground, and are leafy, more or less branched. Leaves much divided and toothed; glaucous beneath. Flowers small, yellow, with numerous radiant florets. Seed bordered.

6. *V. Boswallia*. Fennel-leaved Verbefina. Linn. Suppl. 379. Willd. n. 6.—Leaves alternate, three-cleft, with many capillary segments. Stems prostrate. Seeds hairy, with two bristles. Female floret solitary.—Native of the East Indies. Used by the natives in fomentations. An annual, herbaceous, decumbent plant, having the taste and smell of fennel; the divisions of the leaves also resembling that herb, only shorter and fewer. Flowers mostly solitary, axillary or terminal. Calyx-seales few, broad, elliptical, with a membranous edge. Florets five or six only; of which one is ligulate and female; the rest four-cleft. Seeds compressed, black, clothed with shaggy golden hairs, and crowned with two black bristles. Linnæus, or rather Koenig, who sent him this plant, appears to have had an intention of making it a new genus, by the name of *Boswallia*, which might have been done without violence to nature. We are not informed of the origin of the name.

7. *V. gigantea*. Great Pale Verbefina. Jacq. Coll. v. 1. 53. Ic. Rar. t. 175. Willd. n. 7. Ait. n. 3. Swartz Ind. Occ. 1368. (*Bidens frutescens*, sphondylii folio et facie; Plum. Ic. 41. t. 51.)—Leaves alternate, pinnatifid, sinuated, toothed. Stem shrubby.—Native of mountainous thickets, in Jamaica and other parts of the West Indies, flowering in December and January. Though often seen in our more curious stove collections, it very rarely flowers. The stem is ten or twelve feet high. Leaves deeply pinnatifid; downy beneath; the lower ones twelve to eighteen inches long. Flowers small, white, or flesh-coloured, numerous, in large, corymbose, terminal panicles. Seeds, according to Jacquin, crowned with a solitary bristle.

8. *V. Coreopsis*. Alternate-leaved Winged Verbefina. Michaux Boreal.-Amer. v. 2. 134. Pursh n. 3. (*Coreopsis alternifolia*; Linn. Sp. Pl. 1283. Willd. Sp. Pl. v. 3. 2257. Jacq. Hort. Vind. v. 2. 50. t. 110. Chrysanthemum virginianum, caule alato, ramofius, flore minore; Pluk. Phyt. t. 159. f. 3. C. caule alato, virginianum, &c.; Morif. sect. 6. t. 7. f. 75, 76.)—Leaves alternate, lanceolate, serrated, stalked. Stem winged. Panicle corymbose, leafy.—On the mountains of Virginia and Carolina; perennial, flowering from July to September. From three to seven feet high, the stem furnished with several narrow, green, entire, leafy wings. Leaves four or five inches long, roughest on the upper side; the lower ones opposite, or three or four in a whorl; but the greater part are alternate. Flowers several, in a downy-stalked branched panicle. Calyx widely spreading, almost flat, so that the disk becomes nearly globose, subtended by four or five orange-coloured, spreading, ligulate florets, near an inch long. Seed crowned with two short bristles. This species is naturally very nearly allied to *V. Siegesbeckia*, hereafter described, see n. 11, nor can they be generically separated.

Michaux and Pursh mention a white-flowered variety, always destitute of rays, found by the latter on the coast of Carolina, which is *Aibanafia paniculata*, Walt. Carol. 201. This Mr. Pursh strongly suspects to be a very distinct species.

9. *V. helianthoides*. Sun-flower Verbefina. Michaux Boreal.-Amer. v. 2. 135. Pursh n. 4.—Leaves alternate, broadly lanceolate, acute, slightly toothed; rough above; downy and hoary beneath. Stalks single-flowered, aggre-

gate.—In the western parts of the Allegany mountains, and in the Tennessee and Illinois countries; perennial, flowering in August and September. Flowers like a *Helianthus*. Michaux, Pursh.

SECT. 2. *Leaves opposite.*

10. *V. pinnatifida*. Pinnatifid Yellow Verbefina. Cavan. Ic. v. 1. 67. t. 100. Willd. n. 8. Jacq. Hort. Schoenbr. v. 3. 30. t. 305.—Leaves opposite, pinnatifid, serrated. Stem winged.—Native of Mexico, flowering in the European stoves in December and January, but not yet known in the English collections. The stems are several, rather shrubby, with four, slightly wavy, membranous wings. Leaves about a foot long, tapering at the base. Inflorescence like *V. gigantea*, but the flowers are more numerous, yellow, with several conspicuous rays. Seed crowned with two bristles.

11. *V. Siegesbeckia*. Half-rayed Verbefina. Michaux Boreal.-Amer. v. 2. 134. Willd. n. 9. Ait. n. 4. Pursh n. 2. (*Siegesbeckia occidentalis*; Linn. Sp. Pl. 1269. *Phacelthusa americana*; Gært. v. 2. 425. t. 169. Pursh 561. *Chrysanthemum americanum*, caule alato, amplioribus foliis binatis, floribus e pallide lutescentibus parvis; Pluk. Mant. 46. t. 342.)—Leaves opposite, ovato-lanceolate, serrated, stalked; tapering at each end. Stem winged.—In shady woods, from Virginia to Carolina; perennial, flowering from July to September. A tall herbaceous plant, with four, or more, narrow, uninterrupted wings, running along the stem and branches. Leaves six inches long, undivided, bright green; roughish above; downy beneath; the upper ones sometimes three in a whorl. Panicle terminal, forked, downy, leafy. Radiant florets from one to three, near an inch long, ligulate, bright yellow. We have already (see *PIRÆTHUSA*) given reasons for the above synonyms. Pursh rightly suspected these two plants to be the same, but retained *Phacelthusa* out of deference to Michaux, who nevertheless has omitted it in his *Flora*.

12. *V. serrata*. Serrated Downy Verbefina. Cavan. Ic. v. 3. 7. t. 214. Willd. n. 10. Ait. n. 5.—Leaves opposite, stalked, ovato-lanceolate, with tooth-like serratures; downy beneath. Flowers corymbose.—Native of Mexico. We have a garden specimen from the original author. Mr. Lambert received seeds from him in 1803. The root is perennial. Stems three feet high, erect, round, clothed with white cottony down, especially when young. Footstalks short, combined by a dilated downy base. Leaves three inches long, strongly and unequally serrated; green, but rather silky, above; more hoary, and densely downy, beneath, copiously reticulated with veins. Flowers yellow, numerous, in a downy corymbose panicle. Outer calyx-leaves obovate, recurved. Rays four or five, broad, toothed. Seeds bordered, crowned with two short bristles.

13. *V. ceanothifolia*. Five-ribbed Verbefina. Willd. n. 11.—Leaves opposite, ovate, serrated, with five combined ribs; their under side downy. Flower-stalks racemose, panicked, axillary.—Native of the neighbourhood of Acapulco, in Mexico. The stem is round, erect. Leaves on short stalks, oblong-ovate, bluntly serrated, veiny, clothed on both sides with short scattered hairs; rough beneath. Flower-stalks long, from the bosoms of all the upper leaves. Akin to the following. *Willdenow*.

14. *V. biflora*. Twin-flowered Verbefina. Linn. Sp. Pl. 1272. Willd. n. 12. (“*Valliamanga-nari*”; Rheede Hort. Malab. v. 10. 79. t. 40.” *Willd.*)—Leaves opposite, stalked, ovate, serrated, with three combined ribs; their under side paler, scarcely downy. Flowers solitary or in pairs, on axillary and terminal stalks.—Native of the East Indies. The stem appears to be herbaceous, or slightly shrubby,

shrubby, with forked and subdivided, striated, nearly smooth, leafy branches. *Leaves* two inches or more in length, pointed, their three ribs united a little above the base; their upper side rough with minute depressed bristles; under smooth, or besprinkled with softer hairs. *Flower-stalks* long, either from the forks of the branches, or about their extremities, bearing one or two yellow *flowers*, an inch broad, almost always accompanied by a lanceolate leaf opposite to each partial stalk. Outer *calyx-scales* ovate, bristly. *Radiant florets* several, elliptical, toothed at the end. *Seeds* abrupt, triangular, destitute of a crown, or terminal bristles. The scales of the *receptacle* are obovate, concave, furrowed, abrupt, rough at the extremity, resembling the inner leaves of the *calyx*. Linnæus points out the affinity of this species to his *V. Lavenia*; but this regards their habit only, for *LAVENIA*, now a separate genus, (see that article,) has a naked *receptacle*, and three bristles to the *seed*.

15. *V. fativa*. Oil-feed Verbefina. Sims in Curt. Mag. t. 1017. Ait. n. 6.—Leaves opposite, oblong, clasping the stem, distantly serrated. Calyx simple, of five leaves.—Native of the East Indies; cultivated in the Mysore country, and several other parts of India, for the sake of the expressed oil from its seeds, which serves as a substitute for that of *Sesamum*. Dr. Roxburgh sent some of these seeds in 1805, to Mr. William Salisbury, the assiduous possessor of the botanic garden at Brompton. The plant is annual, either to be kept in the stove, or raised on a hot-bed, and then planted out, flowering in autumn. *Leaves* four inches or more in length, green, not hoary. *Flowers* yellow, two inches broad, with about eight large broad radiant *florets*, jagged or toothed at the end. These *flowers* stand on long simple stalks, from the forks of the stem, and bosoms of the upper leaves. The simple *calyx*, of five broad leaves, agrees with that of the next species; so that, as Dr. Sims observes, if one be reckoned a *Verbefina* the other must. We are not inclined to disturb them, because the whole genus, though in many respects very natural, still labours under some strange exceptions and anomalies, which ought all to be well considered by those who attempt a reform.

16. *V. calendulacea*. Marigold Verbefina. Linn. Sp. Pl. 1272. Willd. n. 13. Ait. n. 7. (*Caltha* flore solitario, ex alis foliorum longissimo pedunculo prodeunte; Burm. Zeyl. 52. t. 22. f. 1. "Pee Cajoni; Rheede Hort. Malab. v. 10. 83. t. 42.")—Leaves opposite, oblong-lanceolate, very remotely serrated, sessile; tapering at the base. Calyx simple, of five leaves.—Native of Ceylon, and other parts of the East Indies; cultivated by Miller. An annual stove-plant, flowering from July to September. The *stem* is branched, clothed, as well as the *leaves*, with rigid depressed bristles. The upper surface of the latter is, besides, usually rough with callous tubercles: their length and shape are variable, and their marginal serratures are few and remote. *Flowers* yellow, not half the size of this last, on long, simple, mostly axillary, stalks. Radiant *florets* from five to eight or ten, elliptical, toothed. *Seeds* very numerous, composing a globular head, wedge-shaped, abrupt, each crowned with two short bristles.

17. *V. nodiflora*. Sessile-flowered Verbefina. Linn. Sp. Pl. 1271. Willd. n. 14. Ait. n. 8. (*Bidens nodiflora*, folio tetrahit; Dill. Elth. 53. t. 45. *Chrysanthemum conyzoides nodiflorum*, semine rostrato bidente; Sloane Jam. v. 1. 262. t. 154. *Synedrella nodiflora*; Gærtn. v. 2. 456. t. 171.)—Leaves opposite, ovate, serrated, with three combined ribs; tapering at the base. Flowers axillary, nearly sessile.—Native of the West Indies. Cultivated early

at Chelsea, and in Sherard's garden, being a tender annual, raised and kept in the stove, for the sake of curiosity, but having nothing to recommend it to popular notice. The *stem* is erect, a foot high, branched from the base. *Leaves* two or three inches long, broadly ovate, tapering suddenly into a winged *footstalk*. *Flowers* solitary, or in pairs, small, yellow, with several emarginate rays. *Calyx* certainly of two very different rows of scales, though the outermost consists of but two leafy ones. *Seed* crowned with two rigid awns.

18. *V. dichotoma*. Forked Verbefina. Willd. n. 15. Ait. n. 9. Murray in Comm. Goett. for 1779. 15. t. 4.—"Leaves opposite, ovate, pointed, serrated, hairy, with three combined ribs. Stalks axillary, single-flowered. Stem forked."—Native of the East Indies. Annual. Whole *herb* beset with copious, short, white hairs. We have seen no specimen.

19. *V. fruticosa*. Shrubby West Indian Verbefina. Linn. Sp. Pl. 1271. Willd. n. 16. Ait. n. 10. (*Bidens frutescens*, ilicis folio, flore luteo; Plum. Ic. 42. t. 52.)—Leaves opposite, stalked, ovate, serrated, rough, with three combined ribs. Stalks single-flowered, axillary. Stem shrubby.—Native of the West Indies. We have a specimen from Dr. Swartz, though this species is not mentioned either in his *Prodromus* or *Flora*. The *stem* is woody, repeatedly branched and forked. The *leaves* appear to vary in hairiness, as well as size, but are always rough with minute tubercles. *Flowers* yellow, with numerous broad rays. *Seed* compressed, crowned with two bristles.

VERBESINA, in *Gardening*, affords plants of the herbaceous and woody flowering exotic kinds, among which the species cultivated are, the wing-stalked verbefina (*V. alata*); the Chinese verbefina (*V. chinensis*); the sessile-flowered verbefina (*V. nodiflora*); the shrubby verbefina (*V. fruticosa*); and the tree verbefina (*V. gigantea*).

The first is an herbaceous perennial plant, with the flowers in single heads, of a deep orange-colour, appearing most part of the summer.

The second is a shrubby plant with yellow flowers.

The fourth rises with a shrubby stalk seven or eight feet high, and has yellow flowers.

Method of Culture.—These plants may be increased by sowing the seeds upon a moderate hot-bed, or in pots plunged into it, in the early spring months; and when the plants are of sufficient growth, they should be removed into separate pots, or into a new hot-bed, giving shade till they become new-rooted; afterwards managing them as tender annual plants, being careful not to draw them up weak: about the middle of summer they may be taken up with balls to their roots, and be planted in a warm sheltered border, being protected and watered till re-rooted, little care being afterwards necessary: these produce seeds often in the autumn; but in the stove they may frequently be preserved over the winter.

They produce variety in stove and greenhouse collections, and sometimes in the borders during the summer season, especially the first sort by its orange flowers.

VERBIAGE, in *Grammar* and *Rhetoric*. See VERBOSITY.

VERBICÆ, in *Ancient Geography*, a people of Africa, in Mauritania Tingitana.

VERBIEST, FERDINAND, in *Biography*, a celebrated missionary, was born in Flanders, and attained distinction as a mathematician in China about the beginning of the 17th century. He was appointed by the emperor Cam-Hi president in the tribunal of mathematics, and entrusted with the care of the Calendar. He also obtained permission to

preach the Christian religion in China, and made many efforts for inducing the emperor to embrace the Christian faith; but though Verbiest succeeded in prevailing with him to acknowledge his belief in one God, he failed in his attempts to convert him to Christianity. Such, however, was the respect which the emperor entertained for this missionary, that on occasion of his death, in 1688, he composed an eulogy upon him, and ordered him to be interred with Christian honours. The principal work of Verbiest is entitled, "Astronomia Europæa, sub Imperatore Tartarico-Sinico Cam-Hi, ex umbra in lucem revocata a P. Ferdinando Verbiest, Flandro-Belga, e S. J. Academiæ Astronomicæ in Regia Pequimensi Præfecto;" Dilingæ, 1687, 4to. He also caused to be constructed, at the request of the emperor, a variety of astronomical instruments, and wrote sixteen volumes, in the Chinese language, on their construction and use. Verbiest contrived likewise to convey over a long bridge, by means of pulleys, several immense blocks of stone for building a mausoleum for the emperor, which, it is said, 500 horses could not have drawn, and extended an aqueduct several furlongs over a wide plain. He moreover cast upwards of 130 pieces of brass cannon for the use of the Chinese government, and calculated astronomical tables with eclipses of the sun and moon for 2000 years. *Monucla Hist. des Mathem. Gen. Biog.*

VERBINUM, in *Ancient Geography*, a town of Belgic Gaul, belonging to the Veromandui, upon the route from Bagacum Nerviorum to Durocortorum, between Buronum and Catuacum. *Anton. Itin.*

VERBO, in *Geography*, a town of Hungary; 16 miles N.W. of Leopoldstadt.

VERBOSANIA, a town of European Turkey, in Bosnia; 15 miles W.N.W. of Bosnaferai.

VERBOSITY, in *Rhetoric*, an offence against energetic and vivid brevity or conciseness in writing. This differs from pleonasm; as in the latter, words are used which make no addition to the sense, whereas in the verbose manner, not only single words, but whole clauses, may have a meaning; but it would be better to omit them, because their meaning is unimportant; and therefore, instead of enlivening the expression, they make it languish. Another difference is, that in a proper pleonasm, a complete correction is always made by expunging; but this will not always answer the purpose in the verbose style, as it is often necessary to alter as well as to raise. Moreover, verbosity does not mean the same thing which the French express by the term "verbiage," which is commonly understood to denote a parade of fine words, plausibly strung together, so as either to conceal a total want of meaning, or to disguise something weak and inconclusive in the reasoning. The former, or verbosity, is merely an offence against vivacity; but the latter is more properly a transgression of the laws of perspicuity. One instance of a faulty exuberance of words is the immoderate use of circumlocution. In some circumstances circumlocution is a beauty, in others it is a blemish. It is often used for the sake of variety; sometimes for the sake of decency: at other times, propriety requires the use of circumlocution, as when Milton says of Satan, who had been thrown down headlong into hell,

"Nine times the space that measures day and night
To mortal man, he with his horrid crew
Lay vanquish'd rolling in the fiery gulf."

In this case, "nine days and nights" would not have been proper, when speaking of a period before the creation of the sun, and consequently before time was portioned out to any being in that manner. Sometimes even the vivacity of

the expression may be augmented by a periphrasis, as when it is made to supply the place of a separate sentence. An instance to this purpose occurs in the words of Abraham, (Gen. xviii. 25.) "Shall not the *judge of all the earth* do right?" This circumlocution for God serves as an argument in support of the sentiment, and conduces more to conciseness. Such also is the periphrasis employed by Cicero, who, instead of saying simply, Milo's domestics killed Clodius, says, "they did that which every master would wish his servants to do in such an exigence."

Another source of languor in the style is the insertion of such clauses, as to a superficial view appear to suggest something which heightens, but on reflection are found to presuppose something which abates the vigour of the sentiment. Such is the following sentence from Swift: "Neither is any condition of life more honourable in the sight of God than another, otherwise he would be a respecter of persons, *which he assures us he is not.*" The last clause enervates the thought, as it too plainly implies, that without this assurance from God himself, we should naturally conclude him to be of a character very different from that here given him by the preacher. Akin to this is the juvenile method of loading every proposition with asseverations. Such a practice in conversation tends to suggest a suspicion of the speaker's veracity, rather than to engage the belief of the hearer; and it has a somewhat similar effect in writing. Thus in our translation of Gen. ii. 17. God is represented as saying to Adam, concerning the fruit of the tree of knowledge, "In the day thou eatest thereof, thou shalt *surely* die." The adverb *surely*, instead of enforcing, enfeebles the denunciation. Another example, somewhat similar, is the manner in which our interpreters have attempted, in the New Testament, to strengthen the negative, wherever the double negative ($\epsilon\ \mu\eta$) occurs in the Greek, even in the most authoritative threatenings, by rendering it sometimes *in no case*, sometimes *in no wise*; neither of which phrases expresses more than the single adverb *not*; and as they partake of the nature of circumlocution, they in effect debilitate the expression. Another cause of a languid verbosity is the loading of the style with epithets. Epithets used sparingly, and with judgment, serve to enliven the expression; but a profusion of them has an opposite tendency. Besides, they lengthen the sentence, without adding proportionable strength. We may also add, that the crowding of epithets into a discourse betrays a violent effort to say something extraordinary; and nothing is a clearer evidence of weakness than such an effort, without a correspondent effect.

There is, however, one kind of composition, the paraphrase, of the style of which verbosity is the proper character; because it is the professed design of the paraphrast to say in many words what his text expresses in few. Another species of verbosity is a prolixity in narration, arising from the mention of unnecessary circumstances. *Campbell's Philosophy of Rhetoric*, vol. ii.

VERBOVETZ, in *Geography*, a town of Croatia, at the conflux of the Csernets and Glocovia; 7 miles N.E. of Ivanitz.

VERBRO AA, a river of Denmark, in North Jutland, which runs into the sea, 6 miles W.N.W. of Hioring.

VERBROECK, a town of Flanders; 8 miles E.S.E. of Hulst.

VERCEL, a town of France, in the department of the Doubs; 11 miles N.E. of Ornans.

VERCELLÆ, in *Ancient Geography*, a town of Italy, in Gallia Transpadana, and the capital of the people called Sessites. It had within its territory a temple and a wood consecrated

consecrated to Apollo. Here the Cimbri were defeated by the Romans, under Marius and Catullus. After the decline of the Roman empire, it became a republic, and from that state it fell under the dukes of Milan; and, lastly, it was given as a marriage portion to Amadeus III., duke of Savoy. See VERCELLI.

VERCELLI, or VERCEIL, in *Geography*, a town of Piedmont, and, under the French dynasty, the capital of the department of *Sesia*; which see. It is situated at the junction of the Cerva with the Sesia, and was anciently called Vercellæ. It is the see of a bishop, suffragan of the archbishop of Milan. There are two churches which are called cathedral, and twelve others, two abbeys, nineteen convents of both sexes, three provostships, two priories, three poor-houses, and five hospitals; the inhabitants are about 20,000. In 1800, the French took Vercelli from the Austrians, with considerable stores; 30 miles S.W. of Milan. N. lat. 45° 22'. E. long. 8° 26'.

VERCHATURSKY GORY, mountains which divide European and Asiatic Russia, extending almost north and south to a great length, and about 40 miles in breadth. They are covered with wood, firs, larch, birch, &c.

VERCHEN, a town of Anterior Pomerania; 6 miles S.W. of Demmin.

VERCHES, LES, a town of France, in the department of the Mayne and Loire; 10 miles S.W. of Saumur.

VERCHIERE, a town of Canada, on the right bank of the St. Lawrence. N. lat. 45° 47'. W. long. 73° 9'.

VERCHODVERSKOI, a town of Russia, in the government of Viatka; 40 miles N. of Viatka.

VERCHOIANSKOI, an ostrog of Russia, in the government of Irkutsk, on the Yana. N. lat. 65° 40'. E. long. 130° 14'.

VERCHOKIZILSKOI, a fort of Russia, in the government of Upha, at the union of the Kizil and Ural; 40 miles S. of Verchouralsk.

VERCHOLENSK, a town of Russia, in the government of Irkutsk, on the Lena; 120 miles N. of Irkutsk. N. lat. 54°. E. long. 105° 34'.

VERCHOTOMSKOI, a town of Russia, in the government of Kolivan; 32 miles N.N.W. of Mungatzkoi.

VERCHOTURA, a town of Russia, in the province of Ekaterinburg, near the river Tura. This was the first town which the Russians built in Siberia. It has four churches and two convents, besides chapels; and is the see of a bishop. Verchotura is situated on a rising ground, and fortified with palisades and a ditch, and defended by a garrison under a commandant. The adjacent country is inhabited by a people called Vogulitz, who live on fruits in huts among the woods, employing themselves in hunting and shooting, without agriculture. In the beginning of the 18th century, they were many of them converted to Christianity, and now mix probably with the rest of the people; 120 miles N. of Ekaterinburg. N. lat. 58° 45'. E. long. 60° 14'.

VERCHOVAGSKOI, a town of Russia, in the government of Vologda, on the Vaga; 48 miles S. of Vielk.

VERCHOURALSK, a town of Russia, in the government of Upha, on the Ural; 120 miles S.E. of Upha. N. lat. 53° 36'. E. long. 59° 14'.

VERD, or VERDE, *Cape*, a cape on the west coast of Africa. N. lat. 14° 48'. W. long. 17° 31'.

VERD, or *Verde Islands, Cape*, islands of Africa, in the Atlantic, deriving their name from the cape opposite to which they are situated, and discovered by the Portuguese in 1446. They are so called, as some say, from a green plant, called Sargosso, resembling water-cresses, and bearing fruit

like a gooseberry, which is found floating near them, and in such abundance as to impede the progress of vessels in their course. They are usually reckoned ten in number, and including rocks, they amount to fourteen. The two largest are St. Jago or Yago in the south-east and St. Anthony in the north-west. Four of these islands are situated towards the east, *viz.* Santiago, Mayo, Bonavista, and Salt isle; four towards the north-west, *viz.* St. Nicholas, St. Lucia, St. Vincent, and St. Anthony; and two are somewhat detached towards the south, *viz.* Brava and Fuego. (See each island respectively.) These islands are generally mountainous; some of them are barren and uninhabited; others are productive of rice, bananas, oranges, cotton, and sugar; and it is said the goats produce thrice a year, and the vines twice; they abound with poultry and rabbits, and turtles are plentiful on the shores. The air is hot and insalubrious, rain being very rare; but a north-east breeze commonly rises before four in the afternoon. The manufacture of leather and salt constitute the chief riches. Many of them have been furnished by their proprietors with cows, goats, hogs, asses, mules, &c. These islands are situate about 390 miles W. of Cape Verd, and between 15° and 18° of N. lat.

VERDACHELON, a town of Hindoostan, in the Carnatic; 20 miles S.W. of Trivady.

VERDAPETTY, a town of Hindoostan, in the province of Madura; 22 miles S. of Madura.

VERDE, CAPE, a mountainous cape on the coast of Peru. S. lat. 6° 20'.—Also, a cape on the coast of Genoa. N. lat. 43° 50'. E. long. 7° 50'.

VERDE, or *Green Island*, an island on the north coast of South America, at the mouth of the river S. Marth.

VERDE Island, or *Verde Key*, one of the small Bahamas. N. lat. 22° 54'. W. long. 75° 26'.

VERDEGREASE, VERDIGREASE, *Verdegris*, or *Verdigris*, a kind of rust of copper, formed from the corrosion of copper by a fermented vegetable, and into a blueish-green substance, of great use among painters for a green colour.

The word is formed from the Latin, *viride aris*: it is also called *arugo*. Others call it the *flower*, and others the *vitriolic salt of copper*; though, in reality, it is rather the proper substance of the metal.

The greatest quantities of verdigris have been manufactured at Montpellier, the wines of Languedoc being very proper for this preparation; and it has been exported thence in cakes, each weighing about twenty-five pounds. The following process for making it is described by M. Monet, of the Royal Society of Montpellier, and is published in the Memoirs of the Academy for the years 1750, and 1753. Vine-stalks, well dried in the sun, are steeped during eight days in strong wine, and afterwards drained. They are then put into earthen pots, and wine is poured upon them; the pots are carefully covered; the wine undergoes the acetous fermentation, which in summer is finished in seven or eight days, but requires longer time in winter, although the operation is always performed in cellars. When the fermentation is sufficiently advanced, which may be known by observing the inner surface of the lids of the pots, which during the process of the fermentation is continually wetted by the moisture of the rising vapours, the stalks are then to be taken out of the pots: these stalks are by this method impregnated with the acid of the wine, and the remaining liquor is but a very weak vinegar. The stalks are to be drained during some time in baskets, and layers of them are to be put into earthen pots with plates of Swedish copper, so disposed, that each plate shall rest upon and be covered with layers of stalks. The pots are to be covered with lids.

and the copper is thus exposed to the action of the vinegar, during three or four days, or more; in which time the plates become covered with verdigris. The plates are then to be taken out of the pots, and left in the cellar three or four days; at the end of which time they are to be moistened with water, or with the weak vinegar above-mentioned, and left to dry. When this moistening and drying of the plates have been thrice repeated, the verdigris will be found to have considerably increased in quantity, and it may be then scraped off for sale.

A solution or erosion of copper, and consequently a verdigris, may be prepared by employing ordinary vinegar instead of wine, as directed in the above process. But it will not have the unctuousity of ordinary verdigris, which is necessary in painting. Good verdigris must be prepared by means of a vinous acid or solvent, half acid and half spirituous. Accordingly, the success of the operation depends chiefly on the degree of fermentation to which the wine employed has been carried; for this fermentation must not have been so far advanced, that no sensibly vinous or spirituous part remained in the liquor. Macquer's Dict. Chem. See the process as described by Chaptal, under the article COPPER.

The Society of Arts, &c. offered a premium in 1756 for the making of verdigris in England; and in 1760 intimated, that it might be made by moistening with the cheapest and worst sort of cyder, the marc or remains of apples, pears, gooseberries, currants, sloes, crabs, blackberries, or any fruits deprived of their juice by expression, proceeding afterwards by the process above described. The premiums offered by the Society were several times claimed and allowed; and it was resolved, in 1763, that verdigris actually made of British materials, and submitted to various trials, was even superior to the foreign. Accordingly, a considerable manufactory was established, and successfully carried on for the purpose of making verdigris.

The goodness of verdigris is judged of from the deepness and brightness of its colour, its dryness, and its forming, when rubbed on the hand with a little water or saliva, smooth paste, free from grittiness. This concrete is partially dissoluble in water and rectified spirit, and almost totally in vinegar; from the acetous solution, well saturated, and left to exhale slowly in a warm air, the greatest part of the verdigris may be recovered in a crystalline form, called *distilled verdigris*. See CRYSTALS of Venus, and COPPER.

The crystals, distilled with a suitable fire, in a retort or other like vessel, give over the acetous acid in a highly concentrated state, but somewhat altered by the process. See ACETIC Acid.

The matter which distilled vinegar leaves undissolved, on being mixed with some borax and linseed oil, and fluxed in a crucible, yields a brittle metallic substance, of a whitish colour, not unlike bell-metal. Neum. Chem. by Lewis, p. 64, n. a.

Verdigris is employed externally for detaching foul ulcers, and as an escharotic; but it is seldom used, though milder than the sulphate or blue vitriol. It is employed as a collyrium in chronic ophthalmia. Hoffman recommends it particularly for destroying the callosities of old fistulæ; tents of powdered verdigris, made up with saliva, or other liquids, not fat or oily, consume, he says, the hardest callus in three or four days, so as to render it completely separable. A detergent ointment, called *mel ægyptiacum*, is prepared by boiling five parts of verdigris in fine powder with sixteen of honey, and seven of vinegar, till reduced to a clear consistence. The thinner matter which floats on the top of

this mixture, after standing for some time, is generally used, unless it be required more acid; in which case, the thick part which has subsided is shook up among it.

In the Edinburgh dispensatory, an ointment, called *unguentum ex æruginè*, has been directed, composed of white wax and resin, each two ounces, olive oil one pint, and verdigris half an ounce. When these kinds of applications are employed for venereal or other ulcerations in the mouth or tonsils, great caution is necessary, lest they should pass into the stomach; in which case, dangerous and even fatal consequences may ensue.

Verdigris is rarely or never given internally. It has been reckoned tonic, and administered with this view in a dose under gr. fs. Some recommend it, in the dose of a grain or two, as an emetic, which produces almost instantaneous effect, where poisonous substances have been taken, for the immediate rejection of them. But warm water, milk, and oils, are much less dangerous, and more proper. In too large doses, it quickly proves fatal; and, on dissection, the coats of the stomach appear much thickened, and of a green colour. Lewis's Mat. Med.

M. Navier has lately evinced the salutary effects of liver of sulphur, and particularly of liver of sulphur of Mars, as an antidote against the poison of verdigris.

Verdigris makes a blue-green colour in paint; but is generally used in yellow, which, by a proper mixture, renders it a true green. It is bright when good; but soon flies, when used in oil. When dissolved in vinegar, it is used in water painting, and is more durable; it may be also dissolved in the juice of rue, and thus produces a fine full green colour, equally fit for washing with that dissolved in vinegar.

Verdigris, with a decoction of logwood, strikes a deep black, which, when diluted, becomes a fine blue. See DYEING.

VERDELLO, in *Natural History*, the name of a green marble used in Italy as a touchstone, for the trying of gold, &c.

VERDEN, in *Geography*, a town of Germany, and capital of a principality of the same name, on the Aller, which divides itself here into two branches, the smaller of which lies near the town, and is at present only frequented by the ships going up and down the Aller. In the town are four churches, and a Latin school; 56 miles S.S.W. of Hamburgh. N. lat. 52° 58'. E. long. 9° 15'.

VERDEN, a principality of Germany, bounded on the north and west by the duchy of Bremen, and on the east and south by the duchy of Lunenburg; about twenty-four miles in length, and nearly as much in breadth. This principality consists for the most part of heath and dry land, as also of forests; but on the rivers Weser and Aller is good marsh-land. The Aller waters almost all the southerly, but the Weser a part only of the westerly boundaries of the country. Verden was formerly a bishopric, founded by Charlemagne. At the peace of Westphalia, in the year 1648, the crown of Sweden obtained the bishopric as a duchy. In 1712, the Danes invading the duchy of Bremen, the inhabitants of Brunswick-Lunenburg possessed themselves of it. In 1715, by virtue of the alliance concluded at Wismar, it was ceded, together with Bremen, by the king of Denmark, to the electoral house of Brunswick-Lunenburg; such cession being also made again, in the year 1719, by the crown of Sweden. This duchy has the same regency with the duchy of Bremen. The inhabitants are Lutherans.

VERDERER, or VERDERON, formed from *viridarius*, which Ulpian used in the like signification, a judicial officer

officer of the king's forest, whose business is to look to the vert, and see it well maintained.

He is sworn to keep the affizes of the forest; as also to view, receive, and enrol, the attachments and presentments of all manner of trespasses, relating to vert and venison therein.

VERDERONNE, or LA BOURLARDERIE, in *Geography*, a small island in the gulf of St. Laurence, near the east coast of Cape Breton.

VERDESE, a town of the island of Corsica, in the district of Cervionne.

VERDETER. See VERDITER.

VERDETUM, the name of a green substance, used as a colour in painting. It is a very pure kind of verdigris, being an ærugo of copper, produced by the vapour of vinegar.

VERDI, in *Geography*, a small island in the Indian sea, near the west coast of Madagascar. S. lat. 14° 35'. E. long. 47° 50'.

VERDICT, from *vere dictum*, q. d. *dictum veritatis*, the *dictate of truth*, is the answer of the jury given to the court, concerning the matter of fact, in any cause, civil or criminal, committed by the court to their trial and examination. See JURY.

A verdict is either *privy* or *public*: a *privy* verdict is when the judge hath left or adjourned the court; and the jury, being agreed, in order to be delivered from their confinement, obtain leave to give their verdict privily to the judge out of court; which is of no force, unless afterwards affirmed by a public verdict given openly in court, in which the jury may, if they please, vary from their privy verdict. If, indeed, the judge hath adjourned the court to his own lodgings, and there receives the verdict, it is a public and not a privy verdict. In a criminal case, no privy verdict is allowed.

But the only effectual and legal verdict is the *public* verdict; in which they openly declare to have found the issue for the plaintiff, or for the defendant; and if for the plaintiff, they assess the damages also sustained by the plaintiff, in consequence of the injury upon which the action is brought. This is either *general* or *special*.

VERDICT, *General*, is that which is brought into the court, in like general terms as the general issue: as in action of disseisin, the defendant pleads, *no wrong, no disseisin*. Then the issue is general, whether the fact be wrong, or not: which being committed to the jury, they, upon consideration of the evidence, come in and say, either for the plaintiff, *That it is a wrong disseisin*; or for the defendant, *That it is no wrong, no disseisin*: and in criminal cases, *Guilty*, or *Not guilty*.

VERDICT, *Special*, is when they say at large, that such and such a thing they found to be done by the defendant, or tenant; declaring the course of the fact, as in their opinion it is proved; and as to the law, upon the fact, praying the judgment of the court.

The special verdict, if it contains any ample declaration of the cause from the beginning to the end, is called a *verdict at large*. This is grounded on the stat. Westm. II. 13 Edw. I. cap. 30. in order to avoid the danger of an *attaint*; which see. After stating the facts, they conclude conditionally, that if upon the whole matter the court shall be of opinion that the plaintiff had cause of action, they then find for the plaintiff; if otherwise, then for the defendant. This is entered at length on the record, and afterwards argued and determined in the court at Westminster, from whence the issue came to be tried. Another method of finding a special verdict is when the jury find a verdict

generally for the plaintiff, but subject, nevertheless, to the opinion of the judge, or the court above, on a *special* case. This is attended with much less expence, and obtains a speedier decision than the other. But as nothing appears upon the record but the general verdict, the parties are precluded hereby from the benefit of a writ of error, if dissatisfied with the judgment of the court or judge upon the point of law. Blackst. Com. book iii. See JURY.

VERDICT, *Attainder* by. See ATTAINDER.

VERDICT, *Falfe*. See ATTAINT.

VERDIER, ANTONY DU, in *Biography*, lord of Vauprivas, was born at Montbrison in Forez in the year 1544, and distinguished himself not only by his writings, but by encouraging literature, for which purpose he granted to men of letters the use of his well-furnished library. He was advanced to the office of historiographer of France, and having occupied the rank of gentleman in ordinary to the king, died in the year 1600. Of his numerous writings, the only work that has been noticed by posterity is his "Bibliotheque des Auteurs François." It was first printed at Lyons in 1585, fol. and again published, under the title of "Bibliotheque de la Croix du Maine," by De Juvigni at Paris, in 5 vols. 4to. 1772-3, with notes and corrections.

VERDIER, CLAUDE DU, the son of Antony, though a man of learning, gained little reputation by his Latin and French publications. Having mismanaged a good estate transmitted to him from his father, he passed the latter part of his life in obscurity, and died in 1649, aged above 80. Moreri.

VERDISTAN, CAPE, in *Geography*. (See Cape BAR-DISTAN.) This cape is a land-mark which ships generally look out for in their passage up the Persian gulf. There is a dangerous shoal, which extends a considerable way to sea, and those are fortunate who pass by this place without meeting with a gale of wind. Here they manufacture an excellent kind of cloth, which is much worn by the Arabs. On this coast lies Congon or Kungoon, a large and populous town, which carries on a considerable trade with the gulf, and also with the inland country. The Portuguese had once a considerable settlement here. Between this and Tahire or Tahirea there is another town of some note, called Toombuch, and also the villages of Shilee (Sheeloo), Burg, and Ynat.

VERDITER, VERDETER, a kind of mineral substance sometimes used by the painters, &c. for a blue, but more usually mixed with a yellow for a green colour. See TERRE-VERTE.

Verditer, according to Savary, ought to be made of the lapis Armenus; or, at least, of an earthy substance much like it, brought from the mountains of Hungary, &c. only prepared by powdering it, and cleansing it by lotion.

But this stone and earth are very rare; and the verditer used is not a native, but a factitious substance, or blue pigment, obtained by adding chalk or whiting to the solution of copper in aquafortis. (See COPPER.) It is prepared by refiners of silver, who employ for this purpose the solution of copper, which they obtain in the process of parting, by precipitating silver from aquafortis with plates of copper. It is said, that a fine-coloured verditer cannot be obtained from a solution of copper prepared by dissolving directly that metal in aquafortis; and that the silver is necessary. According to Dr. Merret's account of the method of preparing it, a quantity of whiting is put into a tub, the copper solution poured on it, and the mixture stirred every day for some hours together, till the liquor loses its colour. The liquor is then poured off, and more of the solution

of copper added; and this is to be repeated till the matter appears of the proper colour; after which it is spread on large pieces of chalk, and laid in the sun to dry. Boyle observes, that the process often miscarried, and that heating the liquor, before it is poured on the whiting, has been found to contribute to its success. It is still, however, Dr. Lewis says, very apt to fail in the hands of the most skilful workmen; the preparation, instead of a fine blue, turning out of a dirty green.

From the liquor poured off in making verditer, Mr. Boyle says (*Works Abr.* vol. i. p. 169.), that the refiners obtain, by boiling, a kind of saltpetre, fit with the addition of vitriol to yield them a new aquafortis. Some have said that a deeper and brighter kind of verditer may be made by using a filtered solution of pearl-ashes instead of the chalk, in the above process.

Verditer, when good, is a cool full blue, but without the least transparency either in oil or water. In oil it is subject to turn greenish, and sometimes black; and in water it is not always found to hold. It is chiefly used for paper-hangings and coarse work, and in varnish.

VERDON, or FORDON, in *Geography*, a town of Prussian Pomerelia; 60 miles S. of Dantzic.

VERDON, a river of France, which runs into the Durance, at Pertuis, in the department of the Mouths of the Rhône.

VERDONE, in *Ichthyology*, the name of a fish of the turdus or wrasse kind, called by some authors *turdus viridis minor*. See TURDUS and LABRUS.

It is of a fine green colour in all parts of its body; the back, sides, and belly, have all plainly the same colour; but in different degrees: the back being of the deepest dye; the belly has something of yellowness with the green, and the sides are variegated with lines of a fine blue. It has only one long fin on the back, which has thirty rays or ribs, the eighteen foremost of which are rigid and prickly, the others soft and flexible. It is caught in the Mediterranean, and sold in the markets in Italy. *Salvian de Aquat.* p. 88.

VERDOY, in *Heraldry*, is applied to a bordure of a coat of arms, charged with any kinds or parts of flowers, fruits, seeds, plants, &c. Of these there are eight in number.

VERDUN, in *Geography*, a town of France, and principal place of a district, in the department of the Meuse. Before the revolution the capital of a province, called *Verdunois*, and the see of a bishop, suffragan of Treves. It is large, populous, and consists of three parts, the Upper, Lower, and New Town. Exclusive of its fortifications, this place is farther defended by a fine citadel. The bishop, before the city and district were annexed to the crown of France, was a prince of the empire, and afterwards styled himself such, as also earl of Verdun. Exclusive of the cathedral in this city, are one collegiate and nine parish churches, six abbeys, and one college. Verdun was formerly an imperial city; 33 miles N.W. of Toul. N. lat. 49° 9'. E. long. 5° 27'.—Also, a town of Spain, in Aragon; 15 miles W. of Jaca.—Also, a town of France, in the department of the Aude; 6 miles N.E. of Castelnaudary.

VERDUN-*sur-Garonne*, a town of France, in the department of the Upper Garonne; 12 miles S.S.E. of Castel-Sarasin.

VERDUN-*sur-Saône*, a town of France, in the department of the Saône and Loire, situated at the conflux of the Saône and the Doubs; 9 miles N.E. of Châlons-*sur-Saône*. N. lat. 46° 54'. E. long. 5° 7'.

VERDURE, the quality of greenness. The word is French, formed of *verd*, green.

VERE, Sir FRANCIS, in *Biography*, an English officer in the reign of queen Elizabeth, was a descendant from a branch of the De Veres, earls of Oxford, and born in 1554. Being sent with a body of troops, under the command of the earl of Leicester, to the assistance of the United Provinces in 1585, he distinguished himself first in the defence of Sluys, and in 1588 at Bergen-op-Zoom by resisting the arms of the duke of Parma. For his services on this occasion he obtained the honour of knighthood, and was employed on many subsequent occasions, in which he gained signal reputation, inasmuch that he was at length entrusted with the command of the English forces serving with the States. When these forces were withdrawn in the year 1592, Sir F. Vere was chosen representative for the borough of Leominster. In 1596 he successfully executed a commission with which he was entrusted to the States, and on his return obtained the command of a ship, with the rank of vice-admiral. In the expedition against Cadiz, he acquitted himself with skill and courage, and was principally instrumental in the capture of the town. On his return from an expedition with the earl of Essex to the Azores, he was appointed governor of Brill, one of the towns assigned to queen Elizabeth as security for money advanced to the States. At the battle of Nieuport, in 1600, his conduct, and the valour of the English whom he commanded, contributed very essentially to the success of the day, though the loss of lives was considerable, and Vere himself received a wound, which he concealed till victory was secured. The States, duly apprized of his merit, appointed him, in 1601, governor of Ostend, which was besieged by a powerful army under the command of archduke Albert. By means of artifices which some have thought incompatible with the character of a generous soldier, he prolonged the siege, and deferred a surrender by negotiation, till he obtained a reinforcement of troops, and then informed Albert that the treaty was at an end. The prince was indignant, nor were the States pleased with the fraud. This circumstance probably occasioned his resignation of the command at Ostend; but being solicited by the States to procure fresh supplies of men from his own country, he succeeded in obtaining them. His government of the Brill, which expired with the death of Elizabeth, was renewed by James I.; but his peace with Spain in 1604 terminated the occupation of military men. Sir Francis was also governor of Portsmouth, and remained at home till his death, in 1608, the 54th year of his age. A splendid monument was erected to his memory in Westminster Abbey by his widow. His exploits have been recorded by himself, in a work entitled "The Commentaries of Sir Francis Vere, being diverse Pieces of Service wherein he had Command, written by Himself in way of Commentary," published from his MSS. by William Dillingham, D.D. fol. Cambridge, 1657.

VERE, HORACE, baron of Tilbury, younger brother of the preceding, whom he accompanied in many of his actions in the Low Countries, and distinguished himself on several occasions. He succeeded his brother in the government of Brill, and held it till the year 1616, when it was restored to the States. Although he was entrusted, in 1620, by king James with a tardy and scanty aid to his son-in-law the king of Bohemia, he contributed for some time to preserve the Palatinate from being overrun by the Imperialists; and at last surrendered on honourable terms to Tilly at Manheim. On the accession of Charles I. he was the first peer created by the king, under the title of lord Vere of Tilbury. Retaining the post of general of the forces in

the service of the States-general, he was appointed master of the ordnance in 1629; but retired from public employment some short time before his death, which was occasioned in 1635, in the 70th year of his age, by an apoplectic fit. Lord Vere, no less skilful and brave than his brother as a commander, was of a milder and more modest temper. Biog. Brit.

VERE, in *Geography*, a river of England, in the county of Herts, which runs into the Coln, 2 miles S.E. of St. Albans.—Also, a county or parish on the south side of the island of Jamaica.

VERE, *Cape*, a cape on the W. coast of Calabria. N. lat. $39^{\circ} 20'$. E. long. $16^{\circ} 10'$.

VEREA, in *Botany*, for so it ought to be written, not *Vereia*, was thus named by Mr. Andrews, in compliment to James Vere, esq. F.L.S. of Kensington Gore, whose garden has long been celebrated among the richest, and best cultivated, in the neighbourhood of London.—Andr. Repof. t. 21. Willd. v. 2. 471.—We regret that this memorial of our amiable and liberal friend cannot be preserved. This supposed genus is merely a *Cotyledon*, with four-cleft octandrous flowers, of which several are known, (see *COTYLEDON*,) nor can they, on any sound principle, be separated therefrom.

The *Verea crenata* is *Cotyledon crenata*, Venten. Malmaif. t. 49. Ait. Hort. Kew. v. 3. 110. Leaves crossing each other in pairs, ovate, obtuse, crenate, fleshy. Flowers four-cleft, erect, in cymose panicles.—Native of Sierra Leone; kept in the dry stove or tan-bed, where it flowers in summer and autumn. The stem is shrubby. Leaves green, large and handsome, very juicy. Flowers an inch long, yellow, with a green tube and orange mouth.

VERELIUS, OLOF, in *Biography*, a Swedish antiquary and librarian in the academy of Upsal, was the son of a clergyman of East Gothland, where he was born in the year 1618. Having commenced his education in the gymnasium at Linköping, he pursued it for five years at the academy of Dorpt, and in 1638 removed to Upsal. Soon after he became tutor to some young Swedish gentlemen, whom he accompanied in their travels through various parts of Europe, and on his return in 1650, he was, by favour of the queen, appointed professor of eloquence at Dorpt in 1651, and in 1653 became treasurer to the academy of Upsal. In 1662 he was appointed professor of the antiquities of his native country, and in 1666 antiquary of the kingdom. He was in the same year nominated assessor in the college of antiquities, and died at Upsal in 1682. He was a good Latin scholar, and well skilled in Swedish antiquities, so that some of his countrymen honoured him with the appellation of “*Patris Eloquentiæ, et Filium Ariadnæum Antiquitatum Patriæ.*” He was a zealous advocate for the ancient origin of the Swedes, inasmuch as to contend that the Goths who took Rome issued from Sweden, and to assert, “that those who deny their antiquity ought to have their brains knocked out with Runic stones.” His dispute with professor Schæffer, concerning the former situation and name of the town and temple of Upsal, produced a number of publications. Among his other principal works are, “*Gothrici et Rolfi, Vestro-Gothiæ Regum, Historia lingua antiqua Gothica conscripta, quam è Manuscripto vetustissimo edidit, Versione et Notis illustravit.*” Upsal 1664, 8vo. and several publications relating to Gothic literature and Swedish history. Gen. Biog.

VERELLA, CAPE, in *Geography*, a cape on the E. coast of Cochinchina. N. lat. $12^{\circ} 55'$. E. long. $109^{\circ} 18'$.

VERELLA, *Cape, False*, a cape on the S.E. coast of Cochinchina. N. lat. $11^{\circ} 45'$. E. long. $109^{\circ} 4'$.

VERELST, SIMON, in *Biography*, was born at Antwerp

in 1604, and became an admirable painter of fruit and flowers. He came to England in the time of Charles II. and obtained very considerable practice; and not only in those matters for which his talents admirably qualified him, but also in portraits for which he was not qualified. His vanity was at least equal to his abilities as an artist, and having been employed and laughed at till he was 47 years of age, death then kindly removed him from any further opportunity of exposing himself.

VERERIA, in *Geography*, a town of Russia, in the government of Moscow; 56 miles W.S.W. of Moscow. N. lat. $55^{\circ} 18'$. E. long. $35^{\circ} 50'$.

VERES, a town of Russia, in the government of Archangel; 80 miles N.N.W. of Kola.

VERESMAN, a town of Hungary; 12 miles E. of Munkacz.

VERETUM, in *Ancient Geography*, a town of Italy, in Messapia, on the confines of the country of the Selentini, according to Strabo, who says that it was anciently called Baris.

VERFEIL, in *Geography*, a town of France, in the department of the Upper Garonne; 11 miles E.N.E. of Toulouse.

VERGA, CAPE, a cape on the W. coast of Africa. N. lat. $10^{\circ} 4'$. W. long. $13^{\circ} 40'$.

VERGADELLE, in *Ichthyology*, the name of a fish of the mullet kind, called by others the *chelon*, remarkable for the thickness of its lips.

VERGÆ, in *Ancient Geography*, a town of Italy, in Brutium.

VERGANTINAS, in *Geography*, a town of Spain, in Galicia; 20 miles S.W. of Corunna.

VERGARA, or VARGARA, a town of Spain, in Guipuscoa; 7 miles S. of Tolosa.

VERGAVILLE, a town of France, in the department of the Meurte; 4 miles N.W. of Dieuze.

VERGE, VIRGA, a rod, switch, or yard; particularly a stick or wand, which persons are admitted tenants by holding in their hand, and swearing fealty to the lord of the manor.

On this account, they are called *tenants by the verge*.

VERGE, among *Gardeners*, generally denotes the edge or outside of a border; but more particularly, is used for a slip of grass adjoining to gravel-walks, and dividing them from the borders in the parterre-garden.

VERGE, *Dented*. See DENTED.

VERGE is also used for the compass or extent of the king's court; within which is bounded the jurisdiction of the lord steward of the king's household.

It is thus called, from the verge or staff which the marshal bears. It was anciently denominated *pax regis*, or the king's peace.

The lord steward, by virtue of his office, without any commission, judges of all transgressions, as treasons, murders, felonies, bloodshed, &c. committed in the court, or within the verge of it; which extends, every way, by 13 Ric. II. stat. 1. cap. 3. (in affirmance of the common law) for twelve miles round the king's place of residence; only London, by charter, being exempted.

VERGE, *Court of*. See COURT.

VERGE of Land, *Virga Terre*. See YARD-Land.

VERGELLUS, in *Ancient Geography*, a torrent or river of Italy, in Apulia, near the place in which was fought the battle of Cannæ. This river was rendered famous by a bridge made here for the passage of the army.

VERGENNES, in *Geography*, a post-town of America, and one of the most flourishing commercial towns of Vermont,

mont, in Addison county, on Otter creek, about six miles from its mouth in lake Champlain. It contains a congregational church and a gaol, and 835 inhabitants. In its vicinity are several mills; 115 miles N. of Bennington, and 519 from Washington.

VERGENTUM, in *Ancient Geography*, a town of Spain, in Bœtica.

VERGER DE HAURANE, JOHN DU, abbot of St. Cyran, in *Biography*, was the descendant of a noble family, and born at Bayonne in 1581. After having enjoyed some inferior preferments he removed to Paris, and in 1620 became abbot of St. Cyran. He was distinguished as a zealous defender and propagator of Jansenism; and under this character gained a great number of partisans. But being suspected of holding several erroneous doctrines, and of contemning the authority of the church, he was denounced as a dangerous person to cardinal Richelieu, who caused him to be imprisoned at Vincennes in 1638, in which state of confinement he remained till the death of the cardinal; and soon after his liberation, he died at Paris in 1643, aged sixty-two. As a champion in the cause of the Jansenists against the Jesuits, the abbot wrote several works, which were evidences of his zeal and diligence rather than of his judgment and ability. Although these works were held at the time of their publication in high estimation, they are now forgotten, as well as the controversy that occasioned most of them; and it is therefore needless to enumerate them. Moreri.

VERGERIO, PIER-PAOLO, the elder, a reviver of literature, was born about the year 1349 at Justinopolis, now Capo d'Istria. Having studied at Padua and Florence, he passed some years in different towns of Italy, particularly at Padua, where he officiated as professor of dialectics; and he studied Greek at Venice, under the celebrated Emanuel Chrysoloras. At Padua he took the degree of doctor of laws in 1404, till which mature period of his life his condition bordered on that of indigence. From Padua, where he was attached to the interests of the princes of Carrara, he removed to Venice, and afterwards accompanied his friend Zabarella, when he became cardinal, to the council of Constance. Having lost this patron in 1417, he is said to have sunk into a state of mental derangement, and to have died in Hungary, about the time of the council of Basil, which commenced in 1431. His works caused him to be ranked among the most successful cultivators of literature at that period. His "History of the Princes of the House of Carrara, from its Origin to the Year 1355," composed in Latin that was deemed elegant in that age, has been published in Muratori's Collection of Italian Historians. His treatise "De ingenii Moribus et liberalibus Adolescentiæ studiis," addressed to one of the princes of Carrara, was very popular at the time of its publication. He also wrote "A Life of Petrarch," published in the "Petrarcha Redivivus" of Tommasini, and an eulogy of St. Jerom; and he left several manuscripts. Moreri.

VERGERIO, PIER-PAOLO, the younger, one of the few prelates converted from popery, belonging to the same family with the subject of the preceding article, was born about the beginning of the 16th century at Capo d'Istria; and having studied the law at Padua, and graduated, he became, in 1522, professor of the notary's art in that university. At Padua and at Venice he maintained the character of an able orator, as well as that of a man of good morals. The charges brought against him by an enemy, and particularly that of poisoning his wife, have been sufficiently refuted. From Venice, where he resided in 1530, he went to Rome, and being introduced to pope Clement VII., was sent by him as nuncio to Ferdinand, king of the Romans, pro-

bably about the close of the year 1532. On this occasion he used all his efforts in support of the papal see, and for the purpose of restraining the progress of Lutheranism. Paul III. recalled him from this embassy, but afterwards deputed him on the same mission, which gave him an opportunity of holding several conferences with Protestant princes, and of an interview with Luther himself at Wittenberg. In 1536 he was sent by the same pope to Charles V. in Naples, and for his services to the church he was made a bishop of his native city. From thence he returned to Germany, and was one of the commissioners who drew up the indictment of the council. At the close of the year 1540 he attended the conference at Worms, as a deputy from the king of France. However, before this time he was suspected by the court at Rome of a secret attachment to Lutheranism, but he still contrived to keep up appearances. Upon his subsequent retirement to his diocese, whilst, as it is said, he was preparing a confutation of the German Separatists, he became convinced that they were right; and having communicated his sentiments to his brother, bishop of Pola, he adopted the same opinions; and they both resolved to propagate them in their respective dioceses. The monks were alarmed, and reported them to the inquisition. Vergerio, after having in vain sought an asylum, determined in 1546 to justify himself before the council of Trent. The council referred his cause to the nuncio and patriarch of Venice. But the consideration of it being protracted to the year 1548, he was ordered not to return to his church; and he soon after withdrew to the country of the Grisons, where, as well as in the Valteline, he for some years exercised his ministry. His brother died before he left Italy. The younger Vergerio, having received an invitation to Tubingen from the duke of Wirtemberg, died there in 1565. His works, written in the Italian language, were numerous; and their principal object was to expose the impostures and absurdities of popery. Its advocates were of course much incensed, and circulated against the author many malignant, and probably unfounded, reports. Some Protestant writers have represented him as unsteady, and little acquainted with theological subjects. Bayle.

VERGERS, VIRGATORES, *Servientes*, are officers who carry white wands before the justices of either bench; called also, *porters of the verge*.

VERGERS of cathedral or collegiate Churches, are inferior officers, who go before the bishop, dean, &c. with a verge, or rod tipped with silver.

VERGES, in *Geography*, a town of Spain, in Catalonia; 10 miles E. of Gerona.

VERGIER, JAMES, in *Biography*, a French poet, was born at Lyons in 1657, and educated at Paris with a view to the ecclesiastical profession; but he soon laid aside the clerical habit and became a man of the world. He recommended himself to those whose society he frequented by his gaiety and polished manner, and in 1690 he obtained the post of secretary of marine, and afterwards that of president of the council of commerce at Dunkirk. But his love of pleasure, combined with indolence, prevented his acquiring the character of a man of business. His career of pleasure was terminated at Paris in 1720, by the pistol of a robber, at the age of 63. Rousseau characterises him as a *philosopher*, formed for society, without any mixture of gall or misanthropy, and extols the noble and elegant simplicity of his convivial songs, which entitles him to the appellation of the French Anacreon. In his other productions, such as odes, madrigals, sonnets, epigrams, tales, fables, epistles, &c. it is acknowledged that his style is negligent, and occasionally profane. "Vergier," says Voltaire, "is with regard

gard to La Fontaine, what Campiftron is with regard to Racine, a feeble but natural imitator." His poems were collected in 2 vols. 12mo. 1750. Moreri. Gen. Biog.

VERGILIA, MURCIA, in *Ancient Geography*, a town in the S.W. part of Hispania Citerior.

VERGILIÆ, a constellation, whose appearance denotes the approach of the spring.

According to the poets, the Vergiliæ were the daughters of Atlas; and by the Greeks, were called Pleiades: but the Romans named them Vergiliæ.

VERGILIO, POLYDORO, in *Biography*, an historian, was born at Urbino in the 15th century, and became first known to the learned by a Latin collection of proverbs, preceding that of Erasmus and the occasion of some bickering between them. It was first printed in 1498, and frequently republished. In the following year appeared his work "De Rerum Inventoribus," a very learned performance, but destitute of found criticism, and exhibiting many evidences of the credulity of the author. About the commencement of the following century, pope Alexander VI. deputed him on a commission to England, for the purpose of collecting the papal tribute called Peter-pence. As he was admired in this country for his learning and Latin style, he was promoted to the archdeaconry of Wells, and engaged by Henry VII. to write a history of England. This work was begun in 1505, and printed at Basil in 1548, with a dedication to Henry VIII. Enjoying in this country the preferments of prebend and archdeacon, he wished to continue it, notwithstanding the changes of religion that had occurred, and the cessation of his office as collector of a tax that no longer subsisted; more especially as he evinced himself, by his approbation of the marriage of the clergy and his condemnation of the worship of images, to be no strict Catholic. He had likewise introduced into his treatise "De Inventoribus," some passages which the Inquisition expunged, and reflected on the pride of the clergy, by suggesting that St. Peter would not suffer Cornelius the centurion to kiss his feet. He ventured, however, in 1550, being in advanced life, to return to his own country for the benefit of a warmer climate. His English benefices were continued till his death, which happened at Urbino about the year 1555. Of his history of England, contained in twenty-six books, and extending to the reign of Henry VIII. it is sufficient to observe, that its style is clear and elegant, but that the matter of it has been censured by various writers. Sir Henry Savile says, that as Polydore was an Italian, little acquainted with public business, possessing no great degree of genius or judgment, and for the most part taking falsehood instead of truth, he has left us a history full of errors, as well as poorly and jejune written. Our antiquaries also have severely treated him, on account of the contempt which he has expressed for the fables of Geoffrey of Monmouth, and other legendary narrations. He has been represented on the one hand as a columniator of our country and an enemy to its glory; whilst, on the other hand, the French and Scotch have accused him of partiality to England in those instances with regard to which their transactions have been blended with its history. Besides, it is said that he destroyed many MSS. with which he was intrusted, in order to prevent a detection of his errors; but Tiraboschi considers this as a tale which no man of sense can credit. By others it has been reported, that he sent off a whole ship-load of MSS. to Rome. Both these stories are destitute of proof. Polydore also published, in 1526, a book "De Prodigis," in which he strongly contends against the divinations of the ancients. Vossius. Tiraboschi. Nicolson's Hist. Lib. Gen. Biog.

VERGINE, in *Geography*, a mountain of Naples, in Lavora; 7 miles E. of Nola.

VERGIVIVS OCEANUS, in *Ancient Geography*, a name given by Ptolemy to that part of the sea which bathed the southern coast of Hibernia, and the western provinces of the isle of Albion. It is now called St. George's channel and the Irish sea.

VERGNE, LOUIS-ELIZABETH DE LA, Comte de Tressan, in *Biography*, a French miscellaneous writer, was born of a noble family at Mans in 1705. Introduced at Paris, when young, to an acquaintance with Fontenelle, Voltaire, and others, he imbibed a taste for polite literature. But devoted also to military service in common with other persons of his rank, he attended Louis XIV. in the campaigns of Flanders, on occasion of the war in 1741, and became his aid-de-camp at the battle of Fontenoy. Having risen to the rank of lieutenant-general, he withdrew upon the peace to the court of king Stanislaus at Luneville, which he contributed to adorn and enliven by his agreeable and sprightly talents. The king's Jesuit-confessor, dreading his influence, accused him of the crime of philosophy. When Stanislaus preferred this charge against him, he replied, "I request your majesty to recollect, that there were 3000 monks at the procession of the League, and not one philosopher." After the death of Stanislaus, the count lived in solitude, and employed himself as an author. In his youth he had penned some epigrams, which are thought to have prevented his obtaining admission into the French academy till his 75th year, an honour of which he was ambitious, and which gratified him much, though he did not long live to enjoy it; for he died of the gout, to which he had been much addicted, in the year 1782, at the age of 77. His love and talent for poetry were retained to the close of life. Several of his works, which were numerous, are romances, or compositions of that class, either original or altered from those of other authors. A posthumous work of different character is entitled "An Essay on the Electric Fluid, considered as an Universal Agent," in 2 vols. 8vo. A collection of his works was published in 1731, in 12 vols. 8vo. Nouv. Dict. Hist.

VERGOBRETS, a name given to magistrates in certain provinces of Gaul, who were like the archons of Athens, but only with an annual power.

VERGORAZ, in *Geography*, a town of Dalmatia, situated at the foot of some mountains which separate the dominions of Venice (now Italy) from those of the grand signior. It was formerly rich and flourishing, but is now a poor place; 20 miles E. of Narenta.

VERGUNNI, in *Ancient Geography*, a people of the Maritime Alps, S. of the Veamini.

VERGUTTUM, in *Geography*, a town of Hindooftan, in the circar of Cicacole; 20 miles N.N.W. of Cicacole.

VERGY, a town of France, in the department of the Côte d'Or; 10 miles S.S.W. of Dijon.

VERHEYEN, PHILIP, in *Biography*, an eminent anatomist and physician, was born in 1648 at Vesbrouck, in the country of Waes, and having been noticed by the rector of the parish, was instructed by him in the rudiments of Latin, and in his 24th year, sent to commence a course of classical education at Louvain. His diligence amply compensated for loss of time; and having assumed the clerical habit, he devoted himself to the study of theology. But his views were changed by an amputation of his leg, occasioned by an inflammation; and he substituted medical pursuits for those of divinity. These he followed at Louvain and Leyden, and taking his degrees at the former place, he there fixed his residence. In 1689 he was nominated professor of

anatomy in the university, to which was annexed that of surgery in 1693. His application was indefatigable, so that he attained to distinguished eminence, and attached to his school a great number of disciples. His celebrity was principally the result of a work, entitled "Anatomia Corporis Humani," published in 1693, frequently reprinted with corrections and additions, and enlarged in 1710 with a supplement, forming a second book. As a classical compendium of the science, it succeeded, for general use, that of Bartholine. Notwithstanding its imperfections and errors, it was entitled to the reputation which it acquired. Verheyen was also the author of a Compendium of the Theory and Practice of Medicine; of a Treatise on Fevers; and of the History of a miraculous Cure of a Jesuit by the Intercession of St. Francis Xavier, which latter work sufficiently evinces the superstitious credulity of the Netherland Catholics. Haller. Eloy.

VERIA, or BERIA, in *Geography*, a town of Spain, in Grenada, anciently Baria, near the coast of the Mediterranean; 16 miles E. of Motril.

VERIA, or *Cara Veria*, a town of European Turkey, in Macedonia; 48 miles W. of Salonichi. N. lat. $40^{\circ} 43'$. E. long. $21^{\circ} 58'$.

VERIFICATION, the act of proving, or making a thing appear true.

In the French law, *verifying* is used for the recording of the king's edicts and decrees by the parliament.

VERIFICATIONE RELICTA. See RELICTA.

VERIMUNGALUM, in *Geography*, a town of Hindoo-stan, in the province of Tinevelly; 20 miles S.S.E. of Palamcotta.

VERIN, a town of Spain, in Galicia; 20 miles S.E. of Orense.

VERISA, in *Ancient Geography*, a town of Asia, in the Lesser Armenia; situated on the route from Tavia to Sebasta, between Sebastapolis and Phiarasis. Anton. Itin.

VERISIMILITUDE. See PROBABILITY.

VERITH, in *Ichthyology*, a name given by Ifidore to the fish commonly called by authors *thrissa*; by us, the *shad*, or the mother of the herrings.

VERJUICE, a juice or liquor drawn from four grapes, or wild apples, unfit for wine, or cyder; or from sweet ones, while yet acid, or unripe.

Its chief use is in sauces, ragouts, &c. though it is also an ingredient in some medicinal compositions; and is used by the wax-chandlers to purify their wax. It is also very useful for forming poultices with, which are used in the swellings of animals, or for bathing the bruised and other parts of them with in different cases.

It has its name from a large sort of grape, called *verjus*, or *bourdela*; which is said never to grow perfectly ripe; or rather, which in its utmost maturity is too austere and sour to be used in wine; whence it is commonly turned into verjuice; though in France all unripe grapes are denominated *verjus*.

There is also tolerable verjuice made of crabs, gathered, and laid in an heap to sweat, the stalks, &c. separated; they are then stamped, or ground, and the crab mash put in a hair bag; the juice squeezed in a press, then barrelled up close, and set in a warm place to work for ten or twelve days.

Verjuice made for sale shall pay the same duty as cyder or perry.

VERIXA, in *Geography*, a town of Asiatic Turkey, in the government of Mosul; 15 miles N.W. of Naufa.

VERKENS VISCH, in *Ichthyology*, the Dutch name of a fish caught in the East Indies. It is about seven inches long, of a blackish-green colour, with fins and tail wholly black, and with yellow irises to the eyes. It is caught in fresh waters in the East Indies, and is a very delicate fish. It is very nearly related to the capriscus, or goat-fish, if not the same species.

VERLUCIO, in *Ancient Geography*, a place of Britain, in the fourteenth route of Antonine, between Aquæ Solis or Bath, and Cunelio or Marlborough. It is placed by Dr. Gale at Westbury, and by Dr. Stukeley at Hedington; but Mr. Horsley, following the route of the military way from Bath to Marlborough, and the distances from both these places, thinks it more probable that it was situated near Leckham, or at Silverfield near Lacock, where great quantities of Roman money have been found.

VERMAND, in *Geography*, a town of France, in the department of the Aisne. Before the revolution, the capital of a district in Picardy, called Vermandois; 6 miles W. of St. Quentin.

VERMANTES, a town of France, in the department of the Indre and Loire; 6 miles N.W. of Bourgeuil.

VERMANTON, a town of France, in the department of the Yonne; 12 miles N.W. of Avalon.

VERMANTREE, one of the smaller Shetland islands. N. lat. $60^{\circ} 27'$. W. long. $1^{\circ} 55'$.

VERMEJO, or RIO GRAND, a river of South America, which rises near Cafabindo, in the province of Tucuman, and runs into the Parana, near its union with the Paraguay, opposite Corrientes.

VERMEJO. See BERMEJO.

VERMELHO, in *Ichthyology*, the name of an American fish, more usually known by the name of the *puadiano*.

University of California
SOUTHERN REGIONAL LIBRARY FACILITY
405 Hilgard Avenue, Los Angeles, CA 90024-1388
Return this material to the library
from which it was borrowed.

--	--

AE 5. R25 1819 36

UC SOUTHERN REGIONAL LIBRARY FACILITY



D 000 342 553 5



